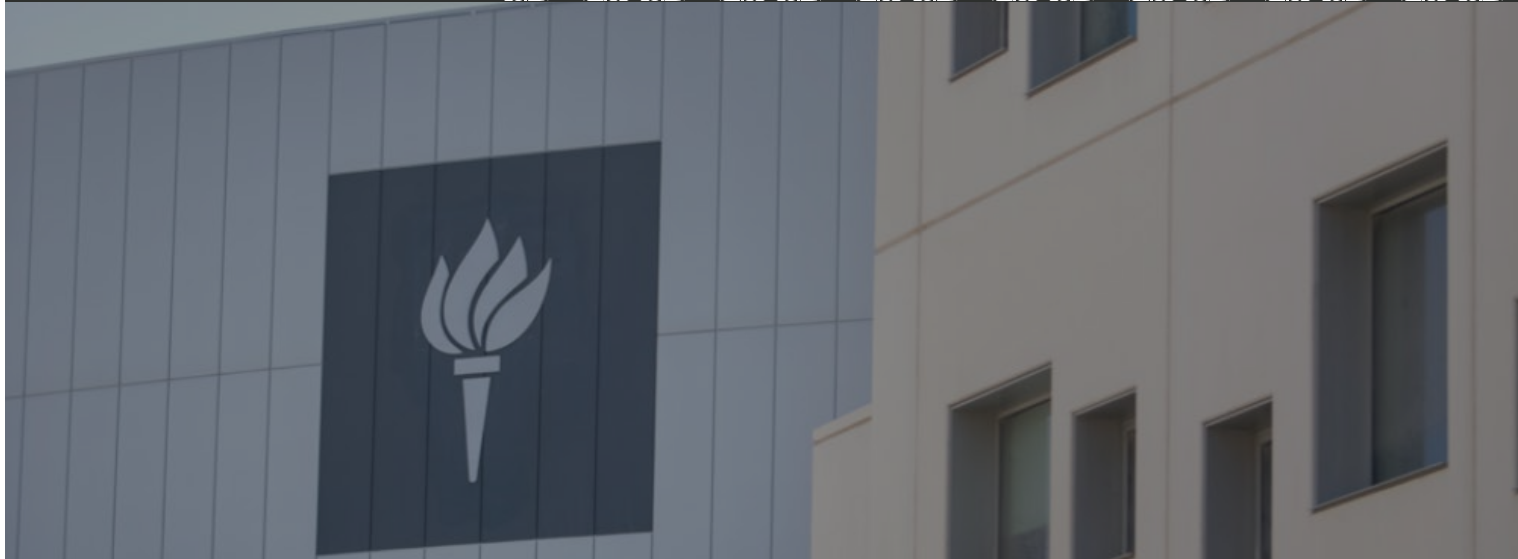جامعـة نيويورك أبوظبي
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The Ends of 30 Big Depressions

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Abstract

How did countries recover from the Great Depression? In this paper we explore the argument that leaving the gold standard helped by boosting inflationary expectations and lowering real interest rates. We do so for a sample of 30 countries, using modern nowcasting methods and a new dataset containing more than 230,000 monthly and quarterly observations for over 1,500 variables. In those cases where the departure from gold happened on clearly defined dates, it seems clear that inflationary expectations rose in the wake of departure. Synthetic matching techniques suggest that the relationship is causal.

1. Introduction

What does it take to end a big depression? Maybe history can provide us with guidance. In this paper we study the end of the Great Depression in 30 countries. Many authors, notably Eichengreen and Sachs (1985), have suggested that leaving the gold standard was a prerequisite for recovery: how true was this in general?[1] And if going off gold and recovery were linked to each other then what was the mechanism? Monetary loosening, in the form of lower nominal interest rates? Beggar thy neighbour currency devaluations? Fiscal expansion, as intellectual straitjackets were jettisoned along with the peg to gold? Or did going off gold matter in some other way?

The title of this paper is of course a tribute to Thomas Sargent's celebrated article on the end of four central European hyperinflations in the aftermath of World War I. Just as Sargent (1982) argued that changing expectations was central to halting hyperinflation, so we argue that changing expectations was central to stopping the Great Depression.[2] And just as he argued that going back on gold, or pegging to the dollar, was essential to replacing expectations of continuing hyperinflation with expectations of stable prices, so we argue that leaving gold was essential to replacing expectations of continuing deflation with expectations of stable or increasing prices. The result was a collapse in ex ante real interest rates, a rebound in interest-rate-sensitive expenditure, and economic recovery. In both cases it took a regime shift to change expectations: as Sargent stresses, a simple change in policies would not have sufficed. Our paper offers a historical bookend to his argument: the monetary institution that allowed individual countries to escape hyperinflation in the 1920s had to be abandoned in the 1930s so that the world could escape the Depression.

We are not the first people to argue that going off gold mattered because it signalled to economic agents that the policy regime had shifted and that the era of deflation was over. This paper is, however, the most comprehensive study to date on the topic, breaking new ground not only in its country coverage but also in the methods used. Temin and Wigmore (1990) made the case for the United States in a paper which cites Sargent in theoretical support of their argument, and whose title also mirrors his. Temin reprised the argument in his Lionel Robbins Lectures (Temin, 1989), and Romer (1992) took it one step further by estimating US *ex ante* real interest rates using the single equation methods of Mishkin (1981) and quarterly data. In her account, an autonomous inflow of gold from Europe shifted US price expectations in an inflationary direction and enabled the economy to recover. More recently, Eggertsson (2008) embedded the argument within a theoretically well-specified dynamic stochastic general equilibrium model.

We extend the argument along several dimensions. First, we provide empirical evidence not just for the United States but for 30 countries. Second, rather than estimating inflationary expectations and *ex ante* real interest rates using single equation techniques, we use state-of-the art dynamic factor models to estimate real-time expectations of inflation that take all the data available into account. Developed to assist decision-making in modern central banks, dynamic factor models keep track of expectations by updating model forecasts whenever there is news in new data releases. Our method for extracting inflation expectations from the data mirrors that currently employed to produce the New York Fed Staff Nowcast.

