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Going Dutch: How the Netherlands Escaped its Golden Fetters, 1925-1936

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Going Dutch: monetary policy in the Netherlands during the interwar gold standard, 1925–1936

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Our study of the day-to-day management of monetary policy in the Netherlands between 1925 and 1936 reveals that policy leaders and central bankers were both willing and able to deviate from the monetary policy paths set by other countries, all while remaining firmly within the gold bloc. The Netherlands wielded an independent monetary policy while remaining on gold thanks to its central bank's plentiful gold reserves. Central bankers quelled any speculation against the guilder by exploiting their domestic policy influence and international reputation to restrict capital mobility. However, maintaining pre-war parity until the collapse of the gold standard in September 1936 came at a cost. Our international comparisons and counterfactual analysis suggest that Dutch officials would have avoided a deepening the Great Depression by leaving gold alongside the UK in 1931.

Keywords: fixed exchange rates, policy trilemma, monetary policy management, independent monetary policy, capital controls, interwar gold standard, the Netherlands.

JEL classification: E42, E52, E58, F33, N14, N20.

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‘Nothing disturbs confidence as much as monetary experiments.’

Leonardus Trip, president of De Nederlandsche Bank, interviewed in the wake of Belgium’s devaluation
(authors’ translation, *De Locomotief*, 5 February 1935).

I

While countries were rapidly abandoning the gold standard in the early 1930s, a succession of Dutch governments remained fixated on preserving the fixed guilder-gold exchange rate. They saw the continued adherence to the gold standard in almost religious terms, and their belief in the stabilising power of gold remained unchecked because they were able to exploit domestic political institutions to pacify any opposition to their policy stance. This context left those tasked with implementing monetary policy – principally the Netherlands’ central bankers working at De Nederlandsche Bank (henceforth referred to as DNB) – with the gargantuan task of maintaining the status quo while the status was decidedly no longer quo. We ask: *how* were Dutch central bankers able to remain on the gold standard all the way until its collapse in September 1936?

The current consensus is that the gold standard limited the degrees of freedom available policymakers by tying their economy’s fate to their currency’s fixed exchange rate – referred to as “golden fetters” (Eichengreen, 1992; Eichengreen and Temin, 2013). Our analysis of the Dutch case is consistent with this view. But we also show how the interwar gold standard had sufficient in-built flexibility for policymakers to “go Dutch” and “bend” the rules – which augments the view (due to Bordo and Kydland, 1995) that the gold standard represented a policy rule that only offered flexibility when it was temporarily suspended with a credible commitment of reinstatement. Instead, our analysis demonstrates that the gold standard rule was not a binding constraint for the Netherlands; this small open economy enjoyed sufficient autonomy to execute policies designed to ensure continued financial and exchange rate stability, all while remaining firmly within the gold bloc. This finding is closest to Bazot et al. (2016, 2019) – and Nurkse (1944) before them – who document ways in which policymakers could “massage” the gold standard from inside the system.

How did this flexibility-within-the-rules manifest itself? Following the UK’s decision to devalue sterling, we document that the Netherlands’ central bankers were able to drive their policy rate away from the most important international policy rates by employing a sophisticated suite of policy measures that together limited capital mobility. We conclude DNB officials were willing, and crucially also able, to use practically any means necessary to remain on gold. We then calculate the cost of DNB’s policy prowess: the degree to which the Dutch economy underperformed.

We contribute to the literature on fixed exchange rate regimes in three ways. First, our analysis constitutes an exploratory case study as we describe the full policymaking process through to its operationalisation by drawing both quantitative and qualitative sources. Second, our analysis is a unique case study because the Dutch were among the first to re-join and the last to leave the interwar gold

standard. Third, our case allows us to “test” one of the cornerstones of macroeconomic theory: the policy trilemma, illustrated in Figure 1 (Mundell, 1960, 1961; Fleming, 1962). Combining archival material with high-frequency macroeconomic data permits us to assess the trade-offs DNB officials faced between 1925 and 1936 when balancing independent monetary policy (i.e., the central bank’s ability to drive local interest rates away from those of its major trading partners) with free capital mobility (e.g., permitting arbitrage on domestic gold markets).

Many empirical contributions to the literature on monetary policy under fixed exchange rate regimes are historical in nature. Scholars remain particularly fascinated by metallist monetary systems like gold standards. The classical gold standard (1870–1914) is typically framed as a piece of successful policymaking (Bordo and Rockoff, 1996; O’Rourke and Williamson, 2001; López-Córdova and Meissner, 2003; Officer, 2008). Meanwhile, the interwar gold standard (1925–1936) is presented as a policy failure, even as a major cause of the Great Depression (Temin, 1976). At the very least, it is argued to have inhibited policymakers from fighting the effects of the Great Depression (Eichengreen, 1992). A direct link between the standard and the banking crises of the 1930s has also been established (Bernanke and James, 1991).

Most contributors agree the interwar standard suffered from the absence of a strong “monetary hegemon” (Kindleberger, 1986), leading to a lack of international policy coordination (Eichengreen, 1985), and the subordination of gold convertibility to other political priorities (Bordo and Kydland, 1995). Apolitical central banking did not help; countries with independent, technocratic, central banks had a preponderance to choose damaging deflationary policies (Simmons, 1996). The interwar gold standard’s eventual collapse has been attributed to different factors in different countries, including their domestic political economy (e.g., Wandschneider, 2008), and the pressures of currency speculation (e.g., Wolf, 2008). There exists a broad consensus that the gold standard was a key cause of the collapse of the global economy during the Great Depression, and that leaving the gold standard was a necessary condition for recovery (Eichengreen and Temin, 2000). We describe how DNB navigated a destabilised fixed exchange rate regime, all the way until the very end of the regime’s lifespan. We show that in the absence of a monetary hegemon, the Netherlands’ central bank was willing and able to go it alone.

The techniques used by central banks to achieve policy autonomy under metallist monetary systems have already been the subject of academic enquiry. Works typically consider convertibility restrictions, foreign exchange interventions and domestic lending policies. Bazot et al. (2016, 2019), who review this literature for the classical gold standard era, conclude that countries were successfully able to use these techniques to isolate their domestic economy from foreign shocks. But while Belgium’s central bank has received the attention of Ugolini (2012) for the classical gold standard and Van der Wee (2012) for the interwar standard, no modern study has explored the neighbouring Dutch case. Conceptually similar to our study is Hsieh and Romer (2006), who demonstrate how US central bankers managed to implement an expansionary monetary policy in 1932 while remaining gold. Like us, they show that the gold standard was not a binding constraint. Related contributions on other country

case studies include Mouré (2002) on France, and Straumann (2010) on Switzerland.

While policy autonomy has not been a focus to date, the Dutch experience of the interwar gold standard has been the subject of several important studies. Contributions to an edited volume (Griffiths, 1987) highlight Dutch support for this exchange rate regime came from diverse interest groups, even though it put most at an economic disadvantage. In particular, Schoorl (1987) argues the Netherlands' most influential economists prioritised moral over economic considerations, which meant leaving gold was considered akin to defaulting on sovereign debt obligations. De Vries (1989, 1994) focuses on the actions of key policymakers during the successive central bank presidencies of Gerard Vissering (1912–1931) and Leonardus Trip (1932–1941), largely absolving them of culpability for the consequences of their policy choices because they were considered best practice at the time. Langeveld (2004) focuses on the politics of Hendrikus Colijn, who as the Netherlands' finance minister – and subsequently as prime minister – was an ardent proponent of the gold standard. Most recently, Straumann (2010) revisited the argument that the conservative mentality of Dutch policymakers inhibited them from responding to the decline of the gold standard.

Research by Joost Jonker and Jan Luiten van Zanden constitute particularly important contributions to the Dutch historiography. Jonker and Van Zanden (1995) argue that the Netherlands avoided a financial crisis during the Great Depression, not because of any active policy decision, but rather because it had experienced one in the early 1920s; the banking system had already undergone the reforms necessary to withstand further adversity and so the government could continue its (monetary) policy unabated. Meanwhile, Jonker (1996) tracks DNB's haphazard institutional evolution towards modern central banking up to 1930, arguing the bank struggled to overcome conflicts of interest arising from its dual status as the government's bank and a private profit-making business organisation. Finally, Van Zanden (1996) links the Netherlands' adherence to gold with the country's poor performance during the 1930s, concluding the policy to remain on gold was probably a mistake.

We contribute by showing *how* the Dutch, with DNB at their helm, remained on the gold standard all the way to September 1936. We document the dynamics of monetary policy management across the interwar period. Our focus on monetary policy implementation and operationalisation also adds a new dimension to analyses of the interwar gold standard in general. We reveal how a central bank created and exploited policy tools designed to deliver on a promise of financial and exchange rate stability. We expose how a small and open economy – a class of economy typically considered most vulnerable to international economic fluctuations – was nevertheless able to exert considerable monetary policy autonomy.

We find DNB reacquired its monetary policy independence following sterling's devaluation in 1931. DNB then used this independence to stabilise the guilder's exchange rate and ensure domestic financial stability. It negotiated formal international agreements with other central banks to offset temporary exchange rate deviations. It also struck informal agreements with domestic banks, obliging them to seek permission to transport gold internationally and forbidding them to speculate against the

guilder. As of about May 1931, DNB started to hoard gold and eliminated arbitrage opportunities by seizing control of all trade in gold bullion.

But while DNB delivered on its promise to stay on gold, this policy choice created difficult trade-offs. We construct a counterfactual in which we examine what *could* have happened to the Dutch economy if the country would have consistently followed the UK and the policies set by the BoE from May 1931, the point at which DNB appears to have first changed its gold policy. It suggests that Dutch policymakers could have avoided a deepening of the Great Depression. Going Dutch meant going it alone, irrespective of the policy choices of other countries. But going Dutch came at a cost, including sacrificing future economic prosperity.

Section II provides necessary historical and institutional context. Section III focuses on DNB's interest rate policy and Section IV on capital mobility policy. Section V evaluates DNB's policy framework in a counterfactual analysis. Section VI concludes. Appendix A describes DNB's use of other policy instruments; Appendix B presents international macroeconomic comparisons; Appendix C contains technical details on our counterfactuals.

II

The UK returned to the gold standard in April 1925 at pre-war parity. It joined the US, which had re-entered in 1919, and the countries of Central and Eastern Europe, which were forced to join in 1924 to combat hyperinflation. The Netherlands followed the UK in its timing, and coordinated their policies with Australia, New Zealand, South Africa and the Dutch East Indies. By the end of 1925, some 35 currencies were officially or *de facto* convertible into gold (Eichengreen, 1992: 192). Figure 2 reports the exchange rate of the Dutch guilder and key currencies between 1925 and 1936. The gold standard fixed exchange rates as soon as countries joined. They only increased in volatility after the UK left, in September 1931.

There were subtle, yet important, differences in the way countries linked their currencies to gold (Eichengreen, 1992). The UK adopted a gold *bullion* standard; gold coin had been withdrawn from circulation and the BoE was no longer legally required to sell gold to the public. A second group, which included Belgium, adopted a gold *exchange* standard, by which a limited share of reserves could be held in the currencies of other gold standard members. The Netherlands was initially able to sustain a full gold *coin* standard, where anyone had the right to exchange their paper money for gold.

It was initially up to the Netherlands' central bankers to judge the proportion of the money supply that was covered by gold and gold-backed foreign exchange. Then, in 1929, the Netherlands' finance ministry insisted on 40 per cent backing – echoing US legislation (Friedman and Schwartz, 1963: 149) – of which 80 per cent had to be held in the vaults of DNB (Vanthoor, 2004: 133). But this was merely a formality; DNB's ample reserves meant it easily achieved the reserve requirement. By its

own admission DNB had a significant surplus of gold (DNB, 1926). Political neutrality during WWI meant it had benefitted from an influx of gold as the Netherlands became a financial safe haven.

DNB officials faced three perennial concerns. The first was the exchange rate at which currencies re-joined gold. The Dutch re-joined at pre-war parity; the guilder was exchangeable for 0.6 grams of pure gold. The contemporary consensus was sterling was overvalued by at least 10 per cent, and the French franc undervalued by the same amount (Keynes, 1925; Irwin, 2010). Some prominent Dutch economists, later famously including Jan Tinbergen, argued the guilder was similarly overvalued (Tinbergen, 1936; 1959). The second concern was the absence of a strong monetary policy anchor. The BoE no longer had the capacity or authority to lead the world's central bankers (Kindelberger, 1986). The lack of international policy coordination that resulted rendered it difficult for central bankers to maintain their policy regime's credibility (Bordo and Kydland, 1995; Obstfeld and Taylor, 2003).

The third, interrelated, concern was a perceived global shortage of gold and a "hot money problem", where foreign-owned funds moved erratically from one financial centre to another in response to changing interest rates (James, 1992; Graff et al., 2014). On the eve of the interwar standard, South Africa produced more than half of the global gold supply (Swanepoel and Fliers, 2021). This supply was then traded in London, effectively making the UK host to the financial centre of the interwar standard. However, the UK's poor export performance undermined attempts to re-establish its leadership position. Gold sterilisation policies in France and the US made matters worse (Friedman and Schwartz, 1963: 283, 297; James, 1992). By the 1930s, central banks were essentially competing with one another (Eichengreen, 1992; Irwin, 2010), and countries wishing to remain on gold consequently had to "go Dutch" and solve problems independently.

Despite these three concerns, DNB was well equipped to fix the value of the guilder to gold, even after the UK had left the standard. While DNB's ample gold reserves were a necessary condition, they were not sufficient. Other important conditions were its government-given mandate, its domestic influence over other policy spheres, and its strong international reputation. DNB's domestic influence can be traced back to its founding in 1814, when the bank was established to improve the money circulation.¹ The bank was founded as a stock exchange-listed corporation with a profit motive and a government concession to operate as the country's sole bank of issue. The proto-central bank had a dual status as the government's bank, dutybound to fulfil public functions, and as a large commercial bank.

DNB was required to pay a percentage of its profits to the Dutch Treasury as part of its 1903 charter renewal. Successive finance ministers then surreptitiously bought up shares in DNB, which became a nationalised corporation in all but name (Petram, 2016: 228). While DNB had no *de jure* responsibilities as a lender-of-last-resort, the bank was forced into the role when it headed the syndicate that rescued the Dutch short-term money market during WWI (Jonker, 1996). By the end of WWI, DNB

¹ The bank's concession reads: 'to improve the circulation of money, there is no worthier goal than to create a National Bank with national authority' (authors' translation, Article 4, 'Octrooi en Reglement voor de Nederlandsche Bank', *Staatsblad*, no. 40, 25 March 1814).

had firmly cemented its position at the head of the Dutch financial system. This position was largely based on informal arrangements and reputation.

DNB's 1918 charter renewal made its informal leadership position more formal (Van Zwet, 2001). Aside from permitting it to invest its funds more flexibly throughout the Dutch economy, the new charter empowered central bankers to supervise the banking sector: (1) all of the country's financial institutions were obliged to send DNB any news of changes to their boards' composition; (2) DNB actively participated in the corporate policy formation of financial firms by parachuting its directors onto the boards of its clients; and (3) DNB could choose the financial terms for its short-term debt instrument, its bill rediscounting facility (Colvin et al., 2015).² In return for its new powers, the charter increased the state's share of DNB's profits to 75 per cent (Van Zwet, 2001).

During the banking crisis of the 1920s, DNB was instrumental in the rescue of several systemically-important commercial banks (Colvin, 2014). DNB's dual private and public objectives finally became irreconcilable and DNB was forced to pivot towards becoming a modern central bank (Jonker, 1996). The most important subsequent change to the rules governing DNB's activities came in 1932, when a law was introduced to cover the losses DNB incurred on its foreign exchange holdings. Sterling's exit from the gold standard in September 1931 had taken officials at DNB and prime minister Charles Ruijs de Beerenbrouck's cabinet by surprise and led to enormous losses (De Vries, 1989: 441–484).³ The government's willingness to support DNB highlights how essential political leaders saw the bank in providing the nation with financial and exchange rate stability.

The most important political actor in the period under study was the politician Hendrikus Colijn – a former military officer, and a long-time Royal Dutch Shell executive with close ties to the *Nederlandsche Handel-Maatschappij*, one of the Netherlands' largest banks. He led the socially-conservative *Anti-Revolutionaire Partij* (Anti-Revolutionary Party), and was finance minister during the 1920s banking crisis as part of a coalition government led by Ruijs de Beerenbrouck, the leader of the *Roomsche-Katholieke Staatspartij* (Roman Catholic State Party). Colijn then briefly became prime minister in 1925–1926 and presided over the guilder's return to the gold standard. Following an interlude back in private business, he regained the role of prime minister from Ruijs de Beerenbrouck in 1933 and kept his cabinet leadership position until WWII (Langeveld, 2004).

In terms of Colijn's economics, De Vries (1981: 123–124) argues he saw the gold standard as a “natural mechanism” which acted as an economic anchor against inflation. This was the prevailing economic orthodoxy and much in line with the Austrian school perspective that was popular in the

² DNB allegedly abused its position by offering loans at terms that no other bank could match (Communication between the director of the *Bond Geld- en Effectenhandel* and the Minister of Finance, December 1917, *Archief van de Bond voor de Geld- en Effectenhandel*, NL-HaNA 2.19.042.14).

³ Losses were at least 30 million guilders, equivalent to the entirety of the central bank's reserves and 3/5th of its share capital (Vanthoor, 2004: 144). 10 million guilders were written off against profits and hidden reserves. The government took on the remaining debt as an interest-free loan. This episode precipitated a change in leadership: Gerard Vissering made way for Leonardus Trip (De Vries, 2013a).

Netherlands (Dullaard, 1984). Colijn venerated gold standard membership and treated it as a matter of national prestige. To him, leaving the standard was equivalent to reneging on sovereign debt (Szász, 1995). Colijn believed the only moral course was to continue repaying the country's debt using the gold-backed currency it had initially been raised in; the guilder had to continue to be "as good as gold".

The fact other countries were leaving gold following the UK's departure only drove Colijn to double-down on his policy instruction to central bankers. In 1933 Colijn was quoted saying 'there will be no monetary policy experiments' under his watch.⁴ Colijn neutralised political opposition by bringing competitors into his cabinet. The most important example of this was appointing Max Steenberghe, a leading figure in the Catholic party – then the single-largest party in parliament – to the role of trade and industry minister (Langeveld, 1987). Colijn did not change his views when Belgium was forced off the standard in 1935.⁵ Later that same year, Colijn even coerced Queen Wilhelmina into delaying national elections after his cabinet temporarily collapsed by suggesting she would otherwise cause the fall of the guilder.⁶ On the eve of the collapse of the standard in 1936, Colijn wrote to the League of Nations about his continued unwavering belief in the power of gold: 'my ideas are unchanged and I dare say: unchangeable'.⁷

DNB stuck to its mandate throughout the interwar period, and never publicly contradicted Colijn's gold politics. In private, however, DNB officials voiced concerns about the incompatibility of the government's domestic agenda with the gold standard. An example of such incompatible policies include Colijn's decision to link agricultural subsidies with new policies aimed at reducing unemployment and deflating wages (Langeveld, 2004: 98–99). Ernst Heldring, an influential financier and a DNB non-executive director, argued privately in January 1933 that the government had displayed very little leadership on the gold standard by refusing to debate its future.⁸

DNB's influence over the private sector that went far beyond its formal statutory powers. This can be partially inferred from the personages and interlocks of its directors. In 1925, DNB's board counted 26 positions, all of which were filled by people with substantial banking and industrial or political experience. DNB president Gerard Vissering had previously presided over the Vereeniging voor den Effectenhandel (stock traders' association), and was a former director of the Amsterdamsche

⁴ Authors' translation, 'Een interview met Dr. Colijn', *De Standaard* (26 March 1933). Shortly before Belgium's exit from the gold standard, Trip said something similar: 'nothing damages confidence more than monetary experiments' (authors' translation, 'Interview Mr. Trip over het Goud', *De Locomotief*, 5 February 1935).

⁵ Steenberghe commissioned a critical report on the future of the gold standard in March 1935: 'Het Probleem van den Gouden Standaard voor Nederland' (May 1935), Collectie 281: Oud, NL-HaNA 2.21.252: 6. Steenberghe was compelled to resign when Colijn refused to accept his advice: 'Nota van den Voorzitter van den Raad van Ministers' (15 May 1935), Collectie 281: Oud, NL-HaNA 2.21.252: 6.

⁶ Letter from Trip to Queen Wilhelmina (Thursday 25 July 1935), Collectie 281: Oud, NL-HaNA 2.21.252: 6.

⁷ Letter from Colijn to Pietro Stoppani, director of the LoN Economic Relations Section (22 September 1936); quoted in Langeveld (2004: 152).