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[1] Campa (1990) extended the Eichengreen and Sachs argument from Europe, which was their focus, to Latin America, and found that their argument held there as well. See also Bernanke and Carey (1996) and Obstfeld and Taylor (2004), pp. 141-5.

[2] Sargent argued that hyperinflation was stopped by changing fiscal and monetary policy regimes in such a way that expectations were permanently changed: instead of expecting ever-increasing rates of inflation agents now looked forward to a future of stable prices. This was accomplished by setting up independent central banks, committed to maintaining convertibility vis-à-vis the dollar or gold, and which would no longer monetise government budget deficits.

Third, we compare the separate contributions of nominal interest rate reductions and changing inflationary expectations to changes in *ex ante* real interest rates. And fourth, we base our analysis on an exhaustive new database collected over several years which gathers together virtually all extant monthly or quarterly time series for the countries concerned.

The papers which are closest to us in spirit are Hamilton et al. (2016) and Albers (2018). Hamilton et al. estimate *ex ante* real interest rates for 15 countries between 1858 and 2014. They use annual data and single equation methods, and do not have our focus on the Depression. Albers (2018) independently collected data from the same interwar data sources that we use. He extracted about 1,150 time series from the sources, and used these to derive monthly economic activity indices for 28 countries. We have collected in excess of 1,500 time series, and use these to trace the links between going off gold, inflationary expectations, *ex ante* real interest rates, and economic recovery.

In Section 2 we introduce the data and document our sources. Section 3 explains the methodology used to estimate real-time inflation expectations and *ex ante* real interest rates. Section 4 discusses the surprisingly tricky issue of when to date countries' departure from gold. Section 5 takes a first look at the link between going off gold and inflationary expectations, while Section 6 takes a more in-depth look at the experiences of three countries (Belgium, Japan and South Africa) to set the scene for cross-country comparisons in Section 7. In Section 8 we use synthetic matching techniques to predict what would have happened if five countries (Denmark, Finland, Sweden, Australia and New Zealand) had not left the gold standard. A final section concludes.

2. Data

The principal data sources for our study are the *International Abstract of Economic Statistics* and the *Statistisches Handbuch Der Weltwirtschaft*. These provide detailed and comprehensive information on a very large number of economic indicators in many countries, at monthly and quarterly frequencies from January 1919 to December 1936. The indicators include a wide range of economic and financial data, such as prices and quantities at both the aggregate and the industry level, volumes and values of aggregate and disaggregated international trade, prices and quantities in financial markets, and measures of labour market conditions. The data in these volumes was transcribed by hand into spreadsheets and files for historical analysis.

The 30 countries in our dataset are Argentina, Australia, Austria, Belgium, Brazil, British India, Bulgaria, Canada, Chile, Czechoslovakia, Denmark, Dutch Indies, Estonia, Finland, France, Germany, Hungary, Italy, Japan, Lithuania, the Netherlands, New Zealand, Peru, Poland, Romania, South Africa, Sweden, Switzerland, the United Kingdom and the United States. We omit Spain because it did not return to the Gold Standard after World War I.[3] The paucity of data for Greece, Latvia, Norway and Yugoslavia precludes their inclusion in our study.

We complement our principal data sources by extracting statistics from the monthly *Federal Reserve Bulletin*, which provides detailed information on the United States and several other countries of interest. The *NBER Macrohistory Database* is an additional source that is useful for long and wide-ranging time series from France, Germany, the United Kingdom and the United States. The availability of multiple datasets from different sources allows us to thoroughly cross-check the validity of our data. Where possible, we also reference the data against the *Statistical Yearbook of the League of Nations*, meaning that our dataset ultimately combines five distinct sources. In total we have data on more than 1,500 variables; our final

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[3] See Choudhri and Kochin (1980). Spain did not return to the Gold Standard after World War I because of serious political protest. Spanish experience during the Great Depression is discussed in Albers (2018).

dataset comprises over 230,000 observations. The data will be made available to researchers on a website dedicated to interwar data.[4]

Given our paper's emphasis on the role of *ex ante* real interest rates, we draw particular attention to our preferred measures of the nominal interest rate, aggregate price level and aggregate output. For the nominal interest rate, we follow Romer (1992) in using three to six month market interest rates wherever possible, with the central bank discount rate acting as a proxy for countries where market rates are unavailable. For the aggregate price index, we focus on the wholesale price index as it is the most commonly available measure across our sample of countries. For those few countries where the wholesale price index is unavailable or of limited use, we select either a cost of living index or the wholesale price of a key product or commodity. Aggregate output is measured by the index of total production or its variant whenever feasible; otherwise it is proxied by the quantity of a key product or commodity produced. Full details of the measures used for each country appear in Appendix A.

3. Methodology

The *ex ante* real interest rate is defined by the Fisher equation as the difference between the nominal interest rate and the expected rate of inflation. To keep track of the *ex ante* real interest rate, we therefore need an estimate of inflation expectations that is updated in real-time as new macroeconomic data are released. Fortunately for us, the real-time estimation of inflation expectations is a core input to decision-making in modern monetary policy-making. Central banks worldwide have therefore developed sophisticated nowcasting and forecasting techniques that we can apply retrospectively to our data. In essence, our estimate of the *ex ante* real interest rate is that which a modern central bank would have made had they been exposed to the flow of information released from January 1919 to December 1936.

We adopt the nowcasting methodology of Bańbura and Modugno (2012) and Bańbura et al. (2010) that is currently used to construct the New York Fed Staff Nowcast.[5] The version we employ is documented in Bok et al. (2018). The method builds on the machinery of dynamic factor models, which views movements in observed data as driven by a limited number of latent factors. This conceptual reduction allows us to analyse our large and complex dataset in a statistically consistent and tractable manner. In particular, we can identify the impact of new data releases on real-time inflation expectations, which is crucial for tracking movements in the *ex ante* real interest rate. The method is conveniently able to handle data with different sample lengths, publication delays, reporting frequencies and missing observations. Historical data is replete with such problems, so adopting the nowcasting methodology improves upon earlier historical studies based on more traditional factor models.[6] Our choice of methodology permits a systematic, unified and efficient treatment of all the available data.

In our dynamic factor model, the large set of variables observed for each country is related to a small number of country-specific latent factors and idiosyncratic components. The number of variables to be explained ranges from a minimum of $n = 10$ in Brazil to a maximum of $n = 50$ in Canada. These are related to r dynamic factors. To be specific, observations $y_{i,t}^{j}$ of variable i in country j and period t are explained by country-specific latent factors $f_{1,t}^{j}, \dots, f_{r,t}^{j}$ and an idiosyncratic component $e_{i,t}^{j}$:

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[4] https://cepr.org/content/trade-depression.
[5] The New York Fed Staff Nowcast is available at https://www.newyorkfed.org/research/policy/nowcast.
[6] Ritschl et al (2016) and Albers (2018) are two examples.

$$y_{i,t}^j = \mu_i^j + \sum_{k=1}^{r} \lambda_{i,k}^j f_{k,t}^j + e_{i,t}^j \quad \text{for } i = 1, \dots, n \qquad (1)$$

The observed variables are related to the dynamic factors through the estimated *factor loadings*, $\lambda_{i,1}^j, \dots, \lambda_{i,r}^j$, with the idiosyncratic component capturing sources of variation unrelated to the factors. The latent factors and the idiosyncratic components are assumed to follow autoregressive processes:

$$f_{k,t}^j = \alpha_k^j f_{k,t-1}^j + u_{k,t}^j \qquad \text{for } k = 1, \dots, r \qquad (2)$$

$$e_{i,t}^j = \rho_i^j e_{i,t-1}^j + \varepsilon_{i,t}^j \qquad \text{for } i = 1, \dots, n \qquad (3)$$

where $u_{k,t}^j$ and $\varepsilon_{i,t}^j$ are i.i.d. normal variables with zero mean and variances $\sigma_{u_k^j}^2$ and $\sigma_{\varepsilon_i^j}^2$.

Equations (1) - (3) form a state space model in which (1) is the measurement equation and (2) – (3) are state transition equations. The system is estimated using the Kalman filter and maximum-likelihood methods. Forecasts for key variables are constructed from forecasts of the latent factors and idiosyncratic components by applying the appropriate factor loadings. Our results are robust to suitable alternative specifications with different numbers of dynamic factors or lags in the autoregressive processes.

A dynamic factor model is estimated separately for each country. We are able to identify four latent factors in most of the countries in our sample. A global factor affects all variables that are observed, whereas three additional factors are specific to variables observed in real, financial and labour markets respectively.[7] Following the model specification in Bok et al. (2018), we do not have a separate factor specific to nominal variables, which means that inflation expectations are exclusively accounted for by the global factor. For a few countries we do not have enough data to identify a separate labour market factor, in which case we estimate a model with three latent factors and allow what labour market data we have to be affected by the real and global factors. Where necessary, all data series are transformed to ensure the stationarity required to estimate a dynamic factor model. Stationarity is inspected visually and checked formally whenever possible. The specification of the model estimated for each country is provided in Appendix A.

Our focus on the real-time updating of inflation expectations means that we need to identify and control for the dates at which new information is released. The principal data sources are not helpful in this respect, but the *Federal Reserve Bulletin* is published monthly and so allows us to check the delay with which each variable is reported. We use evidence from Bulletins published between January 1919 and December 1936 to estimate the release date for each type of variable, and apply the same structure to all countries. Broadly speaking, prices, sales, logistics/transportation and financial quantities are released with a delay of two months; production, labour and international trade with a delay of three months. Financial prices are observed without delay. Results are robust to alternative assumptions regarding release delays (see Appendix B).

The dynamic factor models are estimated using data from the period before the Great Depression. For countries with sufficiently long time series, we use data up to October 1928, one year before the Great Depression began in the United States. For the rest, we use data up to October 1929. This ensures that we are making appropriate pseudo out-of-sample forecasts for the period after the start of the Great Depression. To achieve predictive stability, we make some judgement calls that exclude variables especially

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[7] The labelling of the factor that affects all variables as "global" is taken from Bok at al. (2018). For the avoidance of doubt, we reiterate that we estimate a separate dynamic factor model for each country. Our global factor is "global" in the sense of affecting all the variables in a country, but it is not global in the sense of being estimated from developments in the global economy.

susceptible to extreme swings or structural breaks. Full details are given in Appendix A. Our model specification maximises the reliability of out-of-sample inflation predictions by prioritising the in-sample fit to the inflation data. As we will see below, the results are consistent with the established narrative about how big depressions ended in a well-studied country such as the US. This serves as a proof of concept for our empirical approach, validating our application of the same method to the analysis of the many countries in our sample whose interwar economic experiences have been relatively less studied.