⁸ 'It looks like the pleas of those wishing to leave the gold standard are completely unnecessary; an unholy coalition of faulty insight and electioneering will bring us to the brink of leaving gold anyway', authors' translation, memo on the possible consequences of leaving the gold standard (18 January 1933), Collectie 148: Heldring, NL-HaNA 2.21.085: 176.

Bank (De Vries, 2013b). DNB's vice-president, Samuel Pieter van Eeghen, was one of the most well-connected individuals of Dutch capitalism in the twentieth century (De Jong et al., 2021).

DNB's directors also enjoyed a large international network. Vissering was frequently invited to write opinions on matters of international coordination and economic policy. He was called to China in 1911 to advise on Chinese monetary policy (Vissering, 1914; Matsuoka, 1936). And in 1925, he was instrumental in providing the South African government with monetary policy advice, jointly with economists Edwin Walter Kemmerer and John Maynard Keynes (Richards, 1925; Swanepoel and Fliers, 2021).

Career central banker Leonardus Trip, Vissering's successor from 1931, further extended DNB's influence. He was installed on government advisory committees on domestic policy spheres unrelated to central banking – positions from which he advanced austerity politics and curtailed expansionary fiscal policy measures advocated by Colijn's coalition cabinet colleagues (Nekkers and Salzmann, 1990; De Vries, 1994: 89). He carved out an important niche using his position at the newly-established Bank of International Settlements (henceforth BIS) to advance his views on independent central banking.⁹ Trip's domestic and international profile enabled him to support his government and ensure that other policy areas were kept compatible with monetary policy.

III

We have described how the Dutch government remained enthralled by gold, and how DNB enabled this addiction. We continue by focussing in on the latter with an analysis of the day-to-day operationalisation of monetary policy. Central banks are typically confronted with three desirable, yet jointly unattainable objectives (see Figure 1): (1) to stabilise the exchange rate; (2) to enjoy free international capital mobility; and (3) to engage in monetary policy oriented towards domestic goals.¹⁰ Following Shambaugh (2004) and Obstfeld et al. (2005), we assume engaging in independent monetary policy is defined by a central bank's ability to drive local interest rates away from the market rate (or "world" rate). Given that leaving the gold standard was not seriously considered as a policy direction, DNB consequently faced a dilemma rather than a trilemma: in a fixed exchange rate regime, the central bank was forced to choose between independent monetary policy and free capital mobility. That officials were themselves aware of this dilemma is evident from DNB's 1931–1932 annual report: 'It is often forgotten that the standard is only a means to an end, which finds its footing in sufficient freedom of

⁹ Trip prepared an influential *aide mémoire* on ways in which the BIS could improve the workings of the gold standard: 'League of Nations Monetary and Economic Conference Preparatory Commission of Experts' (9 November 1932), ADN: 17.468. He was promoted to BIS vice-chair in 1933, and chair in May 1935.

¹⁰ Recent versions of the Mundell-Fleming model stress not only the three sides of the trilemma are available to policymakers; partial capital controls and limited fixed exchange rates can also enable monetary policy independence (Fischer, 2001; Klein and Shambaugh, 2008, 2015). Some have recast the trilemma as a dilemma (Rey, 2016; Cheng and Rajan, 2020), or explicitly added a political economy dimension (Bordo and James, 2019).

international capital movement and a sufficient elasticity in the economic system of the different countries' (authors' translation, DNB, 1932: 14).

DNB officials considered the UK, and to a much lesser extent the US, as the guilder's monetary policy anchor prior to 1931. When the Netherlands re-joined the gold standard in April 1925, DNB's annual report described how the value of the guilder should be benchmarked against the pound and the dollar (DNB, 1925). DNB president Vissering communicated this policy to the public: 'Dutch monetary policy should principally focus on the UK's monetary policy' (*Het Centrum*, 19 May 1925). After 1931, we find no evidence in policymakers' media communications that they focused any longer on other countries when it came to their monetary policy formation.¹¹

DNB arranged to store part of its excess reserves in London and New York to facilitate the speedy adjustment of the guilder's exchange rate. While gold movements enabled the Dutch to return to the gold standard, other monetary policy instruments were necessary to maintain gold parity. The most prominent among these policy levers was the central bank base rate, something already noted by contemporary economists (e.g., Ettinger, 1940). Figure 3 depicts the principal Dutch policy rate between 1920 and 1939: the overnight discount window on bills of exchange (the *disconto* rate). We find policy rates became more volatile after countries re-joined the gold standard; the Dutch (and UK) policy rate became a factor 12 more volatile after April 1925.

To examine the degree to which DNB was able to drive local interest rates away from the world rate (typically understood as the policy rate of the monetary benchmark or hegemon), we obtain policy rates for the Netherlands ($R_{d,t}$), UK, US, France and Germany (where each is used as a potential benchmark country, $R_{f,t}$). Figure 4 depicts these series. Following Bordo and MacDonald (2003, 2005), Shambaugh (2004) and Obstfeld et al. (2005), we estimate autoregressive distributed lag models (ARDL) and examine the cointegration of DNB's policy rate ($R_{d,t}$) and foreign policy rates ($R_{f,t}$). Our models capture the co-movement of policy rates correcting for time series properties such as autocorrelation and non-stationarity. Below we provide the base specification for testing the cointegration of central bank policy rates:

$$\Delta R_{d,t} = \theta(c + R_{d,t-1} - \beta R_{f,i,t-1}) + B\Delta R_{f,i,t} + u_{i,t} \quad (1)$$

This empirical setup allows us to assess the short-run response of DNB's interest rate policy to changes in (for example) the UK's policy rate (B), assess the speed of adjustment back from any deviation from the long-run relationship between policy rates (θ), and the degree of cointegration between the rates (β). If $\beta = 1$, monetary policy is fully dependent on foreign policy. Alternatively, if DNB has significant freedom in setting policy, we expect $\beta \neq 1$ and (/or) the long-run relationship to

¹¹ Even when the US government placed an embargo on gold and silver in 1933, Trip was quoted saying '[...] it is an internal matter [for the US] and will have no direct consequences [for the Netherlands]' (authors' translation, *De Telegraaf*, 6 March 1933).

be unstable.¹² Table 1 reports the reduced form estimations, and Table 2 summarises our results: (1) for the period when the UK was still on the gold standard (April 1925 – September 1931); and (2) after the UK departed from gold (October 1931 – September 1936).

(1) For the first period (April 1925 – September 1931) we find the adjustment speed (θ) is always negative. This suggests DNB on average was able to restore interest rate equilibria – within 12 months for the UK, and five for France. $\beta_{f_{UK}}$ is statistically different from zero and approximately equal to one; DNB linked its policy rate to that of the BoE. This implies DNB sacrificed its independent monetary policy with regards to the UK. We also test alternative policy rates which could have been the object of DNB’s focus. $\beta_{f_{US}}$ is significantly different from both zero and one; there is no perfect cointegration between DNB’s policy rate and the rate set by the Federal Reserve. Similarly, we find DNB did not consider France or Germany to be benchmarks.

(2) For the second period (October 1931 – September 1936) we find a significant change in regime. As argued elsewhere (see, e.g., Obstfeld and Taylor, 1998), the UK’s departure from gold prompted a watershed of policy changes around the world. After September 1931, DNB decoupled its monetary policy from all countries (β_{f_i} is indistinguishable from zero) and only changed its interest rate policy to offset short-run changes ($\theta < 0$). We find short-run equilibria were quickly restored by DNB; the Netherlands’ central bank took between 2.7 and 3.2 months to incorporate foreign interest rate changes.¹³ We find DNB offset all changes in foreign monetary policy to stabilise the Dutch guilder and keep the guilder’s peg with gold.¹⁴

In summary, and consistent with qualitative evidence, we find DNB linked its monetary policy to that of the BoE between April 1925 and September 1931. However, the sterling’s devaluation precipitated a change in policy at the central bank. Officials decoupled the country’s monetary policy from that of the BoE and went at it alone; they did not re-orientate towards France or the US. Within the framework of the policy trilemma, the implications of this finding are twofold. First, if DNB regained its independent monetary policy, then it must have sacrificed international capital mobility. Second, given the competing demands of policymakers at the time, DNB would likely have had to deploy additional policy instruments to protect the guilder and maintain economic stability.¹⁵

¹² We rely on the Pesaran et al. (2001) procedure to test the stability of the cointegration relationship. This uses asymptotic F-distributions, which are independent of whether variables are I(0) or I(1).

¹³ DNB observed a significant improvement in monetary stability after decoupling its monetary policy (cf. increase in adjustment speeds). Sterling’s departure improved the functioning of the exchange rate regime for the guilder.

¹⁴ We consider sterling’s departure the most important macroeconomic event for the Dutch economy during the interwar gold standard’s operation. For robustness, we also consider the departure date of the US, and find cointegration with the Federal Reserve’s policy rate cannot be rejected (nor can a non-existent relationship) in the period prior to the US’s exit from gold. However, DNB did not respond to short-run changes in the US policy rate and the levels relationship was highly unstable, making the US an unlikely monetary benchmark for the Dutch.

¹⁵ An alternative hypothetical explanation for the monetary policy independence we observe could be that the central bank committed to a so-called “target zone” mechanism which would have allowed the Dutch policy rate to accommodate a positive income shock by maintaining the short-term rate below the corresponding UK rate for a limited time (following the logic of Bordo and McDonald, 2003).

IV

DNB's decisions to initially link and later decouple its policy from the UK means the central bank must also have made decisions about the other corners of the policy trilemma. Following Shambaugh (2004) and Obstfeld et al. (2005), we define "perfect" capital mobility as the ability to enjoy free arbitrage on open markets.¹⁶ Because the fixed exchange rate regime constituted a peg with gold, we refer specifically to arbitrage on gold markets.

When the guilder first re-joined in 1925, DNB made the conscious choice to avoid any interference in gold markets. In Vissering's 1926 report to shareholders he points out that 50 million guilders in gold flowed into the country because of their policy stance (DNB, 1926: 5). The gold influx primarily originated from London. Figure 5 shows the development of DNB's gold reserves; the central bank kept them relatively stable before re-joining, and then, in the immediate run-up to April 1925, it sold approximately 15 per cent to the UK (Vanthoor, 2004). This permitted the guilder to re-join at the value of 10 guilders = 6.048 grams of pure gold, equal to its pre-1914 parity. DNB again kept its reserves relatively stable after re-joining.

We think there is sufficient circumstantial evidence to suggest DNB officials changed their policy stance towards gold some five months *before* sterling's devaluation in September 1931. Minuted internal discussions between central bankers indicate concerns about the long-term viability of the sterling-gold exchange rate. Speculation about sterling's possible devaluation was a regular discussion point from about May 1931.¹⁷ There was also a marked change in the behaviour of DNB's gold and foreign exchange departments that month, when the central bank started accepting large shipments of gold and selling off foreign bills of exchange. The 50 per cent increase in DNB's gold reserves between May and September 1931 suggests this represents a significant break in policy (see Figure 5). Internal meeting minutes reveal where the gold influx was coming from: much initially originated from the Reichsbank, but DNB was also buying up the holdings of domestic banks.¹⁸

We collect data on the day-to-day functioning of gold markets to better understand how DNB dealt with international capital mobility. Figure 6 shows the monthly net trade (exports – imports) in gold and highlights that the Dutch gold market was relatively quiet prior to May 1931. Significant discrepancies in import and export prices persisted because of the limited trade volume (Figure 7). These discrepancies allowed significant arbitrage to take place. Gold prices in the Dutch market were

¹⁶ We focus on free arbitrage in currency and gold markets. As is described in Eichengreen and Irwin (1995, 2010), the Netherlands increasingly restricted the trade in goods by imposing tariffs and quota for specific commodities and suppliers. The Dutch government raised its trade tariffs by some 25% following the UK's departure from gold. But Colijn and Trip continued to make the case for free trade at the London Conference of July 1933 (De Vries, 1981: 119).

¹⁷ For example, on 20 May, non-executive directors insisted to put 'the exchange rate risk of the foreign exchange portfolio, especially with regard to sterling' on the agenda of the next meeting. Authors' translation, 'Aantekeningen Secretaris' (20 March 1931), ADNB: 3.514.

¹⁸ A lot of attention is spent at these same meetings on working through the implications of the collapse of the Creditanstalt, which had significant ties to the Dutch bank Amstelbank. See, e.g., discussions in 'Aantekeningen Secretaris' (15 June 1931), ADNB: 3.514.

very volatile prior to about May 1931, representing the potential for arbitrage opportunities for Dutch gold traders (i.e., buying cheap South African gold, and selling it on at a high price). Then, trade volatility significantly increased and implied price differences disappeared in the immediate build-up to sterling's devaluation. This suggests DNB already took control of the domestic gold market prior to September 1931 – as was already suggested by Nurkse (1944: 146).¹⁹

We find DNB became ever-more vigilant in its efforts to protect the fixed guilder-gold exchange rate following sterling's devaluation. In addition to its revised gold policy and reclaiming monetary policy independence, the central bank changed its policy in three ways that together equate to *de facto* exchange controls: (1) it exerted more control over who could buy and sell gold; (2) it expanded measures to alleviate temporary gold imbalances with other central banks; and (3) it agreed informal anti-speculation agreements with domestic commercial banks.²⁰

(1) DNB required banks to ask for permission to transport gold internationally by drawing on its authority as *de facto* regulator and supervisor of Dutch financial institutions. DNB then actively used this power and became increasingly reluctant to provide gold conversion services. A letter from the League of Nations to Trip in December 1931 reveals DNB intensified its vigilance against speculation and its hesitance to facilitate the international trade in guilders and gold.²¹ These controls were kept out of the media spotlight; when pressed, central bankers presented their actions as “best practice”.²² Later, following speculation against the US dollar in March 1933, DNB introduced a package of measures to partially suspended free capital mobility. It refused outright to issue new gold coins – *de facto* moving the Netherlands to a gold bullion standard in which only bankers had access to the precious metal underpinning the currency.²³ Later that month, DNB agreed a temporary ban on the private shipment of gold through the postal service, further extending its control of the currency.²⁴ In June, DNB's board increased the burden of information requested of bankers when they approached the central bank for gold; they had to justify their gold demand, including the intended destination of any international shipment.²⁵ And from July DNB required banks to declare their foreign gold holdings in their requests for bullion – an attempt to ration gold.²⁶

(2) DNB sold practically all its foreign exchange reserves to purchase gold in the aftermath of sterling's devaluation. Consequently, it was no longer flexible in its ability to counteract currency speculation. It had to rely instead on interventions in gold markets. A series of “pendulum accords”

¹⁹ DNB's reserve policies were significantly and inversely correlated to (changes in) price differences in gold markets.

²⁰ Nurkse (1944) does not classify the Netherlands as employing explicit exchange control measures, and instead considers these measures as constituting a normal way of conducting monetary policy within the gold standard.

²¹ The concern of LoN officials was it took too long for DNB to convert foreign exchange into gold because of DNB's process of assessing whether gold requests were “genuine”; see letter from LoN to Trip (24 December 1931), ADNB: 17.478.

²² ‘Nota’ (28 December 1931), ADNB: 17.478.

²³ ‘Aantekeningen Secretaris’ (9 March 1933), ADNB: 3.516.

²⁴ Ibid. (29 May 1933).

²⁵ Ibid. (29 June 1933).

²⁶ Ibid. (5 July 1933).

partially solved this constraint. Bilateral deals struck between DNB and other central banks, both inside and outside the gold standard, these agreements allowed temporary deviations in the exchange rates between currencies to be countered with gold located in the vaults of the other country's central bank. This meant gold did not have to be shipped as frequently, cutting transaction costs and keeping more gold in play. The gold would simply be "earmarked", or relabelled.²⁷

(3) Finally, and more informally, DNB struck up gentlemen's agreements with the Netherlands' key commercial banks from May 1933.²⁸ Their stated purpose was to facilitate DNB in collecting the information relevant to deciding on domestic policies with regards to gold markets and credit provision (DNB, 1932: 22–23). These agreements provided new sources of market intelligence. When combined with DNB's revised gold policy and its reclaimed monetary policy independence, this intelligence allowed officials to actively manipulate gold convertibility requirements, delay gold or foreign exchange orders and force temporary anti-speculation measures on the country's financial institutions. DNB's ability to control gold markets combined formal regulation with informal measures and proved extremely powerful. Ultimately, these capital controls constituted *ad hoc* policies to influence the willingness and ability of private parties to move gold across international borders.

De Jong (1967: 517–522) described similar manipulations of gold flows in the Dutch case during the pre-war classical gold standard. We show how the practice continued into the 1920s, and was intensified during the 1930s. DNB's decision to first link, and later decouple its monetary policy – and to first allow for perfect capital mobility and later to restrict gold markets – was made with the intention to protect the guilder's international value. But while DNB was able to reduce arbitrage opportunities in the gold market, the use of additional measures suggests these actions proved insufficient on their own to protect domestic financial stability. Indeed, we find that DNB supplemented its interest rate policy and capital controls with several further policy instruments: (1) managing the domestic money supply; (2) manipulating its short-term credit facility; and (3) providing "forward guidance". These are described in Appendix A.

What impact did this policy mix have on the Dutch economy? What was the cost of DNB's policy prowess? Between 1931 and 1936, the Netherlands suffered declining national income (Figure 8), persistent deflation (Figure 9), mass unemployment (Figure 10) and a steep rise in court-declared bankruptcies.²⁹ The Dutch government did not choose to fully mitigate the consequences of its exchange rate policy with fiscal policy, introducing only limited measures in some politically sensitive sectors, such as agriculture. Indeed, the government reduced its expenditure overall, specifically in the investment category (Figure 11). The Netherlands' debt-to-GDP ratio exploded (Figure 12), driven by

²⁷ See, e.g., notes on shipment of gold from DNB to the Banque de France: 'Aantekeningen Secretaris' (February 1935), ADNB: 3.519.

²⁸ 'Aantekeningen Secretaris' (9 May 1933), ADNB: 3.516.

²⁹ From 2,725 in 1929 to a peak of 4,645 in 1934 (CBS, 1925–1936).

the fall in national income rather than an increase in sovereign debt. To what extent was this poor performance a consequence of monetary policy?

V

To understand the macroeconomic consequences of DNB's policy choices, we conduct two separate analyses. First, in Appendix B, we compare the Netherlands' economic performance with other countries which left gold earlier using monthly data collected by Albers (2018). These international comparisons of economic activity, wholesale prices, trade balances and bond yields help us to identify the possible consequences of alternative exchange rate regimes for the Netherlands. Together they suggest Dutch policymakers prioritised financial stability over economic growth – a finding consistent with Van Zanden (1996) and Keesing (1947) before him.

Second, in the current section, we construct a counterfactual in which we assume the Netherlands continued to follow UK policy after May 1931 and devalued alongside its largest trading partner in September 1931. Such a policy was never seriously considered by political leaders in either Ruijs de Beerenbrouck's or Colijn's cabinets, nor by central bankers at Vissering's or Trip's DNB. As we have now established, this is partially because they always had the means to continue their gold standard policy. But what if they would have been unwilling to employ the various additional “non-standard” policy instruments we have documented in Appendix A? How would the Dutch economy have evolved had policymakers opted for a different path? We have already established DNB changed its policy behaviour from about May 1931, when central bankers decided to hoard gold and started to voice concerns privately about the long-term viability of the sterling-gold exchange rate. What if, instead of this policy break, DNB officials would have remained on their original policy trajectory and continued to follow the BoE?

Our counterfactual traces the evolution of the Dutch economy using three assumptions: (1) the Netherlands continues to fix the guilder's exchange rate to sterling, even beyond sterling's devaluation in September 1931; (2) DNB continues to link its policy rate to that of the BoE; and (3) DNB keeps its gold reserves stable. Our out-of-sample forecast starts in May 1931, when DNB overhauled its gold policies; we assume they continued on their historical policy path. We have documented the primary concern of the Dutch government was financial stability. Given the historical evidence, we argue the most viable alternative strategy to meet this policy goal would have been to fix the guilder to the pound rather than to gold. This means the guilder would have been devalued alongside sterling from September 1931. This choice would have led to DNB keeping its gold reserves relatively stable, as the exchange rate should have been technically easier to manage with only the UK as its only benchmark. This counterfactual gives us a hypothetical universe against which to compare the realised history of the gold standard; it allows us to assess the costs associated with the Dutch government's objective of staying on gold, or the costs of DNB's policy success in achieving its government mandate.