Figure 1 shows the results when the dynamic factor model is estimated for the United States using data from January 1919 to October 1928. The upper panel plots the 30 time series for which we have observations, transformed where necessary to induce stationarity and standardised to have unit variance. The lower panel shows our estimates of the four latent factors. It is clear that many of the patterns in the raw data are reflected in the dynamics of the estimated factors.
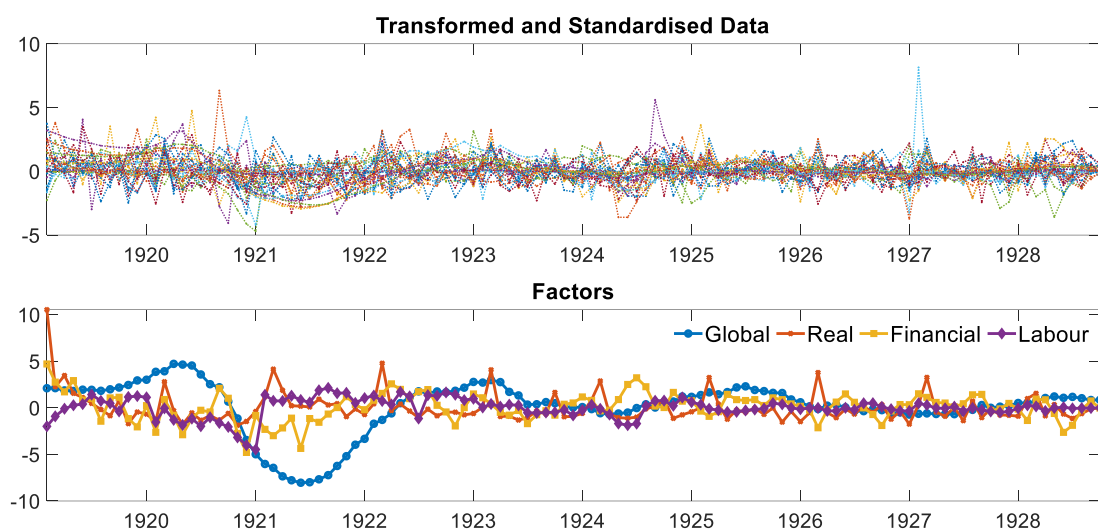

Figure 1: Latent factors in the dynamic factor model for the United States 1919:1-1928:10

Forecasts from the dynamic factor model depend on the latent factors whose estimates evolve as new information becomes available. Updates to the forecasts are driven by changes in these estimates, which in turn depend on the amount of news in each new release and the importance of that news to the variables of interest that are being forecasted. The dynamic factor model methodology calculates these automatically, and allows us to track how forecasts are updated as new information is released. Figure 2 illustrates the results when using the methodology to estimate real-time inflation expectations in the United States from March 1931 to March 1934. The figure is designed to match the format of the contemporary New York Fed Nowcast as closely as possible.

The black line in Figure 2 is the real-time forecast of year-on-year inflation in March 1934. At the beginning of the sample in March 1931, the forecast was that inflation would be -6.6% in March 1934. The forecast remained relatively flat until March 1933, when the release of new information caused it to spike upwards to 13.2%. The spike was swiftly reversed in April 1933, but from that date onwards the forecast for inflation was steadily revised upwards, and inflationary expectations turned decisively positive in November 1933. The final data release was in May 1934, at which point inflation in March 1934 was finalised at 22.4%. This is marked with a red dot in Figure 2. The stacked bars in Figure 2 reveal the origin of the news causing real-time expectations of inflation to be revised. The preponderance of light blue and dark blue bars shows that the vast majority of news comes from variables relating to prices or money, banking and finance.
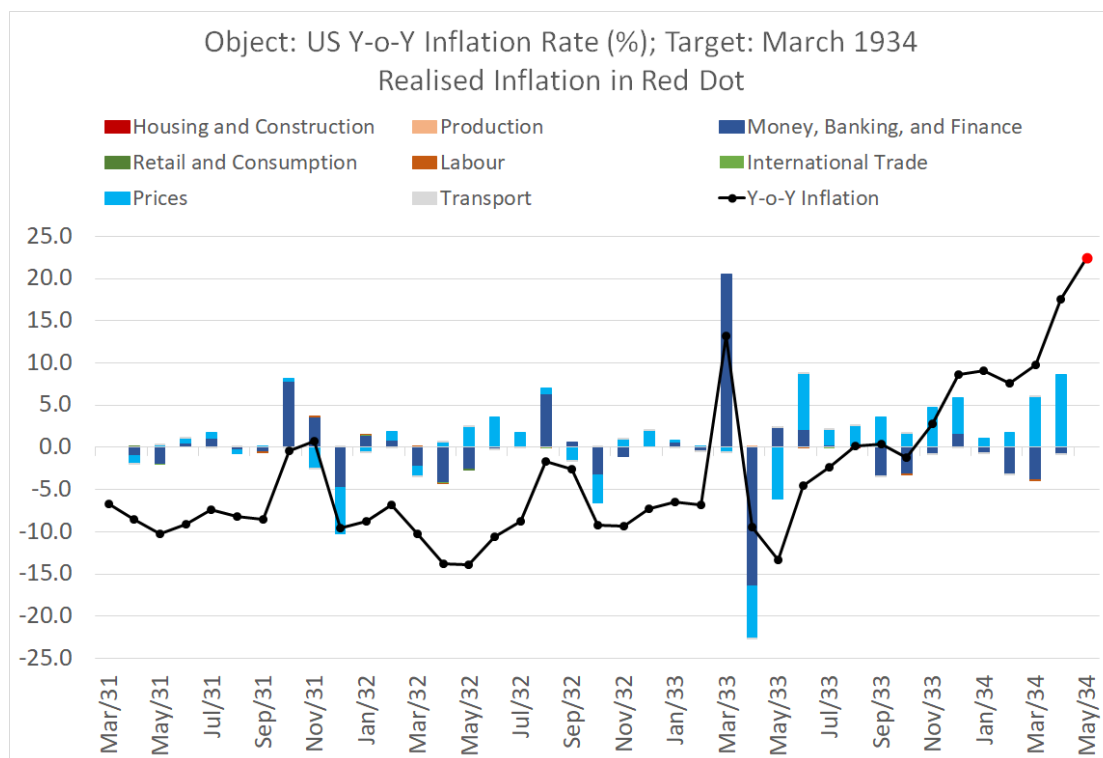
Figure 2: Real-time forecasts of US year-on-year inflation in March 1934

The news that caused inflation expectations to spike upwards in March 1933 is further decomposed in Table 1, which is again designed to mirror the Data Flow section of the contemporary New York Fed Nowcast. The forecast of inflation in March was revised up from -6.77% to 13.20%, primarily because the Prime Commercial Paper Rate and Banker's Acceptance Rate for New York turned out higher than expected in March 1933.