We estimate a vector auto-regression (VAR) following Greene (2008) for the period prior to May 1931:

$$y_t = k + A_1 y_{t-1} + \dots + A_p y_{t-p} + \epsilon_t \quad (2)$$

where y_t is an $n \times 1$ vector of endogenous variables pertaining to the factors described in Appendix Table C1, and k is a vector of constants. A_p is then a $k \times k$ matrix of parameters capturing the relationship between individual endogenous factors. For our baseline model this implies y_t consists of eight domestic factors and four global factors. Our domestic factors are: the policy rate, gold reserves, economic activity, inflation, the money supply, unemployment, total exports, and total imports. Our global factors: the guilder-sterling exchange rate, UK economic activity, the BoE's policy rate, and the global gold price.³⁰ We estimate Equation 2 for the period April 1925 to May 1931. We then use vector A to forecast the development of the Dutch economy.³¹ This implies we keep all parameters stable post-May 1931. Figure 13 reports the full results; we highlight our most important findings below.³²

Had the Netherlands followed the UK, our counterfactual suggests that DNB would have prevented a deepening of the Great Depression, avoided the deflationary trap of the 1930s and halted the unprecedented rise in unemployment. In our out-of-sample forecasts, the Dutch economy would have been 6.6 per cent better off on average over the period May 1931 to September 1936.³³ More significantly, we find this choice would have halted the deflationary spiral and increased domestic wholesale prices by a factor of 1.8. Our forecast suggests recovery from the Great Depression would have reduced unemployment by approximately 25 per cent.³⁴

Overall, we conclude DNB's choice to "go Dutch" – to remain on gold and fend for itself – was a good strategy if the only objective of the Dutch government was to stay on gold by whatever means necessary and to keep prices low. But while DNB skilfully executed its mandate, our international comparison and counterfactual analysis suggest the Dutch paid a steep price for this policy choice.³⁵

³⁰ Appendix C provides additional information on our model specification, calculations, forecasts and accuracy. Figures C1 and C2 depict the time series of our domestic and global factors, including the factors used in the alternative model specifications. All variable definitions are reported in Table C1.

³¹ We are confident our model captures the dynamics of the Dutch economy prior to sterling's departure. The R-squared across is never below 85%. One concern is our standard errors might be biased by the limited timeframe so use a small-sample degrees-of-freedom adjustment. We acknowledge there are various ways to calculate counterfactuals, and that SVAR or VAR methodologies are inherently unstable (see, e.g., Benati, 2010). To this end, we estimate several robustness tests which we report in Appendix C, and report RRMSE prediction errors.

³² Figure 13 reports the time series for our domestic variables alongside our out-of-sample forecasts, and reports confidence bands from May 1931.

³³ This finding is consistent with Eichengreen and Sachs (1985), recently extended by Albers (2020), who argue joint coordinated devaluation could have secured early recovery from the Great Depression.

³⁴ We estimate several additional models in Appendix C. Our conclusions are robust and consistent across specifications.

³⁵ Our counterfactual does not consider that a Dutch departure from gold in 1931 may have precipitated an earlier collapse of the gold standard.

VI

We argue the Netherlands' central bankers interpreted their mandate as to do "whatever it takes" to maintain the fixed guilder-gold exchange rate. Dutch policymakers deliberately stayed away from those policy pathways which would have led to a devaluation. Despite this constraint, DNB was able to creatively design and exploit a wide variety of monetary policy instruments. This allowed the Netherlands to avoid domestic currency crises, and prevented the guilder from being forced off gold. Ultimately, the Dutch only left the gold standard because all other relevant countries had already abandoned ship.

By analysing DNB's day-to-day central banking operations and constructing a counterfactual, we illustrate how policymakers could have ensured an earlier recovery from the Great Depression while still maintaining exchange rate stability – albeit with the pound rather than with gold. DNB officials could have insulated the country from global macroeconomic instability, but chose instead to use all their policy tools to maintain gold parity.

We show central bankers deployed the country's ample gold reserves and decoupled its policy rate from BoE policies from 1931. Supplemented by additional policies, these measures limited international capital mobility. DNB used its domestic influence and international reputation to quell speculation against the guilder, eliminate arbitrage in gold markets and maintain gold parity until 1936. DNB's leaders proved successful at executing their government-mandated exchange rate policy objective.

Going Dutch meant adherence to gold at the cost of everything else, including sacrificing future economic prosperity. Our analysis reveals how a small open economy was able to navigate the constraints of the gold standard and maintain significant policy autonomy. Given the right conditions – ample reserves, a strong reputation and unlimited political backing to enact non-standard policy measures – central banks that go Dutch can survive for a surprisingly long time.

Supplementary material

To view supplementary material for this article (Appendix A, B and C; archival and data sources), please visit: URL.

References

- ALBERS, T. (2020). Currency devaluations and beggar-my-neighbour penalties: Evidence from the 1930s. *Economic History Review*, 73(1): 233–257.
- BERNANKE, B., and JAMES, H. (1991). The gold standard, deflation, and financial crisis in the great depression: An international comparison. In: Hubbard, R. G. (ed.), *Financial Market and Financial Crises* (pp. 33–68). University of Chicago Press, Chicago.
- BAZOT, G., BORDO, M. D., and MONNET, E. (2016). International shocks and the balance sheet of the Bank of France under the classical gold standard. *Explorations in Economic History*, 62, 87–107.
- BAZOT, G., MONNET, E., and MORYS, M. (2019). Taming the global financial cycle: Central banks and the sterilization of capital flows in the First Era of Globalization (1891–1913). CEPR Discussion Paper Series, Paper No. DP13895. URL: https://cepr.org/active/publications/discussion_papers/dp.php?dpno=13895.
- BENATI, L. (2010). Are policy counterfactuals based on structural VARs reliable? ECB Working Paper Series, Paper No. 1188. URL: <https://ssrn.com/abstract=1596588>.
- BORDO, M., and JAMES, H. (2019). The trade-offs between macroeconomics, political economy and international relations. *Financial History Review*, 26(3): 247–266.
- BORDO, M. D., and KYDLAND, F. E. (1995). The gold standard as a rule: An essay in exploration. *Explorations in Economic History*, 32(4): 423–464.
- BORDO, M. D., and MACDONALD, R. (2003). The inter-war gold exchange standard: Credibility and monetary independence. *Journal of International Money and Finance*, 22(1): 1–32.
- ____ (2005). Interest rate interactions in the classical gold standard, 1880–1914: Was there any monetary independence? *Journal of Monetary Economics*, 52(2): 307–327.
- BORDO, M. D., and ROCKOFF, H. (1996). The gold standard as a ‘good housekeeping seal of approval’. *The Journal of Economic History*, 56(2): 389–428.
- CHENG, R., and RAJAN, R. S. (2020). Monetary trilemma, dilemma, or something in between? *International Finance*, 23(2): 257–276.
- COLVIN, C. L. (2014). Interlocking directorates and conflicts of interest: The Rotterdamsche Bankvereniging, Müller & Co. and the Dutch financial crisis of the 1920s. *Business History*, 56(2): 314–334.
- COLVIN, C. L., DE JONG, A., and FLIERS, P. T. (2015). Predicting the past: Understanding the causes of bank distress in the Netherlands in the 1920s. *Explorations in Economic History*, 55: 97–121.
- DE JONG, A. M. (1967). *De Nederlandsche Bank van 1864 tot 1914*. Vol. 3, in: *Geschiedenis van de Nederlandsche Bank*. NIBE, Amsterdam.
- DE JONG, A., Fliers, P. T., and Westerhuis, G. (2021). Exceptional big linkers: Dutch evidence from the 20th century. *Business History*, 63(7): 1144–1174.
- DE JONG, H. J. (2005). Between the devil and the deep blue sea: The Dutch economy during World War I. In: Broadberry, S. N., and Harrison, M. (eds.), *The Economics of World War I* (pp. 137–168). Cambridge University Press, Cambridge.
- DE VRIES, H. (1981). Colijn en de economen. In: Noordegraaf, L. (ed.), *Exercities in Ons Verleden: 12 Opstellen over de Economische en Sociale Geschiedenis van Nederland en Koloniën, 1800–1950* (pp. 107–128). Van Gorcum & Comp, Assen.
- DE VRIES, J. (1989). *De Nederlandsche Bank van 1914 tot 1948: Visserings Tijdvak 1914–1931*. Vol. 5, Part 1, in: *Geschiedenis van de Nederlandsche Bank*. NIBE, Amsterdam.
- ____ (1994). *De Nederlandsche Bank van 1914 tot 1948: Trips Tijdvak 1931–1948, Onderbroken door de Tweede Wereldoorlog*. Vol. 5, Part 2, in: *Geschiedenis van de Nederlandsche Bank*. NIBE, Amsterdam.
- ____ (2013a). Trip, Leonardus Jacobus Anthonius (1876–1947). In: *Biografisch Woordenboek van Nederland*. Huygens ING, Amsterdam.
- ____ (2013b). Vissering, Gerard (1865–1937). In: *Biografisch Woordenboek van Nederland*. Huygens ING, Amsterdam.
- DULLAARD, M. H. J. (1984). *Regeling of Vrijheid. Nederlands Economische Denken tussen de Wereldoorlogen*. PhD Dissertation, Erasmus University Rotterdam, Rotterdam.
- EICHENGREEN, B. (1984). Central bank cooperation under the interwar gold standard. *Explorations in Economic History*, 21(1): 64–87.
- ____ (1985). International policy coordination in historical perspective: A view from the interwar years. In: Buitter, W. H., and Marston, R. C. (eds.), *International Economic Policy Coordination* (pp. 139–183). Cambridge University Press, Cambridge.
- ____ (1992). *Golden Fetters: The Gold Standard and the Great Depression, 1919–1939*. Oxford University Press, New York.
- EICHENGREEN, B., and Irwin, D. A. (1995). Trade blocs, currency blocs and the reorientation of world trade in the 1930s. *Journal of International Economics*, 38(1–2): 1–24.
- ____ (2010). The slide to protectionism in the Great Depression: Who succumbed and why? *The Journal of Economic History*, 70(4): 359–407.
- EICHENGREEN, B., and SACHS, J. (1985). Exchange rates and economic recovery in the 1930s. *The Journal of Economic History*, 45(4): 925–946.

- EICHENGREEN, B., and TEMIN, P. (2000). The gold standard and the great depression. *Contemporary European History*, 9(2), 183–207.
- ____ (2013). Fetters of gold and paper. In: Crafts, N., and Fearon, P. (eds.), *The Great Depression of the 1930s: Lessons for Today* (pp. 429–448). Oxford University Press, Oxford.
- ETTINGER, J. V. (1940). Discontorente en beschikbaar metaalsaldo van de Nederlandse Bank. *De Economist*, 89(1): 501–519.
- FISCHER, S. (2001). Exchange rate regimes: Is the bipolar view correct? *Journal of Economic Perspectives*, 15 (2): 3–24.
- FLEMING, J. M. (1962). Domestic financial policies under fixed and under floating exchange rates. *IMF Staff Papers*, 9(3): 369–380.
- FRIEDMAN, M., and Schwartz, A. J. (1963). *A Monetary History of the United States, 1870–1960*. NBER/Princeton University Press, Princeton.
- GRAFF, M., KENWOOD, A. G., and LOUGHEED, A. L. (2014). *Growth of the International Economy, 1820–2015*. Fifth Edition, Routledge, Abingdon.
- GREENE, W. H. (2008). *Econometric Analysis*. Sixth Edition, Pearson, New York.
- GRIFFITHS, R. T. (ed.) (1987). *The Netherlands and the Gold Standard 1931–1936*. Nederlandsch Economisch Historisch Archief, Amsterdam.
- HSIEH, C. T., and ROMER, C. D. (2006). Was the Federal Reserve constrained by the gold standard during the great depression? Evidence from the 1932 open market purchase program. *The Journal of Economic History*, 66(1): 140–176.
- IRWIN, D. A. (2012). The French gold sink and the great deflation. *Cato Papers on Public Policy*, 2: 3–41.
- JAMES, H. (1992). Financial flows across frontiers during the interwar depression. *The Economic History Review*, XLV(3): 594–613.
- JONKER, J. (1991). Sinecures or sinews of power? Interlocking directorship and bank-industry relations in the Netherlands, 1910–1940. *Economic and Social History in the Netherlands*, 3: 119–132.
- ____ (1996). Between private responsibility and public duty. The origins of bank monitoring in the Netherlands, 1860–1930. *Financial History Review*, 3(2): 139–152.
- JONKER, J., and VAN ZANDEN, J. L. (1995). Method in the madness? Banking crises between the wars, an international comparison. In: Feinstein, C. H. (ed.), *Banking, Currency, and Finance in Europe Between the Wars* (pp. 77–93). Clarendon Press, Oxford.
- KEESING, F. A. G. (1947). *De Conjuncturele Ontwikkelingen van Nederland en de Evolutie van de Economische Overheidspolitiek 1918–1939. De Nederlandse Volkshuishouden tussen twee Wereldoorlogen*. Het Spectrum, Utrecht.
- KINDLEBERGER, C. (1986). *The World in Depression, 1929–1939*. Revised edition, University of California Press, Berkeley.
- KLEIN, M. W., and SHAMBAUGH, J. C. (2008). The dynamics of exchange rate regimes: Fixes, floats, and flips. *Journal of International Economics*, 75(1): 70–92
- ____ (2015). Rounding the corners of the policy trilemma: Sources of monetary policy autonomy. *American Economic Journal: Macroeconomics*, 7(4): 33–66.
- LANGEVELD, H. (2004). *Schipper Naast God: Hendrikus Colijn 1864–1944. Deel Twee: 1933–1944*. Uitgeverij Balans, Amsterdam.
- LÓPEZ-CÓRDOVA, J. E., and MEISSNER, C. M. (2003). Exchange-rate regimes and international trade: Evidence from the classical gold standard era. *The American Economic Review*, 93(1): 344–353.
- MATSUOKA, K. (1936). China’s currency reform and its significance. *The Kyoto University Economic Review*, 11(1): 75–98.
- MOURÉ, K. (2002). *The Gold Standard Illusion: France, the Bank of France, and the International Gold Standard, 1914–1939*. Oxford University Press, Oxford.
- MUNDELL, R. A. (1960). The monetary dynamics of international adjustment under fixed and flexible exchange rates. *The Quarterly Journal of Economics*, 74(2): 227–257.
- ____ (1961). The international disequilibrium system. *Kyklos*, 14(2): 153–172.
- NEKKERS, J. A., and Salzmann, W. H. (1990). Een ‘heilzaam orgaan in ons staatsleven’? De Economische Raad als deskundigencollege 1932–1938. *Economische- en Sociaal-Historisch Jaarboek*, 53: 191–224.
- NURKSE, R. (with Brown, W. A. Jr.) (1944). *International Currency Experience: Lessons of the Interwar Period*. League of Nations, Geneva.
- OBSTFELD, M., SHAMBAUGH, J. C., and TAYLOR, A. M. (2005). The trilemma in history: Trade-offs among exchange rates, monetary policies, and capital mobility. *Review of Economics and Statistics*, 87(3): 423–438.
- OBSTFELD, M., and TAYLOR, A. M. (1998). The great depression as a watershed: International capital mobility over the long run. In: Bordo, M., Goldin, C., and White, E. (eds.), *The Defining Moment: The Great Depression and the American Economic in the Twentieth Century* (pp. 353–402). National Bureau of Economic Research/University of Chicago, Chicago.
- ____ (2003). Sovereign risk, credibility and the gold standard: 1870–1913 versus 1925–31. *The Economic Journal*, 113(487): 241–275.
- OFFICER, L. H. (2008). Gold standard. In: Whaples, R. (ed.), *eh.net Encyclopedia*. Economic History Association. URL: <https://eh.net/encyclopedia/gold-standard/>.
- O’ROURKE, K. H., and WILLIAMSON, J. G. (2001). *Globalization and History: The Evolution of a Nineteenth-Century Atlantic Economy*. MIT Press, Cambridge, MA.
- PESARAN, M. H., SHIN, Y., and SMITH, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16(3): 289–326.

- PETRAM, L. (2016). *De Vergeten Bankencrisis*. Atlas Contact, Amsterdam.
- REY, H. (2016). International channels of transmission of monetary policy and the Mundellian trilemma. *IMF Economic Review*, 64(6): 6–35.
- RICHARDS, C. S. (1925). The Kemmerer-Vissering Report and the position of the Reserve Bank of the Union of South Africa. *The Economic Journal*, 35(140): 558–567.
- SCHOORL, E. (1987). The economists' debate. In: Griffiths, R. T. (ed.), *The Netherlands and the Gold Standard 1931–1936* (pp. 19–29). Nederlandsch Economisch Historisch Archief, Amsterdam
- SHAMBAUGH, J. C. (2004). The effect of fixed exchange rates on monetary policy. *The Quarterly Journal of Economics*, 119(1): 301–352.
- SIMMONS, B. A. (1996). Rulers of the game: Central bank independence during the interwar years. *International Organization*, 50(3): 407–443.
- STRAUMANN, T. (2010). *Fixed Ideas of Money: Small States and Exchange Rate Regimes in Twentieth-Century Europe*. Cambridge University Press, New York.
- SWANEPOEL, C., and FLIERS, P. T. (2021). The fuel of unparalleled recovery: Monetary policy in South Africa between 1925 and 1936. *Economic History of Developing Regions*, 36(2): 213–244.
- SZÁSZ, A. (1995). Colijn en de 'gave gulden'. *NEHA Jaarboek voor Economische, Bedrijfs- en Techniekgeschiedenis*, 58: 277–286.
- TEMIN, P. (1976). *Did Monetary Forces Cause the Great Depression?* W. W. Norton, New York.
- TINBERGEN J. (1936). Kan hier te lande, al dan niet na overheidsingrijpen, een verbetering van de binnenlandse conjunctuur intreden, ook zonder verbetering van onze exportpositie? In: *Praeadviezen van de Vereeniging voor de Staathuishoudkunde en de Statistiek* (pp. 62–108). Martinus Nijhoff, The Hague.
- ____ (1959). Types of equilibrium and business-cycle movements. An economic policy for 1936. In: Klaassen, L. H., Koyck, L. M., and Witteveen, H. J. (eds.), *Jan Tinbergen Selected Papers* (pp. 37–84). Amsterdam, North Holland.
- UGOLINI, S. (2012). The origins of foreign exchange policy: the National Bank of Belgium and the quest for monetary independence in the 1850s. *European Review of Economic History*, 16(1): 51–73.
- VANTHOOR, W. F. V. (2004). *De Nederlandsche Bank 1814–1998: Van Amsterdamse Kredietinstelling naar Europese Stelselbank*. Boom, Amsterdam.
- VAN ZANDEN, J. L. (1996). The dance round the gold standard: Economic policy in the depression of the 1930s. In: van Zanden, J. L. (ed.), *The Economic Development of the Netherlands since 1970* (pp. 120–136). Edward Elgar, Cheltenham.
- VAN ZWET, J. R. (2001). De ontwikkeling van de Bankwet 1814–1998. Van 's Konings oudste dochter tot integrerend onderdeel van het ESCB. De Nederlandsche Bank, Research Memorandum WO&E, no. 649.
- VISSERING, G. (1914). *On Chinese Currency: Preliminary Remarks about the Monetary Reform in China* (Vol. 2). JH de Bussy, Amsterdam.
- WANDSCHNEIDER, K. (2008). The stability of the interwar gold exchange standard: Did politics matter? *The Journal of Economic History*, 68(1): 151–181.
- WOLF, N. (2008). Scylla and Charybdis. Explaining Europe's exit from gold, January 1928–December 1936. *Explorations in Economic History*, 45(4), 383–401.