Data Flow (Mar 1933)					
Model Update	Release Date	Data Series	Actual	Impact	Inflation Forecast
Fed 33					**-6.77**
	Mar 33	■ Prime Commercial Paper Rate	3.06%	8.75	
	Mar 33	■ Bank Rate on Customer Loans - Leading Cities	5.30%	3.20	
	Mar 33	■ Banker's Acceptance Rate for New York	2.38%	5.20	
	Mar 33	■ New York Fed - Discount Rate	3.44%	2.59	
	Mar 33	■ Yield on Long-term US Bonds	3.31%	0.07	
	Mar 33	■ Federal Reserve System Reporting Member Banks - Loans on Securities	$4224m	-0.02	
	Mar 33	■ Volume of Commercial Paper Outstanding	$85m	0.02	
	Mar 33	■ Business Failures	2889	-0.07	
	Mar 33	■ Average Stock Price - Industrials	57.75	0.58	
	Mar 33	■ Average Stock Price - Railroads	23.75	0.14	
	Mar 33	■ Wholesale Price Index (PPI)	61.0	-0.52	
Mar 33					**13.20**

Table 1: Revisions to US inflation expectations in March 1933

4. Dating departures from the gold standard

To explore whether or not leaving the gold standard helped boost inflationary expectations, we need to know when countries left the gold standard. But what exactly does that mean? Full adherence to the gold standard involved a domestic monetary rule (maintaining the convertibility of local currency into gold at a fixed price); no exchange controls (so that, in particular, gold could flow freely into and out of the country); and (as an automatic consequence of the previous two commitments) a fixed exchange rate vis à vis other countries on the gold standard. By implication, leaving the gold standard could involve an official suspension of convertibility; the imposition of exchange controls or restrictions on international gold shipments; or depreciation or devaluation against either gold or other currencies on gold. The League of Nations (1937) published data on all three dimensions of the phenomenon which have been widely reproduced: Table 2 gives the League's data for countries we are interested in. It also gives five sets of judgements regarding exactly when each country should be regarded as having left the gold standard: the authors in question being Brown (1940);[8] Kemmerer's (1954) testimony to the US Senate; Officer's (2008) widely-cited encyclopaedia article on the gold standard; Obstfeld and Taylor (2003); and Wolf (2008).

Country	League of Nations (1937) Official suspension of gold	Exchange control	Depreciation or devaluation in relation to gold	Introduction of a new gold parity	Brown	Kemmerer	Officer	OT	Wolf	Group	Our coding Departure from gold	Exchange control
Argentina	Dec-29	Oct-31	Nov-29		Nov-29	1929	1929	Dec-29		D	Dec-29 & Nov-33	
Australia	Dec-29		Mar-30		Mar-30	1929	1930	Jan-30		D	Jan-31 & Sep-31	
Austria	Apr-33	Oct-31	Sep-31 & Apr-34	Apr-34	Oct-31	1931	1931	Oct-31	Sep-31	D	Oct-31 & Apr-33	
Belgium	Mar-35	Mar-35 & Apr-35	Mar-35	Mar-35		1935	1935	Mar-35		A	Mar-35	
Brazil		May-31	Dec-29	Dec-29	Dec-29	1930	1929	Dec-29		D	Dec-29 & Oct-30	
British India	Sep-31		Sep-31		Sep-31	1931	1931	Sep-31		A	Sep-31	
Bulgaria		1918				1931	1931			B	N/A	Oct-31
Canada	Oct-31		Sep-31		Sep-31	1931	1929	Jan-29		A	Sep-31	
Chile	Apr-32	Jul-31	Apr-32		Apr-32	1932	1931	Jul-31		C	Apr-32	
Czechoslovakia		Oct-31	Feb-34 & Oct-36	Feb-34 & Oct-36		1931	1931		Sep-31	D	Feb-34 & Oct-36	
Denmark	Sep-31	Nov-31	Sep-31		Sep-31	1931	1931	Sep-31		A	Sep-31	
Dutch Indies	Sep-36		Sep-36			1936	1936			A	Sep-36	
Estonia	Jun-33	Nov-31	Jun-33			1931	1931			C	Jun-33	
Finland	Oct-31		Oct-31		Oct-31	1931	1931	Oct-31		A	Oct-31	
France			Sep-36	Oct-36		1936	1936	Sep-36	Sep-36	A	Sep-36	
Germany		Jul-31				1931	1931	Jul-31	Jul-31	B	N/A	Jul-31
Hungary		Jul-31				1931	1931	Aug-31	Jul-31	B	N/A	Jul-31
Italy		May-34	Mar-34 & Oct-36	Oct-36		1934	1934	Dec-34	May-34	D	Jul-35 & Oct-36	
Japan	Dec-31	Jul-32	Dec-31		Dec-31	1931	1931	Dec-31		A	Dec-31	
Lithuania		Oct-35				1936	1936			B	N/A	Oct-35
Netherlands	Sep-36		Sep-36			1936	1936			A	Sep-36	
New Zealand	Sep-31		Apr-30		Apr-30	1931	1930	Apr-30		A	Sep-31	
Peru	May-32		May-32		May-32	1932	1932			A	May-32	
Poland		Apr-36				1936	1936		Apr-36	C	Oct-36	
Romania		May-32	Jul-35			1932	1932			C	Jul-35	
South Africa	Dec-32		Jan-33		Jan-33	1931	1933	Jan-33		A	Dec-32	
Sweden	Sep-31		Sep-31		Sep-31	1931	1931	Sep-31	Sep-31	A	Sep-31	
Switzerland			Sep-36	Sep-36		1936	1936			A	Sep-36	
UK	Sep-31		Sep-31		Sep-31	1931	1931			A	Sep-31	
US	Apr-33	Mar-33 & Nov-34	Apr-33	Jan-34	Apr-33	1933	1933	Apr-33		C	Apr-33	

Table 2: Dates of principal measures affecting exchange. Sources: League of Nations (1937, p. 16), Brown (1940, p. 1075), Kemmerer (1954), Officer (2008), Obstfeld and Taylor (2003), Wolf (2008)

For our purpose the key issue is: what constituted a regime change sufficient that it would change inflationary expectations? De jure suspension, or de facto devaluation, seem more obvious candidates than exchange controls: countries could and often did impose exchange controls while maintaining the link between the money supply and gold reserves. Indeed, one motive for imposing exchange controls was precisely to prevent gold outflows that threatened to destroy this link: it is not surprising, therefore, that

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[8] Brown relied on the September 1933 issue of the Bank of Nova Scotia's Monthly Review.