Table 1. Co-integration of interest rates (before and after UK departure from the gold standard)

	April 1925 – September 1931				October 1931 – September 1936			
	UK	US	FR	DE	UK	US	FR	DE
θ	-0.056*	-0.129**	-0.021	-0.021	-0.221***	-0.232***	-0.260***	-0.220***
	(-1.912)	(-2.621)	(-0.901)	(-0.886)	(-2.773)	(-2.846)	(-3.061)	(-2.739)
β	1.247**	0.656***	0.792	1.051	0.175	-0.135	0.343	0.222
	(2.398)	(5.359)	(0.827)	(0.784)	(0.645)	(-0.476)	(1.235)	(0.527)
Observations	78	78	78	78	60	60	60	60
R-squared	23%	35%	20%	19%	13%	13%	14%	13%
Adj R-squared	20%	31%	17%	16%	10%	9%	11%	10%
Half-life (months)	12.4	5.4	33.0	33.0	3.1	3.0	2.7	33.0
F-test	0.23	7.92	0.05	0.00	9.26	16.14	5.60	3.42
Prob > F	0.64	0.01	0.83	0.97	0.00	0.00	0.02	0.07
Stability @ I(0)	n.s.	n.s.	n.s.	*	*	*	*	*
Stability @ I(1)	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Independence	n.s.	***	n.s.	n.s.	***	***	**	*
Policy type	Ineffective	Offsetting	Ineffective	Ineffective	Offsetting	Offsetting	Offsetting	Offsetting

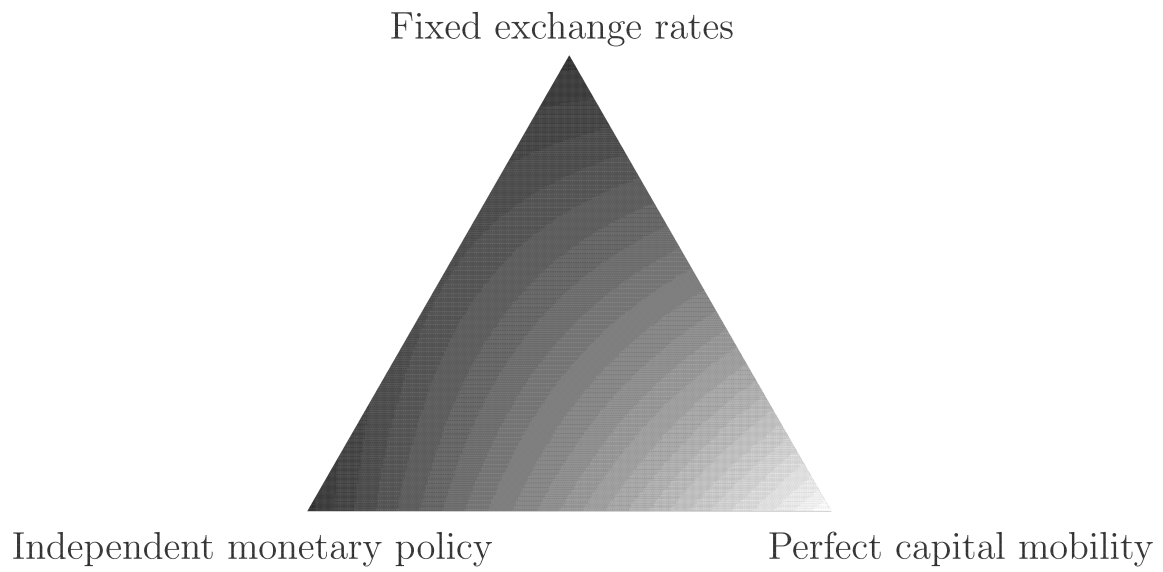
Note: Reported are the ARDL estimation results for equation 1 for different time periods. The variables of interest are explained in-text, and in the note under Figure 4. Tests for breakpoints using ADF, Zt and Za statistics yields no significant break dates. T-statistics in parentheses. Significance levels: *** p<0.01, ** p<0.05, * p<0.1, n.s. = not significant.

Table 2. Summary of econometric findings on the monetary policy independence of the Netherlands

	NL–UK	
	Apr 1925 – Sep 1931	Oct 1931 – Sep 1936
Policy independence?	No	Yes
Policy type	Ineffective	Effective offsetting
Stable?	No	Yes
Adjustment speed (months)	12	3
	NL–US	
	Apr-1925 – Sep-1933	Oct-1933 – Sep-1936
Policy independence?	Yes	Undetermined
Policy type	Effective offsetting	Undetermined
Stable?	Yes	No
Adjustment speed (months)	3	3

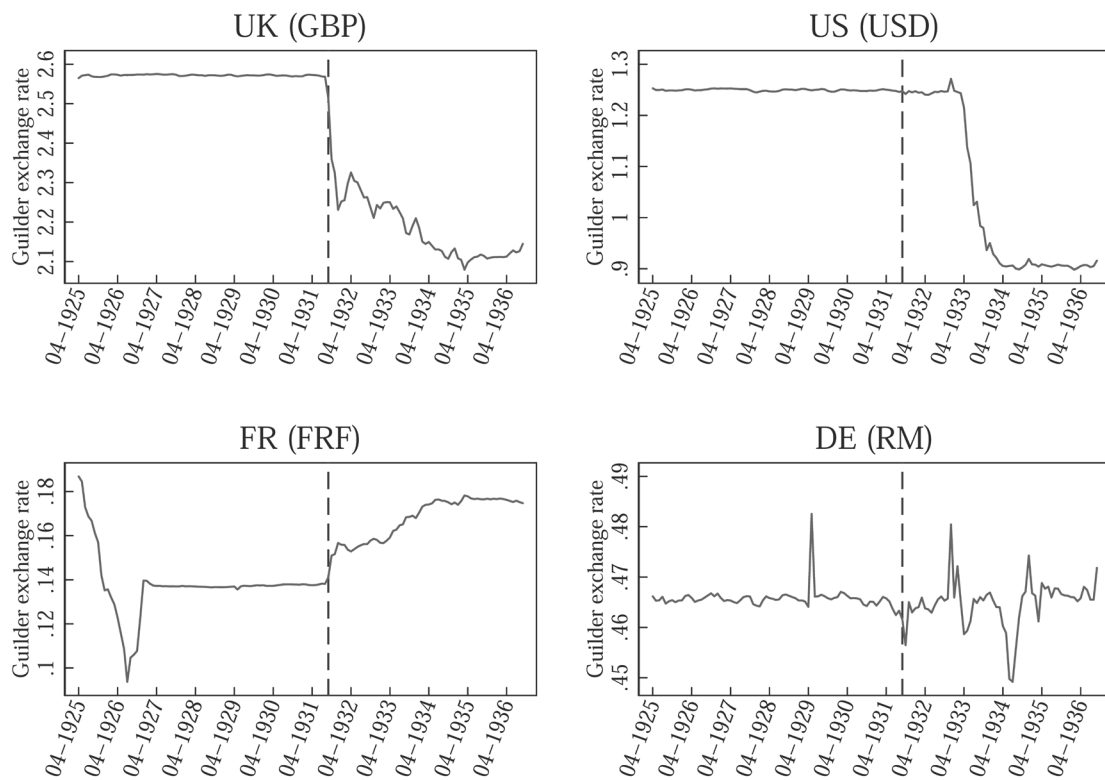
Note: Summary of results in Table 1.

Figure 1. *The Mundell-Fleming Monetary Policy Trilemma*



Note: Countries must choose any two from the three policy options. In a fixed exchange rate regime, a country must either sacrifice its independent monetary policy, or restrict capital mobility.

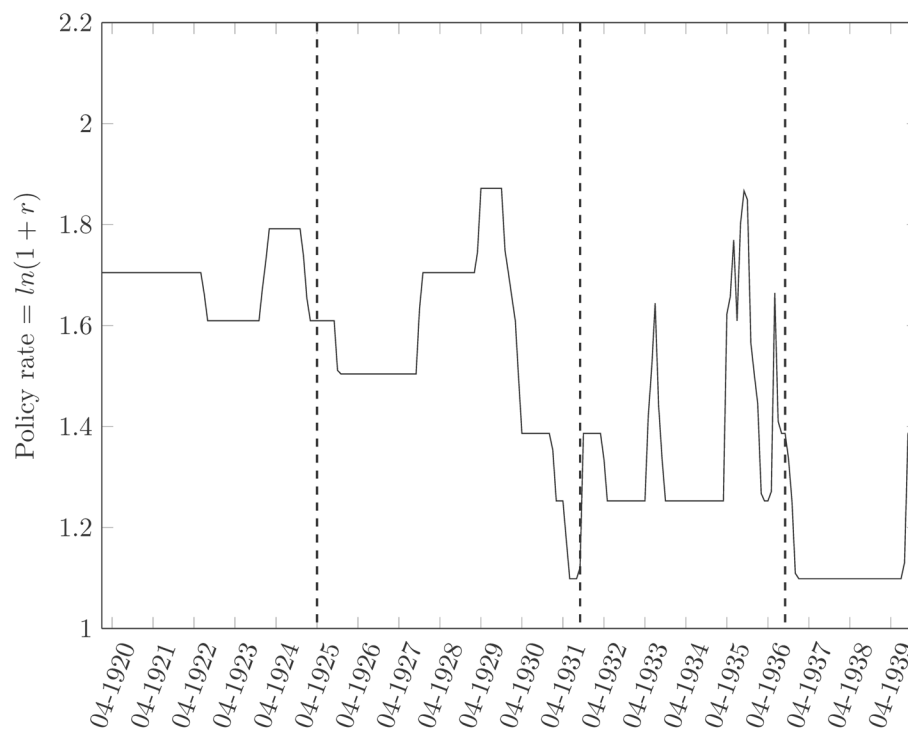
Figure 2. Exchange rate of the Dutch guilder (FL) (monthly frequency), 1925-1936



Note: Depicted are the exchange rates ($\ln(1+r)$) of the NL Guilder expressed in UK Pounds, US Dollars, FR Francs and DE Reichsmarks. The vertical lines denote the date of the UK's departure from the gold standard in September 1931.

Source: Centre for Financial Stability, using Bohlin (2010).

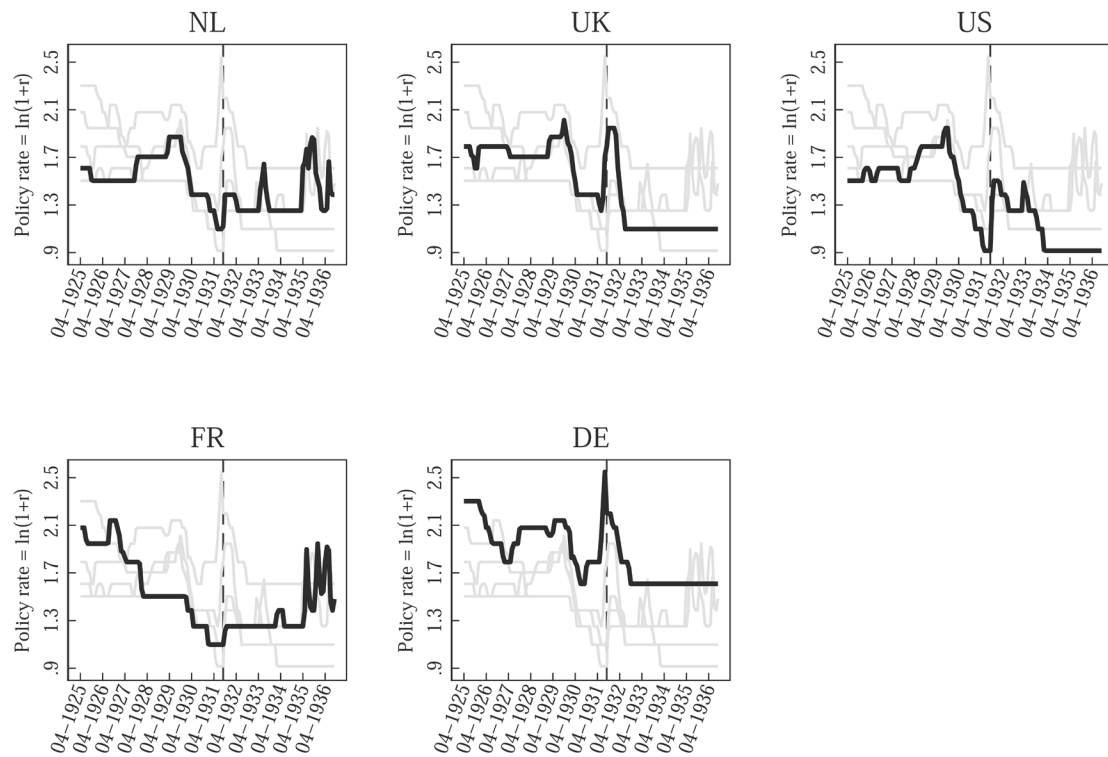
Figure 3. Policy rate of DNB (monthly frequency), 1920-1939



Note: Depicted is the key policy rate set by DNB. Vertical lines denote the Netherland's entry (April 1925), the UK's departure (September 1931) and the Netherland's departure (September 1936) from the gold standard.

Source: Own calculation, using DNB (2011).

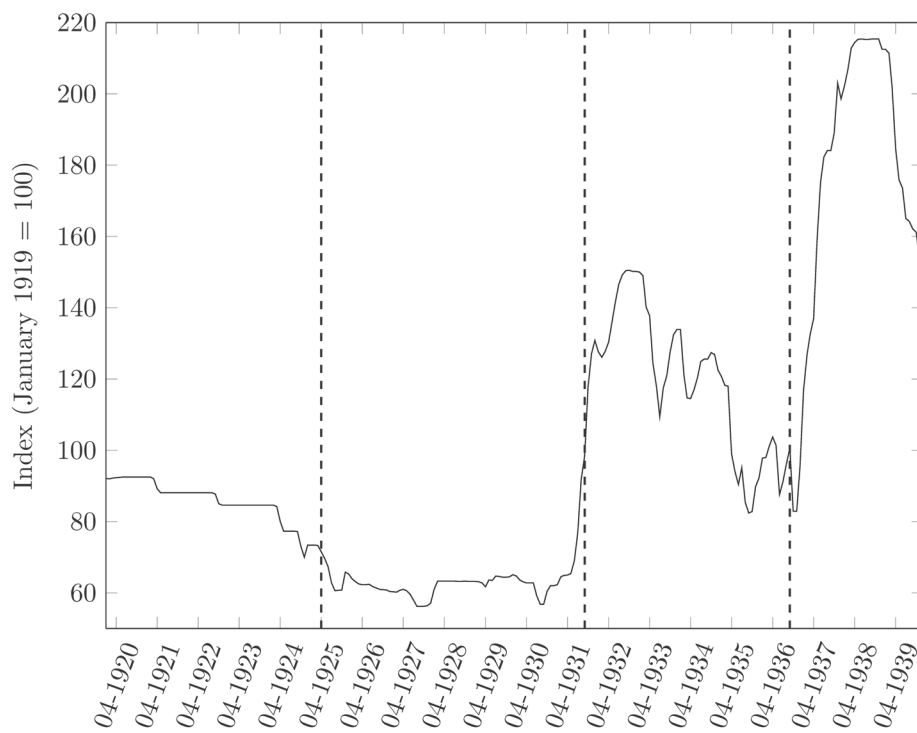
Figure 4. Central bank policy rates of selected countries (monthly frequency), 1925-1936



Note: Depicted are the key policy rates set by the Netherlands, the UK, the US, France and Germany. The vertical lines denote the UK's departure from the gold standard in September 1931.

Source: Own calculation using for NL: DNB (2011). Remaining data sourced by Centre for Financial Stability using for UK: Hills et al. (2015); US: Board of Governors (2020); FR: Loubet (1990), Flandreau and Zumer (2004) and Homer and Sylla (2005); GE: Deutsche Bundesbank (1976: 276; 2009).

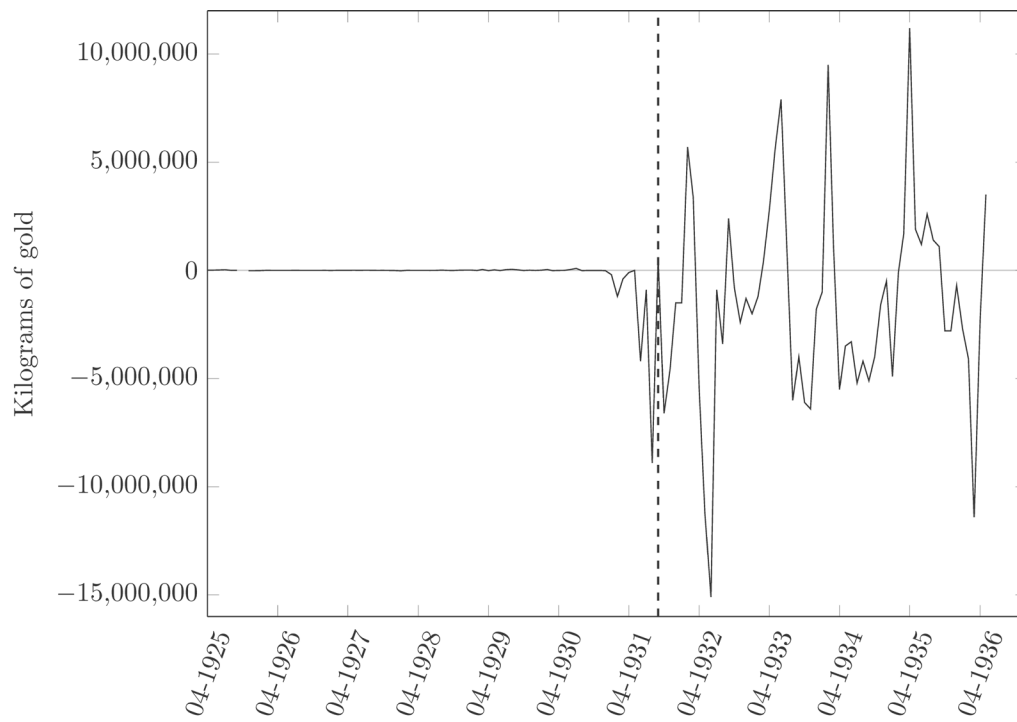
Figure 5. Gold reserves on DNB's balance sheet (monthly frequency), 1920-1939



Note: Depicted is an index of the stock of gold coin and bullion held by DNB. Vertical lines denote the Netherland's entry (April 1925), the UK's departure (September 1931) and the Netherland's departure (September 1936) from the gold standard.

Source: Own calculation, using DNB (1920-1939).

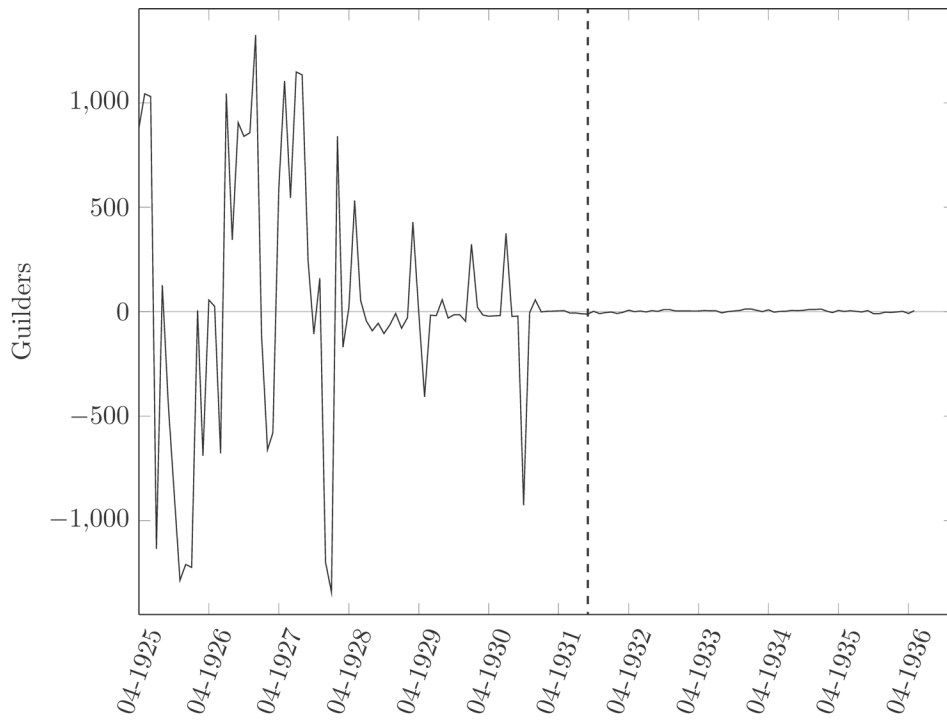
Figure 6. Net trade in gold and gold materials in the Netherlands (monthly frequency), 1925-1936



Note: Quantity of gold exported subtracted from the quantity of gold imported to the Netherlands (in kg). The vertical line denotes the UK's departure from the gold standard in September 1931.

Source: Own calculation, using CBS (1925-1936).

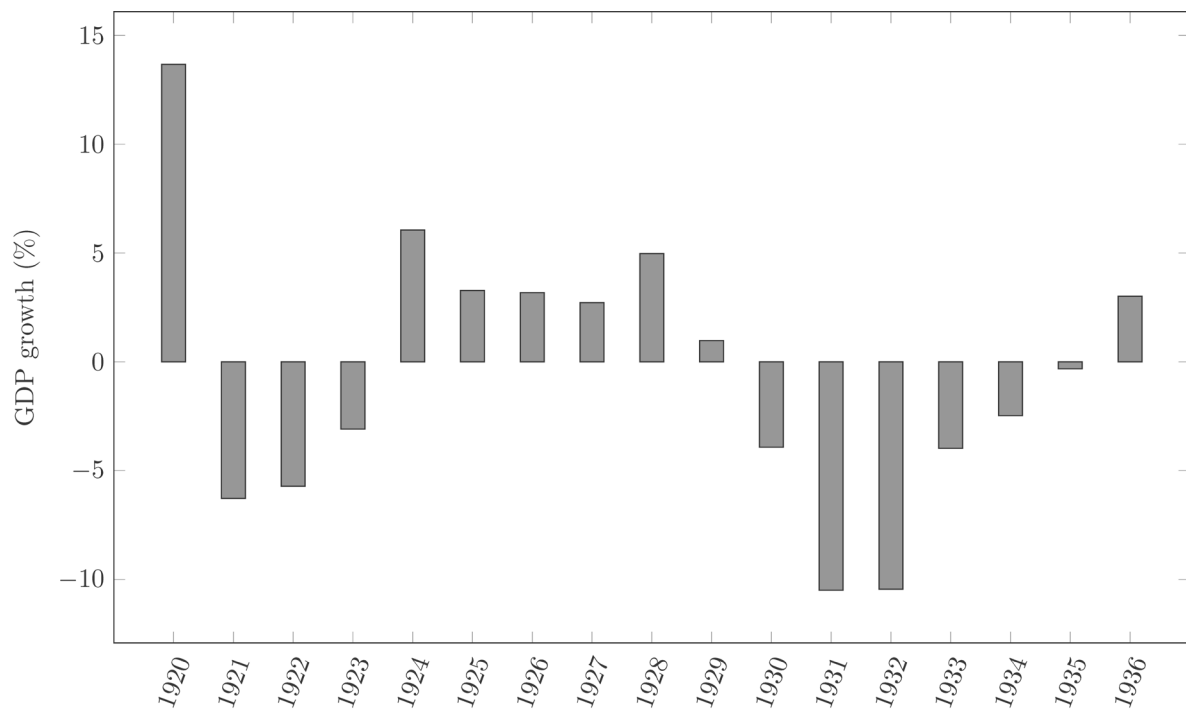
Figure 7. *Implied price difference between gold exports and imports in the Netherlands (monthly frequency), 1925-1936*



Note: Import price subtracted from export price (in guilders). The vertical line denotes the UK's departure from the gold standard in September 1931.

Source: Own calculation, using CBS (1925-1936).

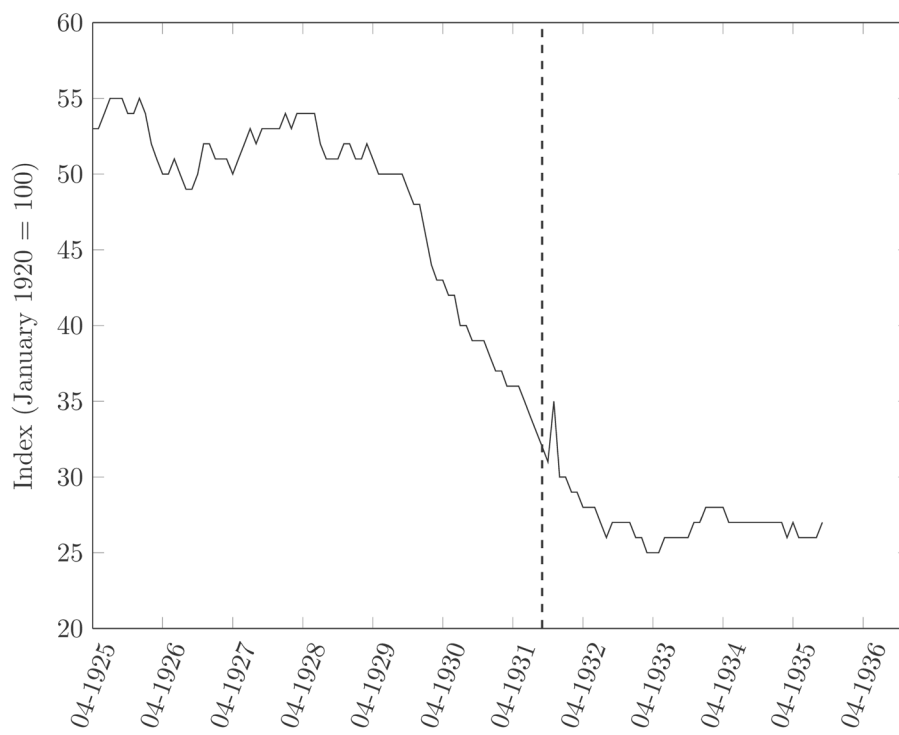
Figure 8. GNI growth of the Netherlands (annual frequency), 1920-1936



Note: Depicted is the growth of Gross National Income (at market prices) of the Netherlands.

Source: CPB (2014).

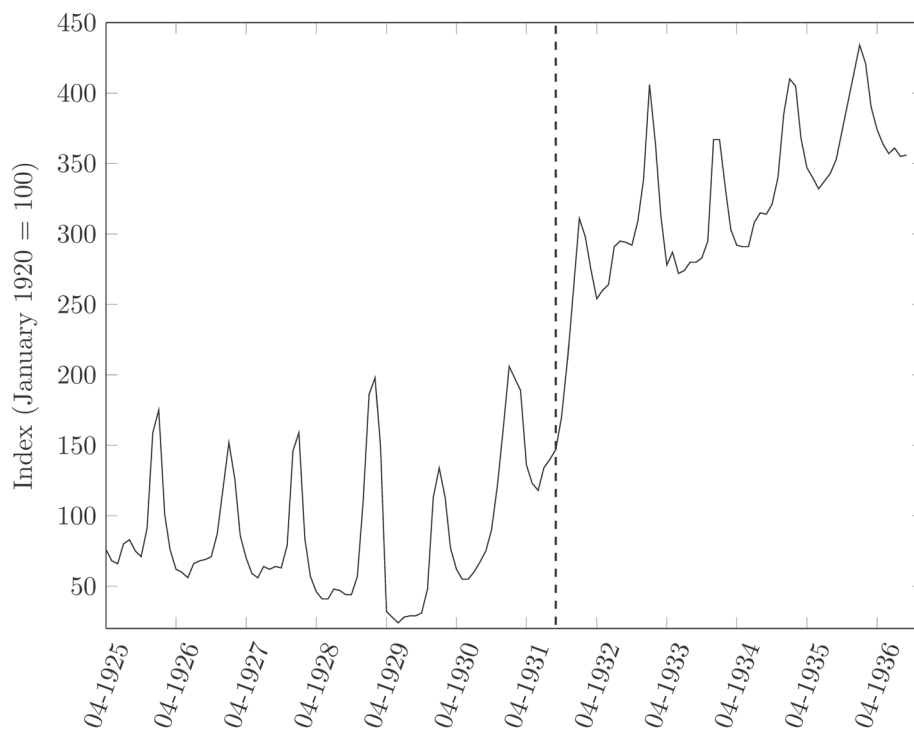
Figure 9. Wholesale prices in the Netherlands (monthly frequency), 1925-1936



Note: Depicted is an index of monthly wholesale prices in the Netherlands. The vertical line denotes the UK's departure from the gold standard in September 1931.

Source: Own calculation, using CBS (1925-1936).

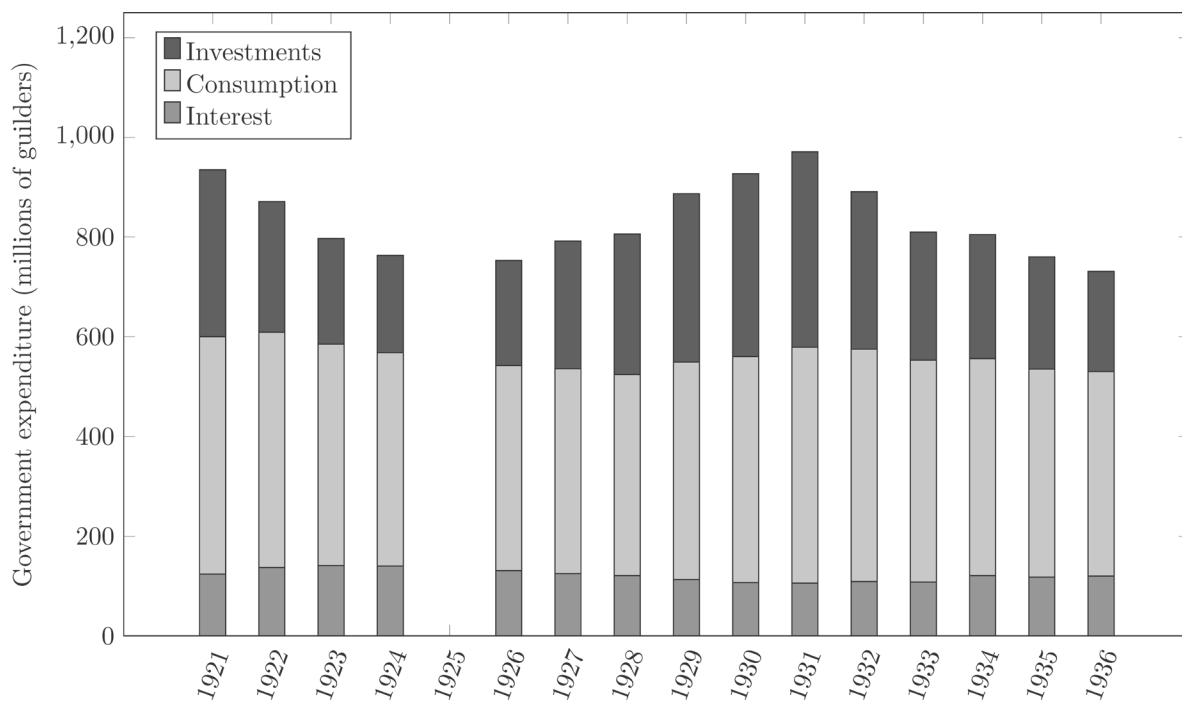
Figure 10. *Unemployment in the Netherlands (monthly frequency), 1925-1936*



Note: Depicted is an index of unemployment in the Netherlands. The vertical line denotes the UK's departure from the gold standard in September 1931.

Source: Own calculation, using CBS (1925-1936).

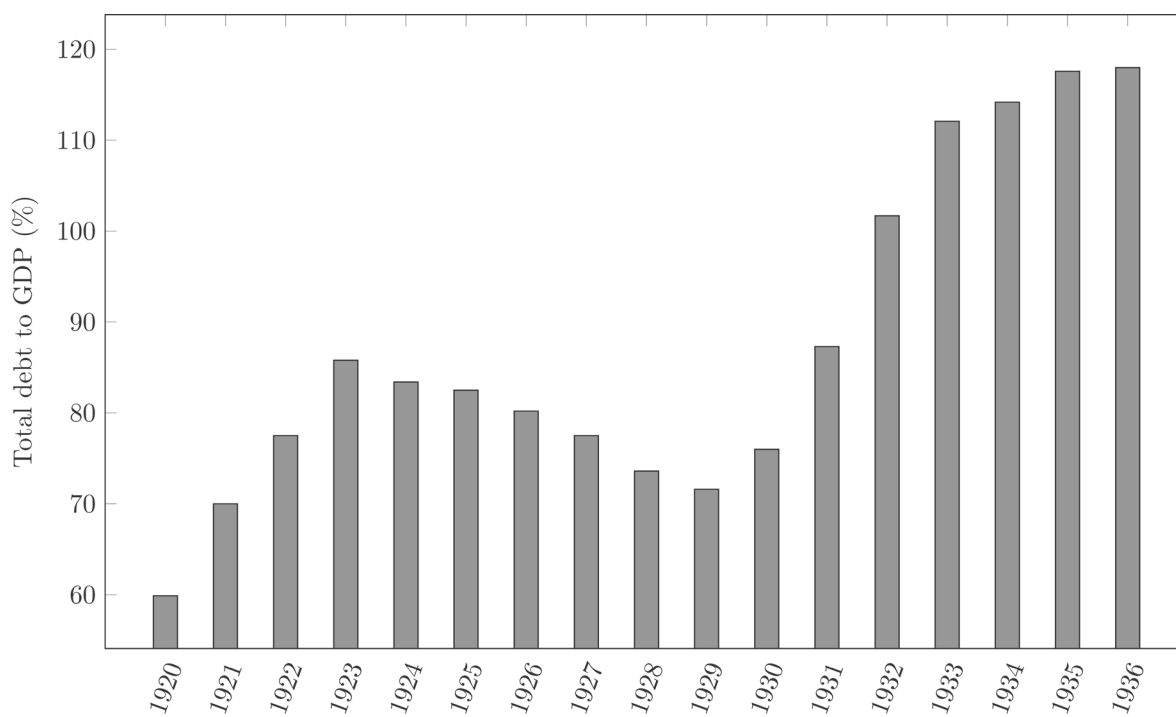
Figure 11. *Total government expenditure in the Netherlands (annual frequency), 1921-1936*



Note: Depicted is the total government expenditure decomposed into investments in capital goods, consumption of goods and services, and interest payments. Expressed in current prices (in millions of guilders). Data for 1925 are not available.

Source: Own calculation, using CBS (2014).

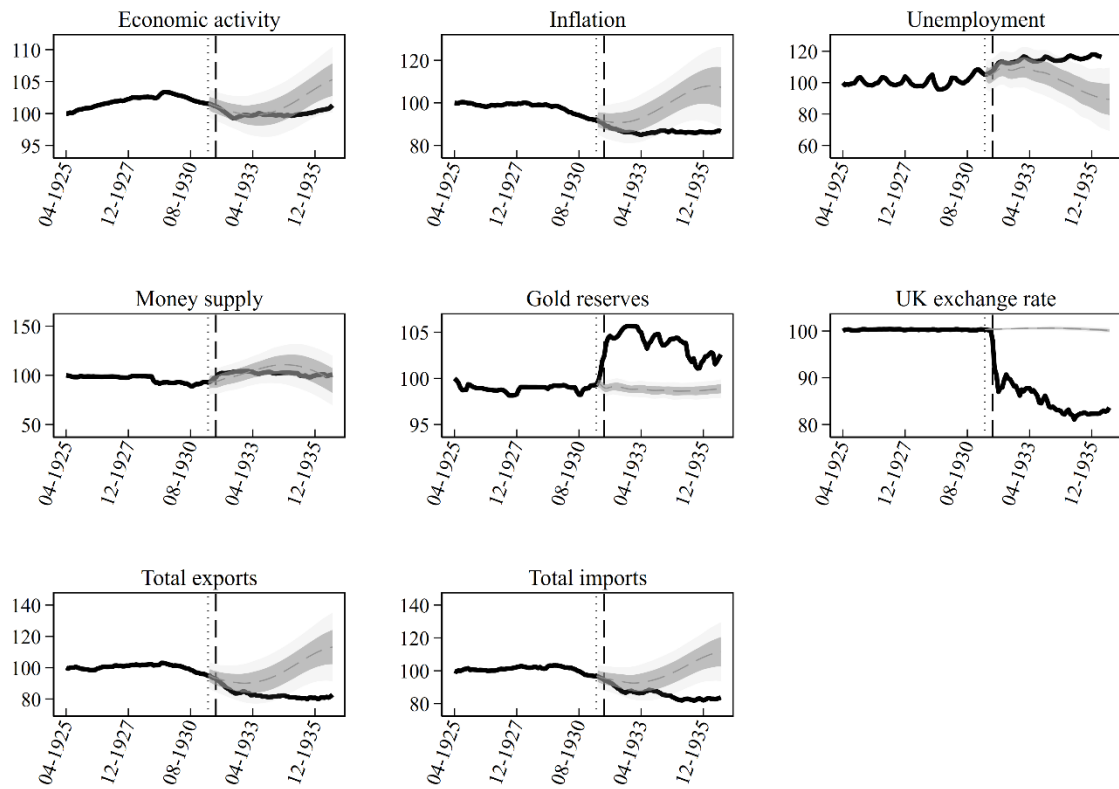
Figure 12. *Total debt to GNI of the Netherlands (annual frequency), 1920-1936*



Note: Depicted is a ratio of sovereign debt to GNI for the Netherlands.

Source: Own calculation, using CBS (2017).

Figure 13. *Baseline VAR counterfactual simulation (monthly frequency), 1925-1936*



Note: Depicted are the observed outcomes (solid line) and counterfactual results (dashed line). The vertical lines denote DNB's gold policy change in May 1931 (dotted line) and the UK's departure from the gold standard in September 1931 (dashed line). We report two sets of confidence intervals: 95% (dark grey) and 68% (light grey). VAR estimation is described in Section V and Appendix C.

Source: Data sources, variable definitions and model specification are provided in Table C1. All factors are log-transformed and depicted as indices with the reference data as April 1925.

Going Dutch: monetary policy in the Netherlands during the interwar gold standard, 1925–1936

SUPPLEMENTARY MATERIAL

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Queen's University Belfast

Appendix A

Besides employing interest rate policy (described in Section III) and capital controls (Section IV), DNB had three additional policy instruments in its arsenal: (1) managing the domestic money supply; (2) manipulating its short-term credit facility; and (3) providing “forward guidance”. These policy instruments were primarily used to stimulate domestic consumption, provide Dutch firms with sufficient financial flexibility to weather the global economic crisis, and to quell any uncertainty creeping into the Dutch economy that was driven by the country’s exchange rate policy.

(1) As per its charter, DNB was the country’s sole bank of issue, enjoying the monopoly on the minting of coin and the printing of paper money. Figure A1 reveals a precipitous decline in the money supply in the lead up to, and immediately following, re-joining the gold standard in 1925; by 1927 the amount of money in circulation was just 75 per cent of what it had been in 1920. Then, in 1931, central bankers dramatically changed course: DNB expanded the money supply, returning to levels last seen a decade before, during the 1920s banking crisis. The Dutch currency became a safe haven in this time of monetary instability and uncertainty. We already saw a sharp increase in gold reserves on DNB’s balance sheet from May 1931 (Figure 5, main text). But DNB failed to increase the money supply to the same degree as the increase in gold; while DNB’s gold reserves continued to expand, the money supply fell all the way through to 1936; DNB was partly sterilising its gold influx.

(2) DNB officials used two policy instruments to provide the Dutch economy with liquidity: (a) providing *beleeningen*, a short-term repo (Lombard) facility where borrowers had to put up securities such as government bonds as collateral; and (b) granting access to its *disconto*, an alternative short-term discount credit facility offered at the policy rate with negotiable instruments (bills of exchange) used as collateral. Figure A2 shows DNB’s lending portfolio between 1920 and 1939, and suggests the central bank attempted to offer policy relief. DNB used its *disconto* to provide liquidity to markets around flashpoints, such as the UK’s departure in 1931 and the US in 1933. Liquidity provision was inversely related to its reserve politics; decreases in DNB’s gold reserves correspond to significant

increases in its lending. There was a substantial increase in the use of DNB's repo lending facility following the dollar's devaluation. Given the drop in discounting business, we think that DNB became more risk averse in its credit provision. This shift away from accepting negotiable instruments as collateral and towards government debt continued after the Netherlands eventually left gold in 1936.

That DNB became more risk averse is also evidenced by how it dealt with its foreign bills investments. Figure A3 shows the evolution of DNB's foreign bills of exchange holdings. These bills were accepted and sold regularly prior re-joining the standard as part of DNB's usual business model; they were an important source of profit. Then, after the Dutch joined the standard, the monthly volatility in the quantity of bills on DNB's balance sheet increased by a factor of ten. Central bankers were actively using their position in the exchange market to offset and affect the money supply. DNB quickly reduced its foreign bills holdings after the UK left in 1931 as they constituted a significant exchange rate risk. The central bank then withdrew from this market altogether in 1933, when the US left.

(3) Besides sitting on various government advisory committees through which they could frustrate fiscal policy initiatives, DNB officials had one more "non-standard" monetary policy tool at their disposal: forward guidance. Communicating about plans for future monetary policy decisions is a way in which central bankers can influence the expectations of consumers and firms. DNB used it principally to quell any domestic unrest that might affect stock prices or consumption propensity. Interest in central bank communication has increased recently as central bankers have used it more systematically to enhance the effectiveness of their monetary policy (Moessner et al., 2017). Communication about monetary policy, from central bankers and political leaders, was used infrequently during the interwar period. The overriding aim of such communication was instead to assure the general public the gold standard would be maintained, no matter what. Typically, there was no explanation accompanying changes in interest rates; changes were reported as a matter-of-fact in a few short lines in among newspapers' other news-in-brief items.

Central bank communication intensified when the Netherlands' gold policy became open to question during a series of crisis episodes in the 1930s. When the UK left in 1931, the Netherlands' political leaders and central bankers used communication as a tool to reassure markets the guilder-gold fixed exchange rate would continue to be their core policy position. As far as we can discern, the media briefings of central banker "policy implementers" was always consistent with those of their political "policy setters"; they presented a united front. On the political side, Colijn is quoted as declaring the position of the guilder is 'safe' (*De Telegraaf*, 27 September 1931), and gold reserves are 'stronger than ever' (*Provinciale Geledersche en Nijmeegsche Courant*, 28 September 1931). And on the central banker side, Trip is quoted as blaming speculation against the guilder on the foreign press (*Het Vaderland*, 17 July 1931), while DNB officials briefed journalists that the public had no reason to worry about the position of the guilder despite an increase in interest rates (*De Limburger*, 30 September 1931). Trip even went as far as saying 'when price and quality are similar, Dutch products should be

preferred over foreign products' (*Provinciale Overijsselsche en Zwolsche Courant*, 11 March 1933: 9). Further communications of this kind are found when the US leaves the gold standard in 1933,¹ at the time of the government's budget in 1934,² and when Belgium is forced off gold in 1935.³

Interestingly, central bankers had to move prime minister Colijn towards communicating the guilder's departure from gold in 1936. Colijn was initially reluctant to pass comment – he was still reeling from having to quit gold following the decision of his French and Swiss counterparts. But he was eventually convinced by DNB leaders that communication would help to quell financial market unrest (De Vries, 1989). Colijn then explained his government's change in policy direction, in some detail, in a national radio address which was reprinted widely.