Mitchener and Wandschneider (2015, p. 189) find that "countries imposing exchange controls did not actively pursue expansionary monetary policy after abandoning gold. An examination of discount rate policy of exchange-control countries suggests that, while they did not follow France and continue to raise rates after imposing controls, they also did not pursue a discount rate strategy similar to the U.S., a country which floated and then aggressively pursued expansionary monetary policy."

Similarly, in discussing Germany's decision to impose foreign exchange controls in July 1931, Knut Borchart (1984, p. 475) writes that "If one regards the guarantee of convertibility for capital transactions as an essential feature of the gold standard, then Germany left the gold standard in July 1931. On the other hand, for contemporaries we have to notice that only leaving the parity against gold seemed to be the real breaking of the rules of the gold standard. At least this is the way our sources regard it. Till long after July 1931, and thus after the introduction of the "Devisenbewirtschaftung" the question was asked, whether Germany would or should leave the gold standard. This could only mean leaving the parity in favour of floating." For this reason, we privilege suspension or devaluation when timing the departure of countries from the gold standard.

Our task is straightforward when countries left the gold standard without imposing exchange controls, or when they imposed exchange controls at the same time, or after, devaluation or suspension. This is the case for Belgium, British India, Denmark, the Dutch East Indies, Finland, France, Japan, the Netherlands, Peru, Sweden, Switzerland, and the UK. For each of these 12 countries there is one unambiguous date of departure. Canada devalued in September 1931 and officially suspended the following month: the Economist commented that the latter decision was "simply the conferring of legal recognition to a previous *fait accompli*".[9] South Africa was forced to suspend convertibility in December 1932 and the following month the pound reached parity with sterling (Drummond 1981, pp. 61-4, 95-6). In both cases we take the earlier of the two months as the date of departure. These 14 countries, with one unambiguous departure date, plus New Zealand (which will be discussed later), are referred to collectively as Group A.

Four of our countries imposed exchange controls without ever formally abandoning the gold standard or devaluing (Group B). Germany and Hungary both imposed exchange controls in July 1931 but the official parities remained unchanged throughout our period (League of Nations, 1937). Authors such as Bernanke and James (1991) and Obstfeld and Taylor (2003) date these countries' abandonment of the gold standard to this moment, but it is important to note that observers at the time, like Brown (1940), regarded these countries as still being pegged to gold, and that efforts to reduce wages and prices in an attempt to regain competitiveness continued in Germany after the imposition of exchange controls (Brown, 1940, pp. 1214-5; Eichengreen and Temin, 2000, p. 203).[10] In Bulgaria, the government dismissed the possibility of going off gold, but was forced to impose exchange controls: in October 1931 the Bulgarian National Bank was given a monopoly on all foreign exchange transactions (Tooze and Ivanov, 2011, p. 41).[11] Similarly, Lithuania imposed exchange controls in October 1935 while maintaining the link with gold (League of Nations, 1937).

In these four cases we look at what happened following the imposition of exchange controls, which occurred at an unambiguous moment in time, but since the experiences of such countries may not have been the same as those of countries suspending convertibility or devaluing we discuss them separately. As already suggested, the imposition of exchange controls on its own may not have sufficed to create

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[9] "Canada and Gold." *Economist*, 24 Oct. 1931, p. 752.
[10] Obstfeld and Taylor follow Brown (1940, p. 1198) in choosing August 1931 for Hungary.
[11] The League of Nations (1937) merely gives "1918" as the date of the imposition of exchange controls in Bulgaria, which is not very informative. Both Kemmerer (1954) and Officer (2008) date Bulgaria's departure from the gold standard to 1931.

expectations of a regime change, even though in formal terms it marked the abandonment of full adherence to the rules of the gold standard. In Germany, for example, the arrival to power of Hitler, in January 1933, may have been the catalyst for changing inflationary expectations. Eichengreen and Temin (2000, p. 205) comment that "whatever else might be said about it, no one could mistake the rhetoric of the Nazis for the rhetoric of the gold standard" and contemporaries took the same view. In 1932 the Commercial Counsellor of the British Embassy in Berlin described the Nazis' programme as "consisting chiefly of departure from the gold standard and ejection of all Jews", while an employee of the German Economics Ministry claimed that "the Government's view against Hitler in the election campaign has not failed to impress itself, namely the opinion that in the matter of currency the utmost correctness is necessary" (Borchart 1984, p. 497). Sticking to gold, says Borchart, was "understood as a kind of bulwark against Hitler": you would then expect expectations to have shifted in January 1933 even if parity was officially maintained thereafter. We will explore the possibility in what follows.

For the rest of our sample the abandonment of the gold standard took place in stages. A third group of countries (Group C) first imposed exchange controls and then unambiguously suspended convertibility, devalued or depreciated. Given our prioritization of devaluation or suspension over exchange controls, Chile is taken to leave in April 1932 when it suspended the gold standard rather than in July 1931 when it imposed exchange controls; Estonia is taken to leave in June 1933 rather than November 1931; Poland is taken to leave in October 1936, when it devalued, rather than in April when it imposed exchange controls (Bernanke and James, 1991, p. 37; Wolf, 2007); and Romania is taken to leave in July 1935, when it devalued, rather than May 1932. [12] In March 1933 the newly elected President Roosevelt imposed restrictions on foreign exchange transactions and gold exports, but it was only the following month that the dollar was devalued and, in the eyes of most commentators, taken off gold (Eichengreen 1992, pp. 328-32; League of Nations, 1937).