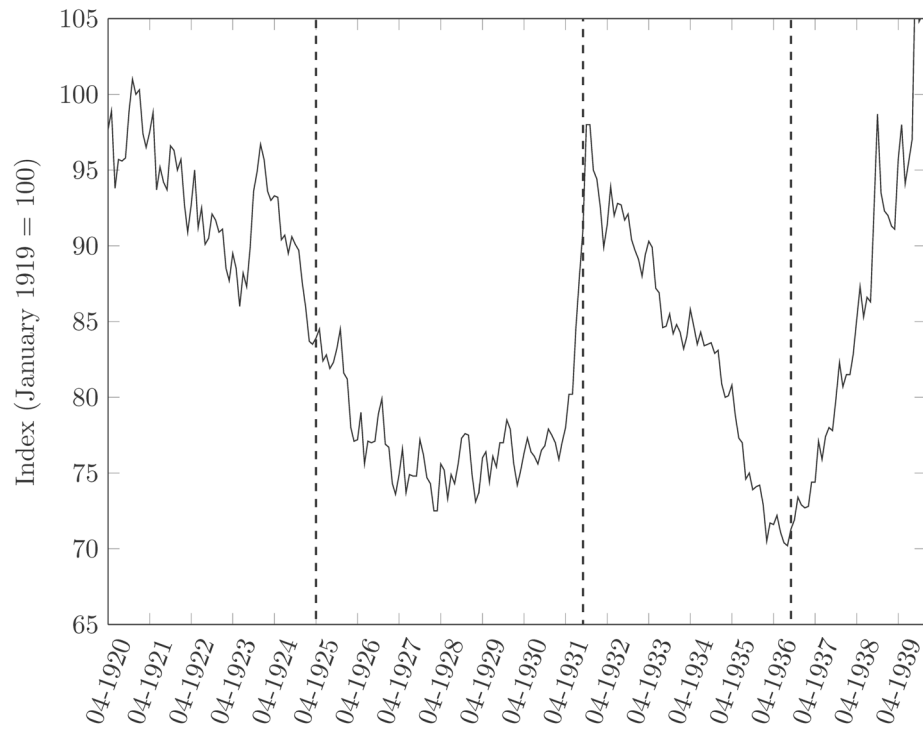
Overall, we find Dutch policymakers had significant scope for monetary policy autonomy with regards to managing their adherence to gold. Most importantly, DNB had the means to offset policy changes made by other central banks, both inside and outside of the gold bloc. Aside from changing its policy rate, from about May 1931 DNB also engaged in gold and foreign exchange transactions, open market operations and short-term lending to sustain the guilder-gold exchange rate at pre-war parity and provide much needed financial stability.

¹ On the political side, Colijn is quoted as saying 'why should we go off the gold standard when our banknotes are almost 100% covered?' (authors' translation, *Frisch Dagblad*, 26 September 1933). And on the central banker side, Trip briefs journalists no special measures are necessary in light of the US departure from gold (*De Telegraaf*, 3 June 1933), and 'the technical position of our medium of exchange does not give rise to any of the problems which have occurred in other countries' (authors' translation, *Leeuwarder Courant*, 3 July 1933).

² Confusion by some commentators in the media about Minister of Finance Pieter Oud's views on devaluation forced him to clarify his position – he remained vehemently opposed – by directly briefing influential media outlets (see, e.g., *De Tijd*, 16 November 1934).

³ On the political side, Colijn argues devaluation is not on the agenda as it would adversely affect international trade and financial stability (*Het Nieuws van den Dag*, 16 February 1935). And on the central banker side, DNB declares 'no change will be made in monetary policy' (authors' translation, *De Tijd*, 29 March 1935), and DNB still has 'numerous measures available for the defence of the guilder' (*De Indische Courant*, 4 June 1935).

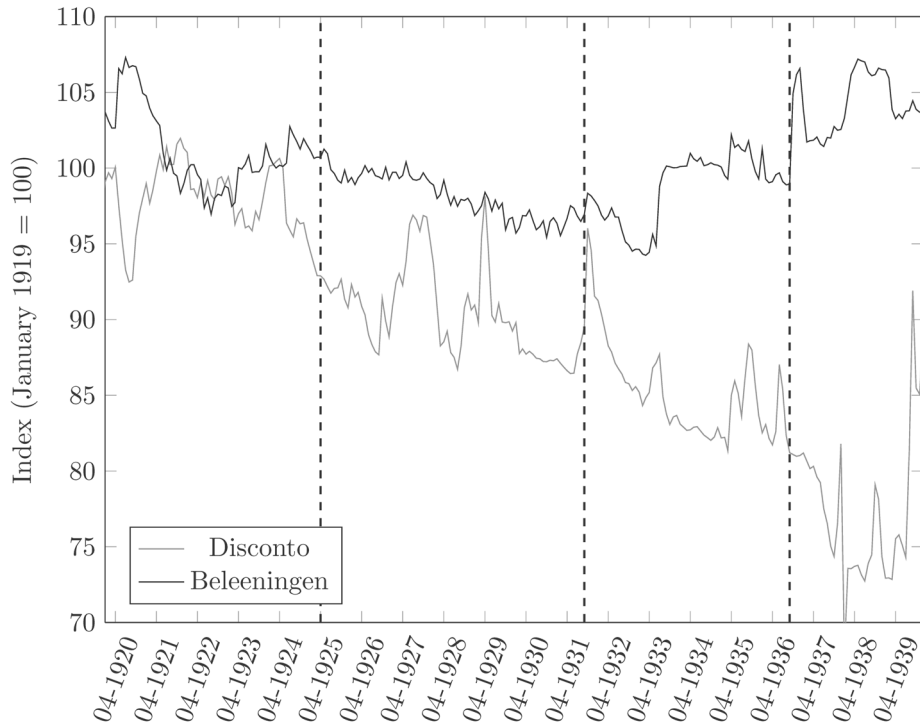
Figure A1. Money in circulation in the Netherlands (monthly frequency), 1920-1939



Note: Depicted is an index of bank notes and coins in circulation (M0). Vertical lines denote the Netherlands' entry (April 1925), the UK's departure (September 1931) and the Netherlands' departure (September 1936) from the gold standard.

Source: Own calculation, using DNB (1920-1939).

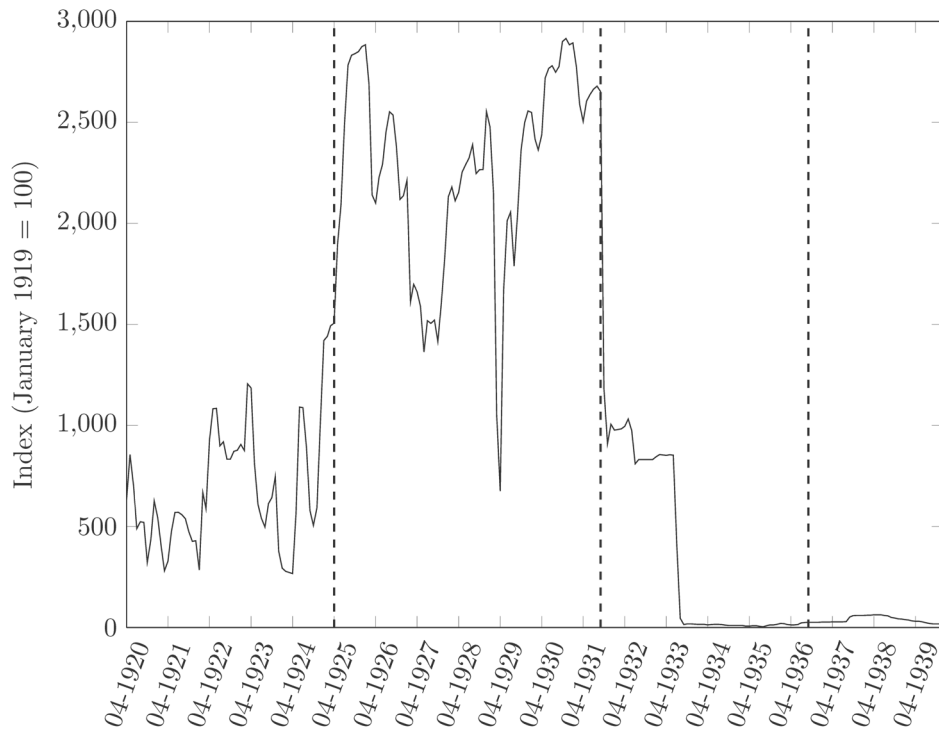
Figure A2. Lending practices of DNB (monthly frequency), 1920-1939



Note: Depicted are indices of the quantity of short-term and secured lending to private institutions originated by DNB. Vertical lines denote the Netherland's entry (April 1925), the UK's departure (September 1931) and the Netherland's departure from the gold standard in September 1936.

Source: Own calculation, using DNB (1920-1939).

Figure A3. Foreign bills on DNB's balance sheet (monthly frequency), 1920-1939



Note: Depicted is DNB's holdings of foreign bills of exchange. Vertical lines denote the Netherlands' entry (April 1925), the UK's departure (September 1931) and the Netherlands' departure from the gold standard in September 1931.

Source: Own calculation, using DNB (1920-1939).

Appendix B

The literature on the interwar gold standard in the Netherlands focuses on whether the country's exchange rate policy was to blame for its poor economic performance. In his professorial inaugural lecture, Van Zanden (1996) characterises the work of Keesing (1947) and Klein (1973) – previously the two giants in this literature – as being a debate on the culpability of exchange rate policy. Van Zanden attributes to Keesing the view that the long duration of the Great Depression was down to the gold standard, and to Klein the alternative that structural weaknesses were to blame – the country's small size, open character and dependence on agriculture.

Van Zanden (1996) argues the Dutch economy was structurally relatively well-equipped to absorb the economic shocks of the early 1930s. He rejects the hypothesis that small open economies are inherently less able to adapt, and argues the country was anyway sufficiently rich and diversified to substitute imported for domestic production. The fact this did not occur, then, is for Van Zanden down to policy decisions. He argues the austerity policies of the 1930s that followed from continued gold standard adherence had a scarring effect on the Dutch economy.

We reconsider these conclusions by tracking the performance of the Dutch economy relative to that of the other countries in our analysis. In so doing, we link exchange rate policy choices with the country's economic performance. We ask: what if the Netherlands' central bankers would have followed a different path and left the gold standard in 1931 (with the UK), 1933 (with the US) or 1935 (with Belgium)? The purpose of this comparison is to examine DNB's role in the underperformance of the Dutch economy during the 1930s. Like Van Zanden (1996), our evidence points to Keesing's (1947) argument that government policy choices were at least partially culpable for the Dutch experience of the Great Depression.

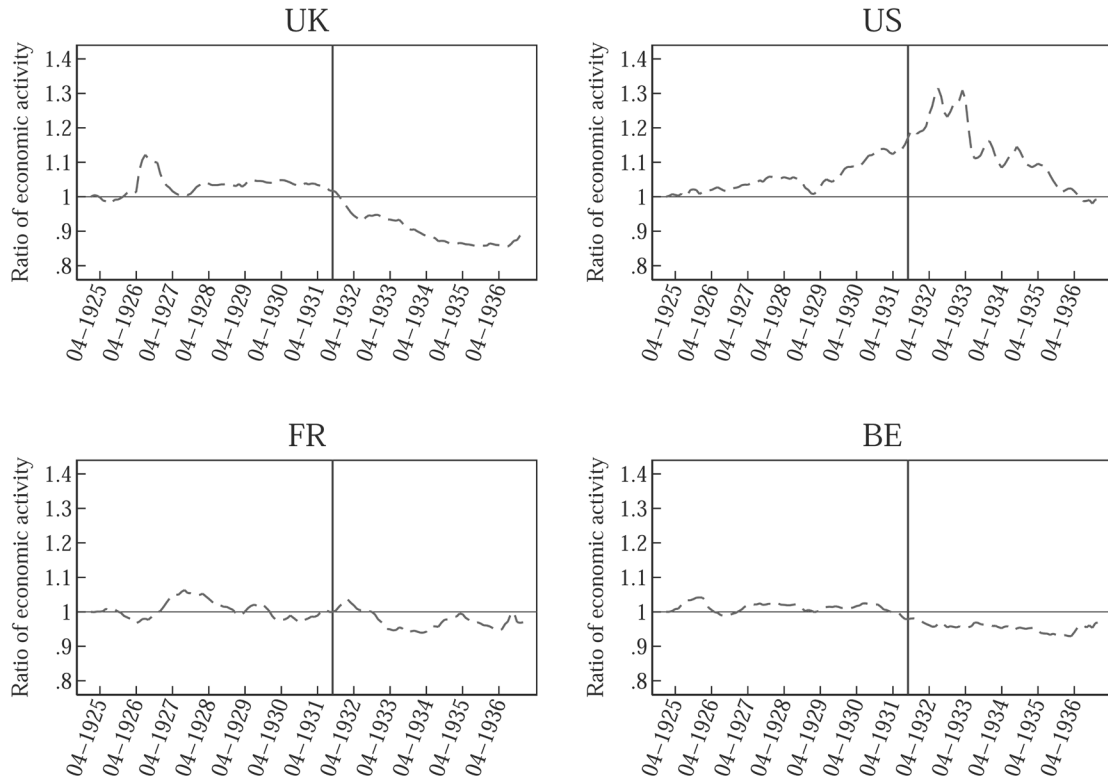
Figure B1 depicts the Netherlands' economic activity relative to a set of "peer" countries (UK, US, France and Belgium) using monthly data compiled by Albers (2018) from contemporary sources. The Netherlands' economic performance relative to the UK declined by approximately 15 per cent following sterling's devaluation. The Dutch outperformed only the US over the period 1925–1936. Dutch economic activity did not recover in the later period relative to France and Belgium. The Netherlands' record versus early leavers is mixed; the country performed worse than some early leavers, but also worse than others in the gold bloc rump.

Figure B2 depicts the development of Dutch wholesale prices relative to the same set of countries. The Netherlands suffered significantly stronger deflationary pressures throughout the gold standard. It was the Dutch government's stated objective to suppress wages to deflate the economy and support the currency; in that sense, policymakers achieved their policy objective. But this did not aid in the economic recovery. Taken together, the data suggest the key cost of the gold standard was persistently falling prices.

Figure B3 compares the development of trade balances. The Netherlands' trade balance became relatively more volatile after the UK left gold, and the Dutch economy significantly underperformed in terms of its ability to maintain a trade surplus relative to the countries which left the gold standard earlier. The Dutch were never able to export more than they were importing. The gold standard did not help the Netherlands to insulate itself from the increasingly protectionist beggar-thy-neighbour trade policies of its neighbours.

Figure B4 shows the development of Dutch bond yields alongside those of its peers. It shows bond markets responded strongly to the UK leaving the gold standard; bond yields on average increased significantly across the board in 1931. As DNB continued to hoard gold, Dutch bond yields dropped relative to developments in Belgium and France. But the continued demand for guilder-denominated debt suggests investors neither judged Dutch policymakers to be mismanaging their monetary policy, nor that markets expected that the Dutch state would default on its debt. The Netherlands faced relatively low bond yields, which meant the Dutch government enjoyed a relatively low cost of borrowing. But rather than exploiting the low borrowing costs, the Dutch government reduced its spending by more than 10 per cent between 1930 and 1936 (Figure 12, main text) – consistent with the narrative presented by Van Zanden (1996). We conclude that although the Dutch economy could not outperform the early leavers of the standard, it was nevertheless able to keep the confidence of international financial markets. Policymakers prioritised financial stability over economic growth.

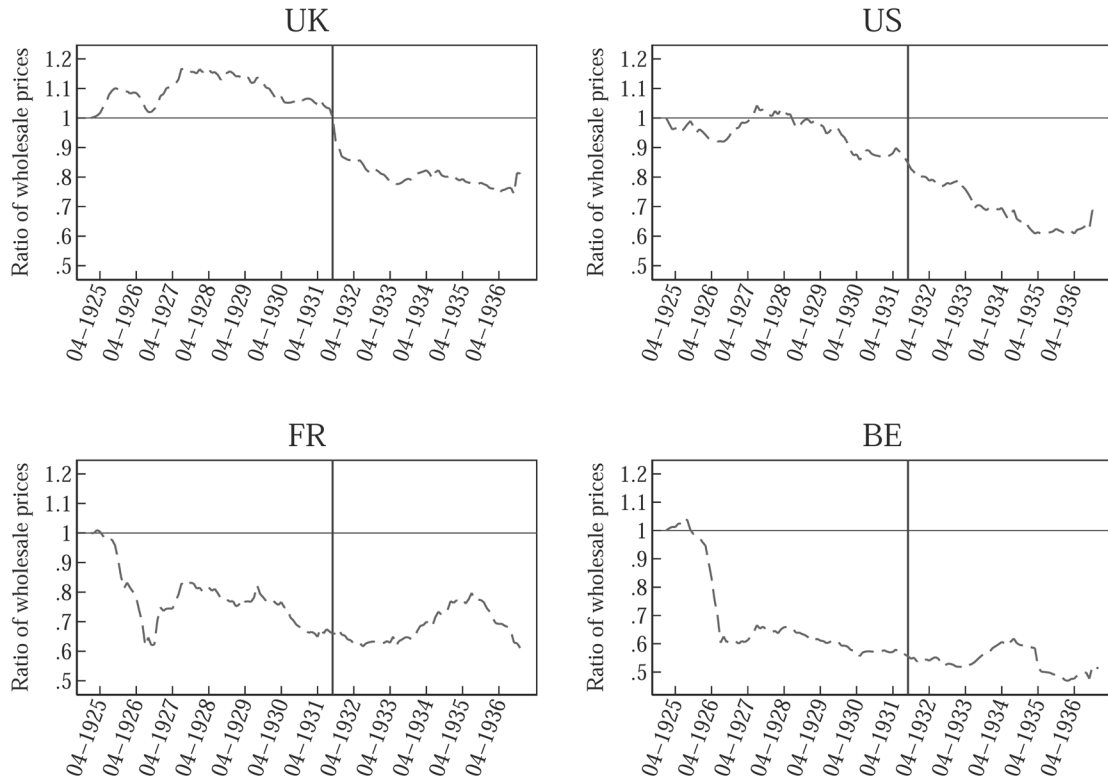
Figure B1. *Economic activity of the Netherlands relative to peer countries (monthly frequency), 1920-1936*



Note: Depicted are the ratios of indexed economic activity of the Netherlands to the indexed economic activity of peer countries. The vertical lines denote the UK's departure from the gold standard in September 1931.

Source: Own calculation, using Albers (2018).

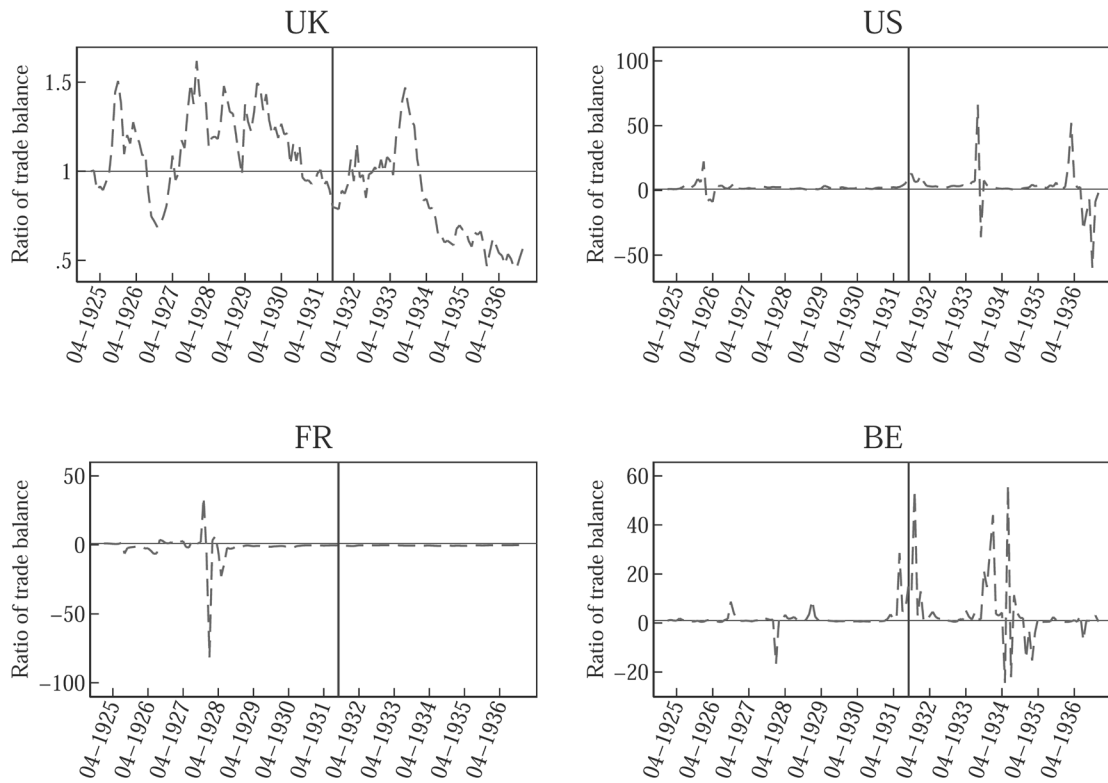
Figure B2. Wholesale prices in the Netherlands relative to peer countries (monthly frequency), 1920-1936



Note: Depicted are the ratios of indexed wholesale prices in the Netherlands to the indexed wholesale prices of peer countries. The vertical lines denote the UK's departure from the gold standard in September 1931.

Source: Own calculation, using Albers (2018).

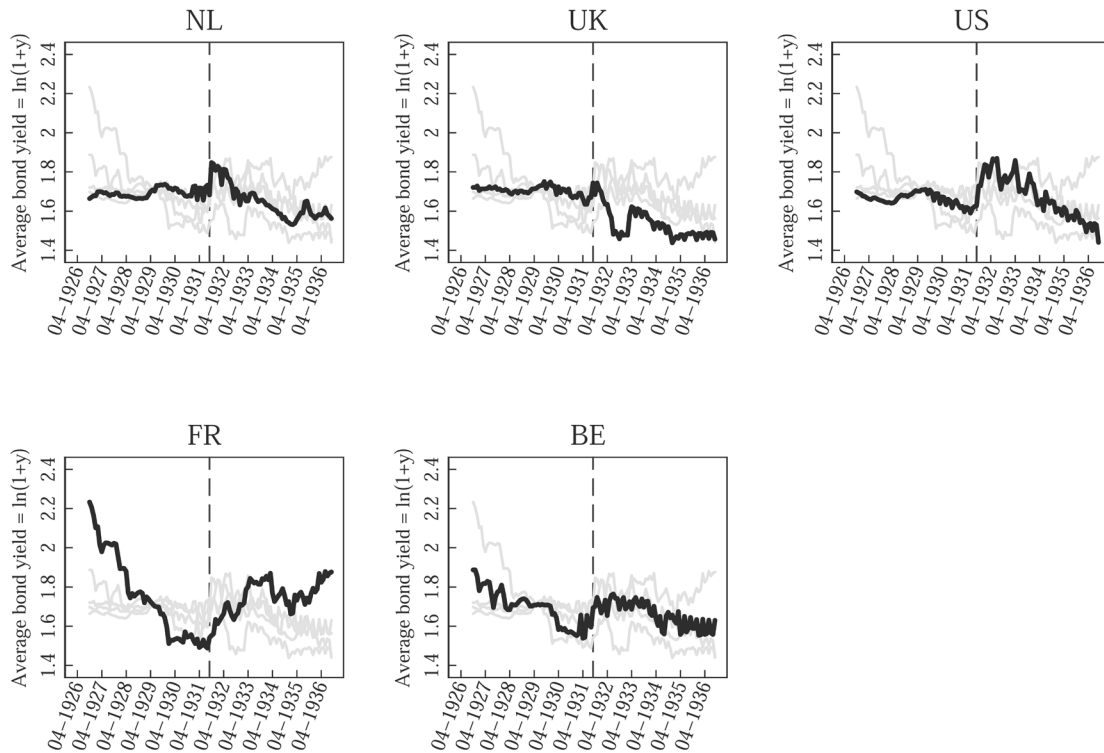
Figure B3. Trade balance of the Netherlands relative to peer countries (monthly frequency), 1920-1936



Note: Depicted are the ratios of indexed trade balances of the Netherlands to the indexed trade balances of peer countries. The vertical lines denote the UK's departure from the gold standard in September 1931.

Source: Own calculation, using Albers (2018).

Figure B4. Average yields of bonds in selected countries (monthly frequency), 1926-1936



Note: Depicted are the average bond yields ($\ln(1+y)$) of a collection of bonds (as described in text) traded in the respective countries. The vertical lines denote the UK's departure from the gold standard in September 1931.

Source: Own calculation, using data from Center for Financial Stability, compiled from LoN Statistical Yearbook (various issues, 1930/31-1942/44). For the Netherlands we use: unspecified perpetual, redeemable bond, 4% prime bond, government bond, two series of miscellaneous public and private bond baskets, miscellaneous public bonds, 2.5/3% perpetual bond, 3/3.5% 1938 state lone. For the UK: 2.5% perpetual bond, 3.5% 1932 war loan, basket of industrial loans. For the US: a basket of Liberty and Treasury bonds, 10 year Treasury bond, a basket of all Treasury bonds not due for more than 12 years, partly tax-exempt bonds, taxable bonds not due for more than 15 year, municipal bonds, a basket of utility bonds, a basket of railway bonds and a basket of industrial bonds. For France: a combination of 3% perpetual and 4.5% 1932 loan, 4% 1918 bond, 4.5% 1932 Tranche A, a basket of miscellaneous government and private bonds (two significant revisions in 1929, and 1939). All yields are expressed in the form $\ln(1 + r)$. For all countries we average the different yields to have an extended series.

Appendix C

To facilitate the construction of a counterfactual, we estimate a vector autoregression (VAR) using a combination of Dutch domestic factors and global factors. Table C1 highlights the factors included in our analysis and the source materials used to construct the relevant time series. All factors are reported at a monthly frequency and have been log-transformed. Forecasts have been represented as index figures, where our base period is April 1925. Figures C1 and C2 report the time series of our domestic and global factors. All data obtained from DNB's weekly balance sheets have been aggregated to a monthly frequency.

We estimate a VAR following Greene (2008). The model can be written as:

$$y_t = k + A_1 y_{t-1} + \dots + A_p y_{t-p} + \epsilon_t \quad (C1)$$

where y_t is an $n \times 1$ vector of endogenous variables, pertaining to the factors described in Table C1, and k is a vector of constants. A_p is then a $k \times k$ matrix of parameters capturing the relationship between individual endogenous factors. For our baseline model this implies that y_t consists of eight domestic factors and four global factors. For ϵ_t we assume that $E(\epsilon_t) = 0$, and the covariance matrix is $E(\epsilon_t \epsilon_t')$. This means that we assume our model is correctly specified and contains no errors related to our endogenous variables. Our baseline model uses $p = 3$; we used Akaike Information Criterion to select a three-month lag structure for our endogenous variables.

We then estimate our models for the period April 1925 to May 1931. We stop our estimations in May 1931 – well before the UK leaves the standard – because after this date DNB significantly revised its policy on gold, as discussed in the main text. Then using stable parameters, included in A, we calculate our out-of-sample forecasts for June 1931 to September 1936.⁴ We ask: what would have happened to the Dutch economy if Dutch policymakers would have left gold early alongside the UK, fixed the guilder to the pound and kept gold reserves stable?

Our forecasts are calculated using parametrically bootstrapped standard errors for which the confidence bounds are estimated via simulation in which the changes come from a multivariate normal distribution. For the bounds we rely on centiles of the bootstrap set. To ensure that our forecasts remain within the observed bounds, all estimations use 500 replications. In total, we estimate six different models, of which we only discuss our baseline model in the main text.

Figures C3 to C8 show the forecast outcomes for our variables of interest. Table C2 shows the average deviation of forecasted versus observed levels for our variables of interest. Additionally, we report relative root mean squared errors (RRMSE) to capture the scale invariant forecasting errors. This

⁴ We assume a lower-triangular matrix that imposes an ordering on the variables. Changes to any one equation affect the variables later in the ordering contemporaneously, but each variable is contemporaneously unaffected by the changes to variables earlier in the system.

signals the accuracy of each of the VAR models for our endogenous variables. We find that all our models perform relatively well. While the RRMSE for our baseline model might be somewhat higher than the reduced lag or closed model, we calculate that these models provide a less accurate reflection of the Dutch economy. This is because the Dutch economy needed more than two months to return to equilibrium following a foreign exogenous shock, and the Dutch economy is traditionally characterised as a small and very open economy.

What follows is a short reading example for Table C2. Compared to the observed outcomes for the Dutch economy, our baseline model suggests that Dutch economic activity would have been on average 6.6 per cent higher if Dutch policymakers would have chosen to leave gold early. Across our models, we find that this figure lies between 6.6 and 10.9 per cent. We find that our variables of interest are forecasted with relatively high accuracy (low RRMSE) across our different model specifications, with the notable exception of the *US policy* specification. This is consistent with our previous findings that US monetary policy was not on the minds of Dutch central bankers when they made their decisions.

Had the Netherlands devalued the guilder in 1931 and maintained its unrestricted trade policies, this would have also affected the country's relative trading position; there may have been: (a) a negative effect on the export competitiveness of Dutch trading partners; and (b) an increase in now-cheaper Dutch exports. We do not model these effects because their respective sizes are not obvious; they depend on the importance of the Dutch economy, the Netherlands' current account balance, and the dynamics of international trade specialisation.

Table C1. *Domestic and global factors for VARs*

<i>Model</i>	Baseline	Robustness					Source
		<i>Reduced</i>	<i>Closed</i>	<i>US policy</i>	<i>BoE gold</i>	<i>Credit</i>	
<i>Number of factors</i>	12	12	10	13	13	13	
<i>Number of lags</i>	3	2	3	3	3	3	
<i>Domestic factors</i>							
Policy rate	√	√	√	√	√	√	DNB (2011)
Gold reserves	√	√	√	√	√	√	DNB (1920-1939)
Economic activity	√	√	√	√	√	√	Albers (2018)
Inflation	√	√	√	√	√	√	Albers (2018)
Money supply	√	√	√	√	√	√	DNB (1920-1939)
Unemployment	√	√	√	√	√	√	Albers (2018)
Total exports	√	√	x	√	√	√	Albers (2018)
Total imports	√	√	x	√	√	√	Albers (2018)
Lending	x	x	x	x	x	√	DNB (1920-1939)
<i>Global factors</i>							
UK exchange rate	√	√	√	√	√	√	Bohlin (2010)
UK economic activity	√	√	√	√	√	√	Albers (2018)
UK policy rate	√	√	√	√	√	√	Hills et al. (2015)
US policy rate	x	x	x	√	x	x	Board of Governors (2020)
Global gold price	√	√	√	√	√	√	MacroTrends LLC
BoE gold reserves	x	x	x	x	√	x	Huang and Thomas (2016)

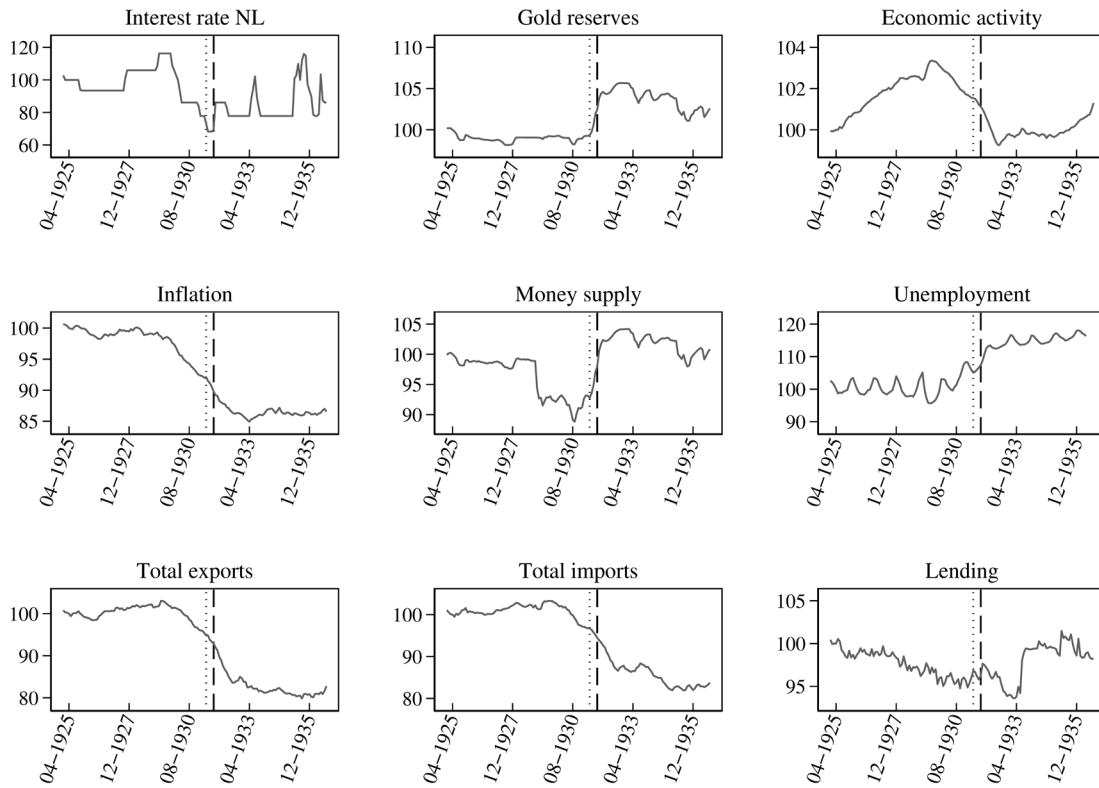
Note: Domestic factors defined as: Policy rate is the key policy rate set by DNB as reported in Figure 3 and calculated as $\ln(1+r)$, based on DNB (2011). Gold reserves are defined as the stock of gold coin and bullion held by DNB. Economic activity is defined as calculated by Albers (2018). Inflation is defined as wholesale price levels, as calculated by Albers (2018). Money supply is defined as bank notes and coins in circulation based on DNB (1920-1939). Unemployment is defined as the total number of unemployed individuals as calculated by Albers (2018). Total exports and total imports are defined as in Albers (2018). Lending is the total of credit provided via the short-term repo (Lombard) facilities with required collateral based on DNB (1920-1939). Global factors defined as: UK exchange rate is the value of the pound relative to the value of the guilder as per our own calculation using data provided by Bohlin (2010). UK Economic activity is defined as calculated by Albers (2018). UK policy rate is the discount rate set by BoE, obtained from Hills et al. (2015). US policy rate is the discount rate set by the FED as obtained from Board of Governors (2020). Global gold price is defined as the monthly inflation adjust gold price denoted in US dollars, provided by MacroTrends LLC. BoE gold reserves is defined as the amount of gold reserves held by the BoE Issue department, as obtained from Huang and Thomas (2016).

Table C2. Average deviation from forecasted levels after May 1931

<i>Model</i>	<i>Baseline</i>		<i>Reduced</i>		<i>Closed</i>	
Number of factors	12		12		10	
Number of lags	3		2		3	
	Deviation	RRMSE	Deviation	RRMSE	Deviation	RRMSE
Economic Activity	6.6%	0.7%	8.8%	0.4%	7.9%	0.3%
Inflation	80.4%	2.7%	58.8%	1.5%	27.3%	1.0%
Unemployment	-74.4%	3.6%	-73.0%	1.5%	-51.7%	1.2%
Gold reserves	-46.7%	0.2%	-44.1%	0.1%	-45.2%	0.2%
<i>Model</i>	<i>US policy</i>		<i>BoE gold</i>		<i>Credit</i>	
Number of factors	13		13		13	
Number of lags	3		3		3	
	Deviation	RRMSE	Deviation	RRMSE	Deviation	RRMSE
Economic Activity	10.9%	1.0%	8.5%	0.4%	7.1%	0.7%
Inflation	105.0%	10.7%	60.6%	3.8%	83.1%	7.0%
Unemployment	-81.6%	17.3%	-73.4%	4.9%	-76.3%	9.5%
Gold reserves	-44.1%	0.2%	-44.3%	0.2%	-46.2%	0.2%

Note: All variables of interest are defined as in Table C1. Deviation is calculated as $\left(\frac{\sum_{May\ 1931}^{September\ 1936} \hat{y}_t}{n}\right) - \left(\frac{\sum_{May\ 1931}^{September\ 1936} y_t}{n}\right)$, where \hat{y}_t is the forecasted value of our variables of interest and y_t is the observed (i.e. actual) value of our variables of interest. Reported deviations are reported as normalized effect sizes. RRMSE is then the relative root mean squared error of our estimated forecasts over the period May 1931-September 1936.

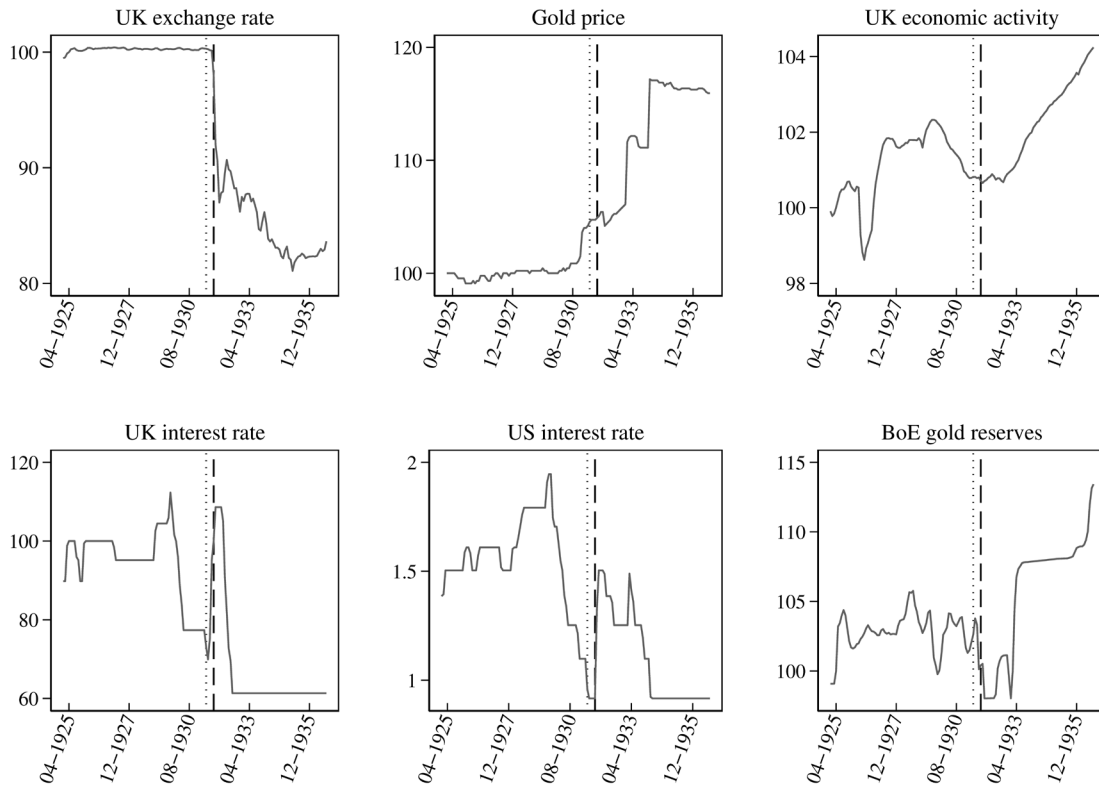
Figure C1. Domestic factors included in VAR models (monthly frequency), 1920-1939



Note: Depicted are the time series of the factors pertaining to the evolution of the Dutch domestic economy. The vertical lines denote DNB's gold policy change in May 1931 (dotted line) and the UK's departure from the gold standard in September 1931 (dashed line). All factors are log-transformed and depicted as indices with the reference date of April 1925.

Source: Data sources, variable definitions and model specification are provided in Table C1.