Group D consists of countries where the timing of devaluation or suspension is ambiguous, or where a country left the gold standard more than once. Argentina is a good example of the latter. The Argentinian paper peso depreciated relative to gold in November 1929, but at the time this was not perceived as a break with the gold standard: on December 14 the Economist was still describing the country's exchange rate system as being based on gold.[13] Three days later, however, the *Casa de Conversión*, which was responsible for converting paper currency into gold and vice versa, was unexpectedly closed: we follow other scholars in dating Argentina's original departure to December 1929 (see for example Smith 1934, p. 433; Brown, 1940, p. 883; Eichengreen 1992, p. 237). Despite this shift, however, government debt repayments drained liquidity from the system, the authorities were determined to prevent further drops in the value of the peso, and real interest rates remained high (Díaz Alejandro 1970, p. 97-8; Alhadeff 1986, p. 104) To complicate matters further, in October 1931 Argentina imposed capital controls, and it followed this up in December by pegging to the US dollar and French franc, both of which were tied to gold. This in turn eventually led to a second suspension of the gold standard, in November 1933 (when the currency was devalued and a bill was introduced in parliament that would lead to the creation of a new central bank and a fiat money system: see Brown, 1940, pp. 1168; Gerchunoff and Machinea, 2015). Table 2 thus lists two dates for Argentina: December 1929 and November 1933.

The question of when Australia and New Zealand should be taken as having left gold also requires judgment. Private banks managed the exchange rate, which was quoted as a premium or a discount vis à vis sterling; Drummond (1981, p. 100) comments that people in the two countries tended to assume that a pound was a pound wherever it had been issued, and that while prior to 1925 "the premiums and

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[12] In cases like Italy where suspension or devaluation preceded exchange controls we naturally take the earlier date, but this involves less of a judgement call on our part.

[13] "Finance and Banking." Argentine Supplement. *Economist*, 14 Dec. 1929, p. 7+.

discounts had sometimes been sizable", "this had appeared unnatural". Faced with chronic balance of payments problems, in December 1929 the Australian government introduced legislation allowing it, operating in conjunction with the Commonwealth Bank, to require that other banks disclose their gold holdings; to require that gold be exchanged for Australian notes; and to ban the export of gold. The League of Nations (1937, p. 16) regarded this as an official suspension of the gold standard, but that was not how the government viewed it. The following month, faced with further gold losses, the Bank exercised its right to requisition gold holdings, and Schedvin (1970, p. 125) writes that "There is little doubt that the gold standard was, in fact, abandoned" then – but the authorities had chosen this option, rather than the alternative of banning gold exports, precisely because the latter would have been seen as unequivocally abandoning the gold peg. Schedvin argues that trying to keep the "myth" of gold standard adherence alive made sense, and that the myth persisted until mid-1930 (p. 126).

The Australian pound had been slipping in value relative to sterling since October 1929 but as mentioned earlier there was nothing unusual about this. By April 1930 it was 6% below par and there was a further modest devaluation in October to 9 below par. But it was the abrupt movement to 30 below par in January 1931 (Figure 3) that in the eyes of most commentators marked the real devaluation (Eichengreen 1992, pp. 235-6; Schedvin 1970, pp. 164-8). Writing on January 10, The Economist commented approvingly that "now that a more nearly "true" exchange rate has been established, the normal economic forces should come into play."[14] It seems reasonable to date Australia's departure to this date, although it should be noted that the exchange rate remained pegged against sterling at a new lower rate for the best part of a year. Indeed, in February the newly elected Premier of New South Wales urged "the abandonment of the gold standard", a course of action that was opposed by the Chairman of the Commonwealth Bank in the following month (Brown, 1940, pp. 877-8). One could therefore also argue that it was sterling's departure from gold in September that marked the real rupture in the Australian case: Table 2 lists both January and September 1931 as potential departure dates.
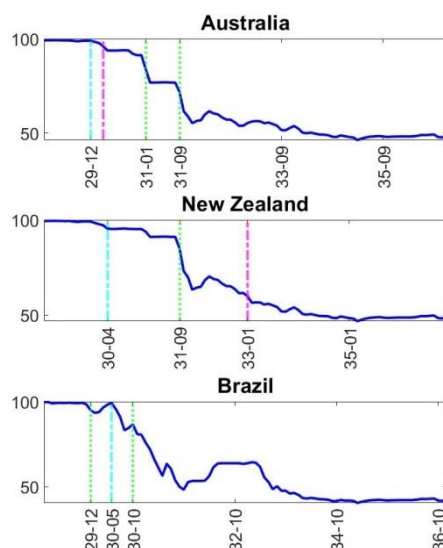
Figure 3. Currencies' gold value (percentage of parity)

In New Zealand too the pound gradually slipped against sterling in the early years of the depression, reaching a rate of £NZ110 to £stg100 by early 1931. The League of Nations lists a devaluation or depreciation as occurring in April 1930, and both Brown, and Obstfeld and Taylor, date New Zealand's departure to that month. But the depreciation was viewed by the banks as undesirable and, hopefully, temporary: it was also relatively minor as Figure 3 indicates. During 1932 there were growing calls for

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[14] "Australian Exchange Developments." *Economist,* 10 Jan. 1931, p. 59+.

devaluation against sterling, however, and the government finally acceded to these calls in January 1933 (Fleming 1997; Singleton 2003). By that time, however, sterling itself had abandoned gold: we therefore favour dating New Zealand's departure to September 1931, when the UK left, and Figure 3 strongly suggests that this did indeed mark the real break with gold.[15] We thus include New Zealand in our Group A category.