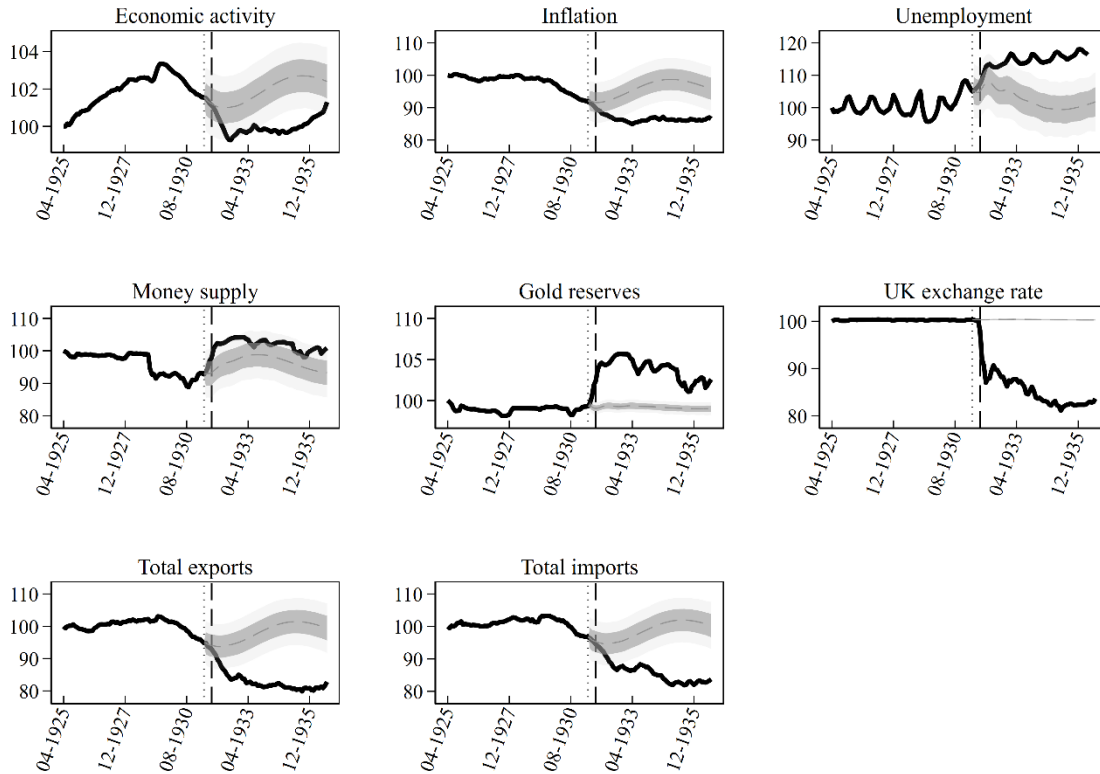
Figure C2. Global factors included in VAR models (monthly frequency), 1920-1939



Note: Depicted are the time series of external and global factors affecting the Dutch domestic economy. The vertical lines denote DNB's gold policy change in May 1931 (dotted line) and the UK's departure from the gold standard in September 1931 (dashed line). All factors are log-transformed and depicted as indices with the reference date of April 1925.

Source: Data sources, variable definitions and model specification are provided in Table C1.

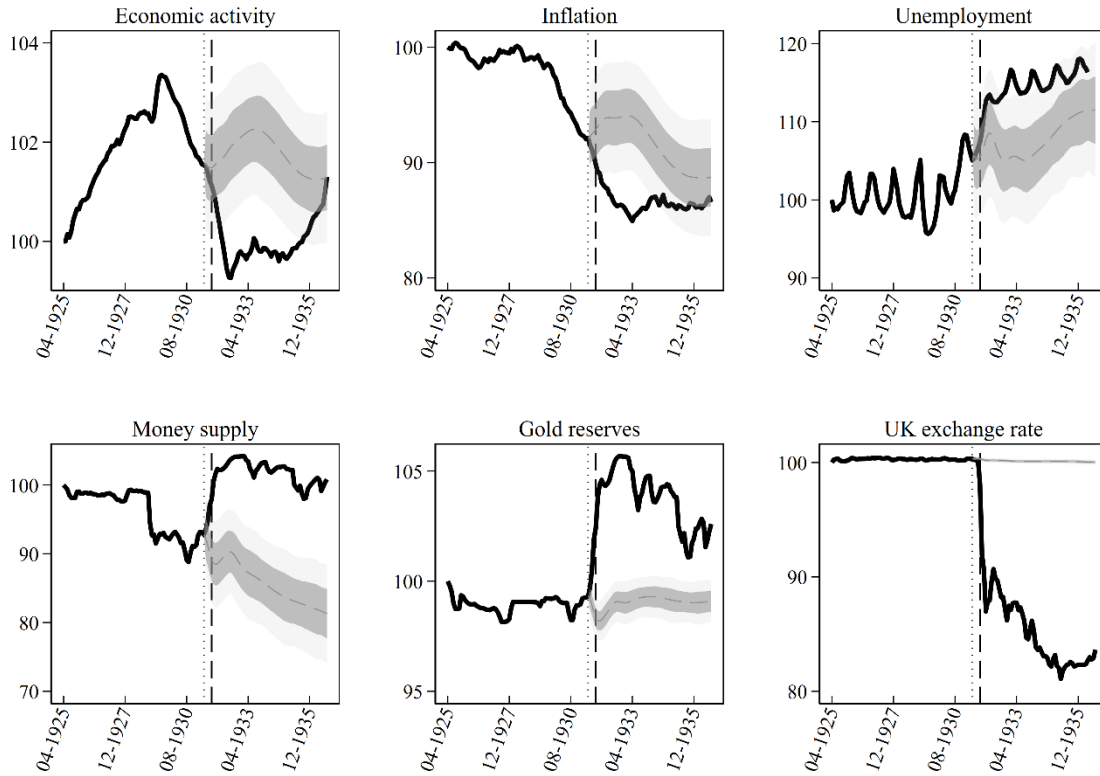
Figure C3. *Alternative VAR counterfactual, specification with two-month lag (monthly frequency), 1925-1936*



Note: Depicted are the observed outcomes (solid line) and counterfactual results (dashed line). The vertical lines denote DNB's gold policy change in May 1931 (dotted line) and the UK's departure from the gold standard in September 1931 (dashed line). We report two sets of confidence intervals: 95% (dark grey) and 68% (light grey). VAR estimation is described in Section V and Appendix C.

Source: Data sources, variable definitions and model specification are provided in Table C1. All factors are log-transformed and depicted as indices with the reference date of April 1925.

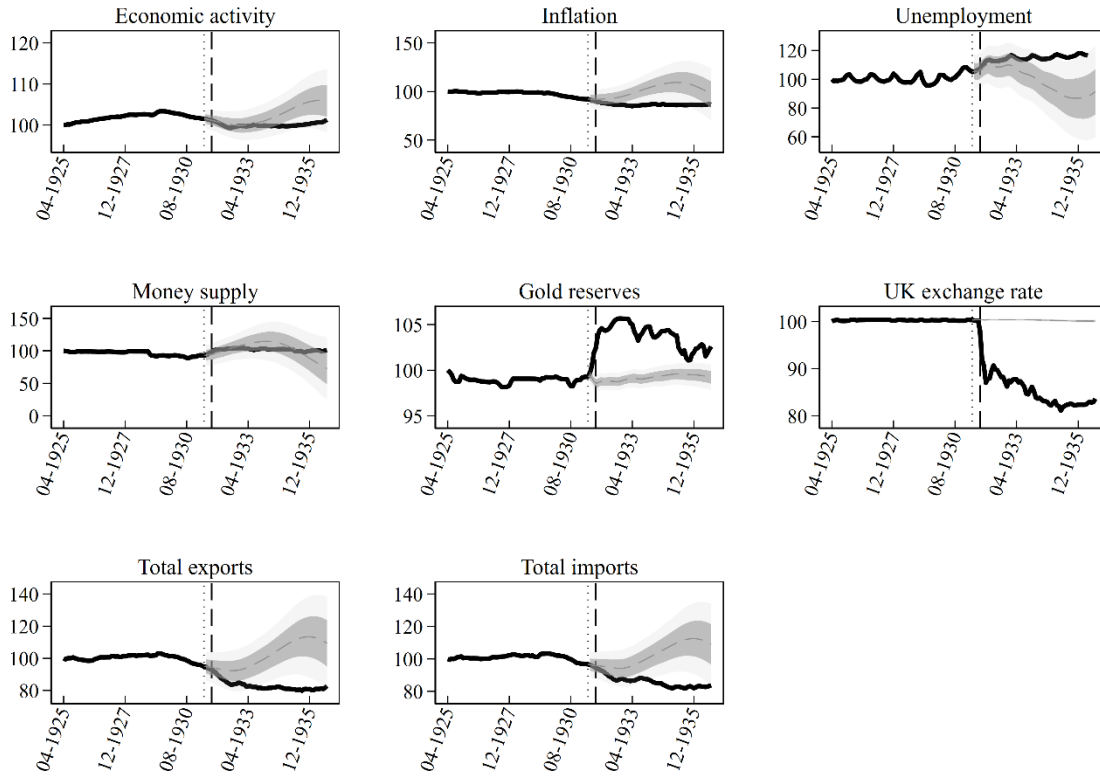
Figure C4. *Alternative VAR counterfactual, specification with closed economy assumption (monthly frequency), 1925-1936*



Note: Depicted are the observed outcomes (solid line) and counterfactual results (dashed line). The vertical lines denote DNB's gold policy change in May 1931 (dotted line) and the UK's departure from the gold standard in September 1931 (dashed line). We report two sets of confidence intervals: 95% (dark grey) and 68% (light grey). VAR estimation is described in Section V and Appendix C.

Source: Data sources, variable definitions and model specification are provided in Table C1. All factors are log-transformed and depicted as indices with the reference date of April 1925.

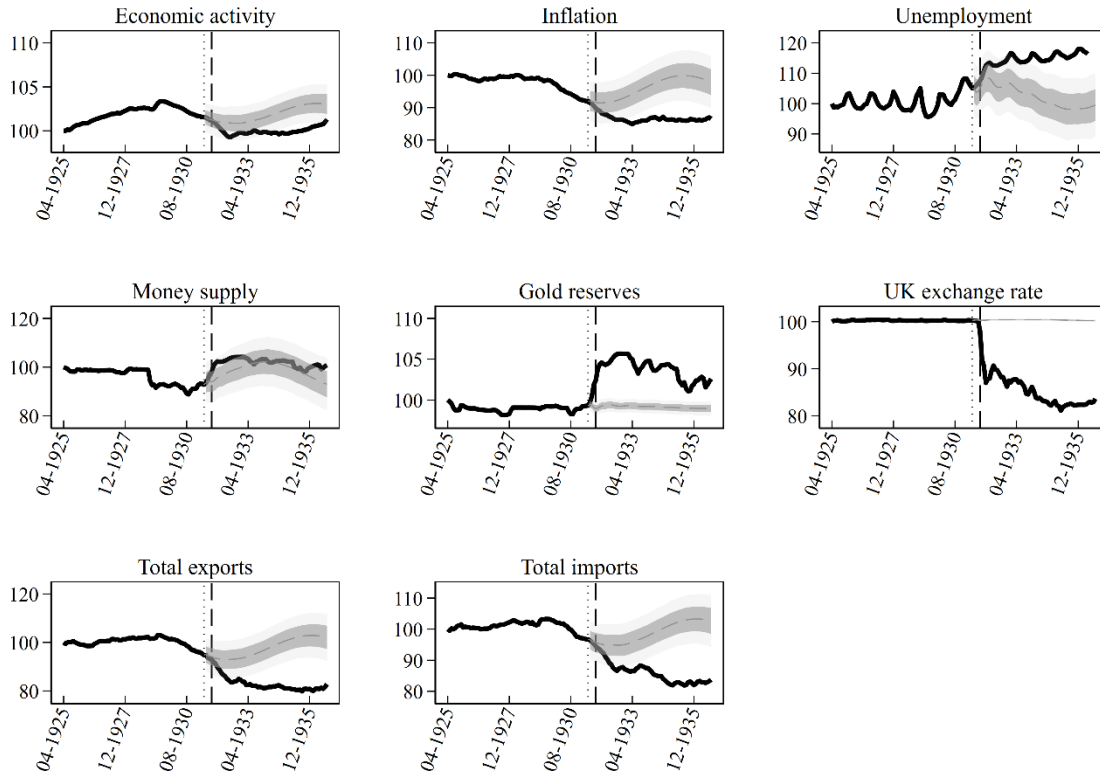
Figure C5. *Alternative VAR counterfactual, specification including US interest rate (monthly frequency), 1925-1936*



Note: Depicted are the observed outcomes (solid line) and counterfactual results (dashed line). The vertical lines denote DNB's gold policy change in May 1931 (dotted line) and the UK's departure from the gold standard in September 1931 (dashed line). We report two sets of confidence intervals: 95% (dark grey) and 68% (light grey). VAR estimation is described in Section V and Appendix C.

Source: Data sources, variable definitions and model specification are provided in Table C1. All factors are log-transformed and depicted as indices with the reference date of April 1925.

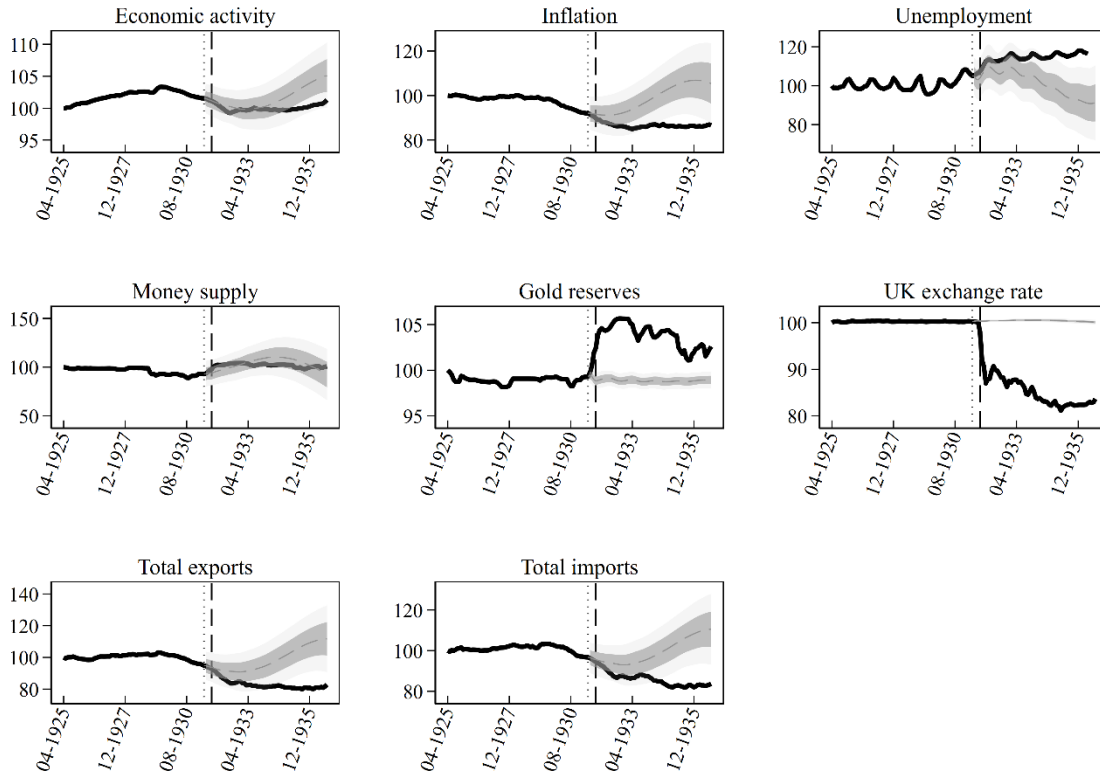
Figure C6. *Alternative VAR counterfactual, specification including BoE gold reserves (monthly frequency), 1925-1936*



Note: Depicted are the observed outcomes (solid line) and counterfactual results (dashed line). The vertical lines denote DNB's gold policy change in May 1931 (dotted line) and the UK's departure from the gold standard in September 1931 (dashed line). We report two sets of confidence intervals: 95% (dark grey) and 68% (light grey). VAR estimation is described in Section V and Appendix C.

Source: Data sources, variable definitions and model specification are provided in Table C1. All factors are log-transformed and depicted as indices with the reference date of April 1925.

Figure B7. *Alternative VAR counterfactual, specification including DNB lombard lending (monthly frequency), 1925-1936*



Note: Depicted are the observed outcomes (solid line) and counterfactual results (dashed line). The vertical lines denote DNB's gold policy change in May 1931 (dotted line) and the UK's departure from the gold standard in September 1931 (dashed line). We report two sets of confidence intervals: 95% (dark grey) and 68% (light grey). VAR estimation is described in Section V and Appendix C.

Source: Data sources, variable definitions and model specification are provided in Table C1. All factors are log-transformed and depicted as indices with the reference date of April 1925.

Archival sources

- Afdeling Historisch Archief De Nederlandsche Bank NV, Amsterdam (ADNB).
Koninklijke Bibliotheek, The Hague:
Delpher historical newspapers repository. URL: <https://www.delpher.nl/>.
Nationaal Archief, The Hague (NL-HaNA):
Archief van de Bond voor de Geld- en Effectenhandel te 's-Gravenhage.
Collectie 148: Heldring.
Collectie 281: Oud.

Data sources

- ALBERS, T. N. H. (2018). The prelude and global impact of the Great Depression: Evidence from a new macroeconomic dataset. *Explorations in Economic History*, 70: 150–163.
- Board of Governors of the Federal Reserve System [Board of Governors] (2020). Federal Reserve Bank of St. Louis Basic Discount Rate. FRED, Federal Reserve Bank of St. Louis. URL: <https://fred.stlouisfed.org/series/DISCNTD8>.
- BOHLIN, J. (2010). From appreciation to depreciation – the exchange rate of the Swedish krona, 1913–2008. In: Edvinsson, E., Jacobson, T., and Waldenström, D. (eds.). *Historical Monetary and Financial Statistics for Sweden, Volume I: Exchange Rates, Prices, and Wages, 1277–2008* (pp. 340–411). Sveriges Riksbank, Stockholm.
- CAPIE, F., and WEBBER, A. (2013). *A Monetary History of the United Kingdom: 1870–1982*. Routledge, Abingdon.
- Centraal Bureau voor de Statistiek [CBS] (1916–1936). Groothandelsprijzen. *Maandschrift van Centraal Bureau voor de Statistiek*. URL: <http://www.delpher.nl>.
- ____ (1916–1936). Cijfers betreffende den economische en sociale toestand van Nederland. *Maandschrift van Centraal Bureau voor de Statistiek*. URL: <http://www.delpher.nl>.
- ____ (1924–1936). Handelsbewegingen. *Maandschrift van Centraal Bureau voor de Statistiek*. URL: <http://www.delpher.nl>.
- ____ (2014). *Nationale Rekeningen: Historie 1900 – 2012*. URL: <http://statline.cbs.nl/>.
- De Nederlandsche Bank [DNB] (1920–1939). Wekelijks balans. In: *Verslag door den President en door de Commissarissen, Algemene Vergadering van Aandeelhouders*. Blikman & Satorius, Amsterdam.
- ____ (2011). *Official Rates of De Nederlandsche Bank (1898–1998)*. URL: <https://www.dnb.nl/en/statistics/>
- Deutsche Bundesbank (1976). *Deutsches Geld- und Bankwesen in Zahlen 1876–1975*. Fritz Knapp, Frankfurt am Main. URL: http://www.digitalis.uni-koeln.de/Geldwesen/geldwesen_index.html.
- FLANDREAU, M., and ZUMER, F. (2004). *The Making of Global Finance 1880–1913*. OECD, Paris.
- HILLS, S., THOMAS, R., and DIMSDALE, N. (2010). The UK recession in context – what do three centuries of data tell us? *Bank of England Quarterly Bulletin*, Q4: 277–291.
- HOMER, S., and SYLLA, R. E. (2005). *A History of Interest Rates*. Fourth edition, Wiley, Oxford.
- League of Nations [LoN] (1930/31–1942/44). *Statistical Yearbook*. League of Nations, Geneva.
- LOUBET, P. (1900). *La Banque de France et l'Escompte*. A. Rousseau, Paris.
- MITCHELL, B. R., and Palgrave Macmillan (eds.) (2013). *International Historical Statistics*. Palgrave Macmillan, Basingstoke. URL: <https://doi.org/10.1057/978-1-137-30568-8>.
- Statistische Reichsamt (1935/6). *Statistische Handbuch der Weltwirtschaft*. Verlag für Socialpolitik, Wirtschaft und Statistik, Berlin.

Supplementary references

- HUANG, H., and THOMAS, R. (2016). The Bank of England Weekly Balance Sheet. OBRA Dataset. URL: <https://www.bankofengland.co.uk/statistics/research-datasets>.
- KLEIN, W. (1973). Depressie en beleid tijdens de jaren dertig. Kanttekeningen bij de ontwikkeling van de Nederlands volkshuishouding in de jaren dertig. In: *Lof der historie. Opstellen over Geschiedenis en Maatschappij* (pp. 287–335). Universitaire Pers, Rotterdam.
- MOESSNER, R., JANSEN, D.-J., and DE HAAN, J. (2017). Communication about future policy rates in theory and practice: A survey. *Journal of Economic Surveys*, 31(3): 678–711.