Dating Brazil's departure is also tricky. By the end of 1929 it had become very difficult for investors to obtain gold in exchange for currency: gold and foreign exchange reserves were being preserved "for the sake of appearances" (Brown, 1940, p. 897; Eichengreen 1992, p. 238). As Table 2 shows several authors date Brazil's departure from gold to December 1929. However, a bigger rupture seems to have been the suspension of gold shipments in May 1930: this coincided with the beginning of a sharp slide in the value of the *milreis* that continued into the following year (Eichengreen 1992, p. 239; Figure 3). In October 1930 the government suspended the redemption of notes into gold, and Smith (1934, p. 442) comments that with this "the actual working of the gold standard in Brazil came to an end." According to Brown (1940, p. 897), by the stage a new revolutionary government came to power in late October Brazil had "practically completed a transition to what was in effect, if not in form, a single government note issue and a pure paper standard." In November the Caixa de Estabilizacao, whose function had been to convert paper currency into gold, was abolished: the Economist commented that "The exchange of notes for gold is, therefore, in suspense and the currency position as a whole is obscure."[16] A good case could be made for several dates: we favour October 1930, but include December 1929 as another possible candidate in light of the existing literature.

When Austria imposed exchange controls in October 1931 the schilling was trading at a 10-15% discount on informal markets; by November the discount had risen to over 34%, a dramatic shift. By this stage, according to the official history of the Austrian Central Bank, "Policy makers did not, in actual fact, truly consider reinstating the gold parity of the schilling." When in March 1933 the government decreed that "all liabilities in gold or foreign exchange had to be settled at the intrinsic value prevailing at the contract date," this was merely an acknowledgment "that the schilling had been devalued" (Jobst and Kernbauer, 2016, pp. 180, 183; Eichengreen, 1992, p. 269). It thus seems reasonable to date Austria's departure to October 1931, as do both Brown, and Obstfeld and Taylor, although a case could also be made for the September 1931 date favoured by Wolf (2008), by which time black market rates were already diverging from parity.

On the other hand, at the end of October 1931 the Economist was reporting that the Austrian government regarded the schilling as being "perfectly stable" and that it was therefore refusing to prohibit "gold clauses" in commercial invoicing (specifying that payments be made in terms of gold) since in any event such clauses were "of purely theoretical significance."[17] In April 1933, however, the Central Bank permitted the sale in private clearing of "all incoming foreign currencies (not only those derived from the export trade, as heretofore)". The Economist commented that "The foreign exchange regulations, in fact, in so far as they apply to the compulsory exchange rate of the schilling, have been withdrawn, and it is now publicly known that the schilling has dropped by 30 to 32 per cent." The Austrian public, it noted, was following these developments "with anxiety."[18] The League of Nations (1937) dated Austria's official suspension of the gold standard to this month, and it seems that the official recognition of what had become de facto reality, combined with the abandonment of the remaining legislative props to the gold standard, may have

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[15] September 1931 is also when the League of Nations considered New Zealand to have officially suspended the link with gold, and Kemmerer 1954 also favours a 1931 departure.
[16] "Brazil." Commercial History and Review of 1930. *Economist*, 14 Feb. 1931, p. 32+.
[17] "Austria." *Economist*, 31 Oct. 1931, p. 807+.
[18] "Austria." *Economist*, 22 Apr. 1933, p. 862+.

mattered for expectations. We therefore consider two potential departure dates for Austria: October 1931 and April 1933.

Czechoslovakia imposed exchange controls in October 1931, and then devalued against gold in both February 1934 and October 1936. We consider both of these dates, although Eichengreen notes that the first devaluation "was not used as an occasion to expand domestic credit" (Eichengreen, 1992, p. 365). Finally, Italy is listed by the League of Nations as having depreciated or devalued in March 1934, and two months later exchange controls were introduced. In May 1935 the Sovrintendenza allo scambio delle valute was created, for the purpose of managing foreign exchange.[19] A greater turning point, in terms of what matters to us, arguably came in July 1935 when the 40% reserve requirement regarding paper money was abolished, allowing the government to monetize a greater portion of its budget deficits. In Luigi Einaudi's view the shift meant that the future of the lira would no longer be determined by gold reserves, since these could now by replaced by government paper, but by the supply of and demand for the currency. The lira remained overvalued, however, and the gold standard was definitively abandoned in October 1936 (Toniolo 1980, pp. 290, 293-5; Fratianni and Spinelli 1997, pp. 153-4). We consider both July 1935 and October 1936 as candidate dates.

In summary, there are four categories of countries. First, there are 15 countries that suspended the gold standard and/or devalued, unambiguously, at a clearly defined date, and did so either without (or before) imposing capital controls (Group A). These are Belgium, British India, Canada, Denmark, the Dutch Indies, Finland, France, Japan, the Netherlands, New Zealand, Peru, South Africa, Sweden, Switzerland, and the UK. Second, there are the four countries that imposed exchange controls but maintained the formal link with gold (Bulgaria, Germany, Hungary and Lithuania) (Group B). Third, there are five countries that first imposed exchange controls, and then broke the link with gold at clearly defined dates: Chile, Estonia, Poland, Romania, and the USA (Group C). And finally there are six countries (Argentina, Australia, Austria, Brazil, Czechoslovakia and Italy) that clearly left the gold standard, but where the timing of the departure is ambiguous (Group D). In the following section we look at movements in inflationary expectations and real interest rates in each of these four groups.

5. Inflationary expectations and real interest rates by country group

Figure 4 plots expected inflation (the dash-dotted red line; on the right axis) and real interest rates (the solid blue line; on the left axis) for each of the countries in Group A: these all left the gold standard on clearly defined dates. (Only the expected inflation rate is available for Brazil and Canada, for which we do not have suitable nominal interest rate data.) The date of departure from the gold standard is indicated in each case by a green vertical dotted line. While it is more difficult to see for countries that left the gold standard in 1936 (i.e. the Dutch Indies, France, the Netherlands, and Switzerland), which is when our data end, it seems clear that leaving the gold standard was followed by an almost ubiquitous increase in expected inflation and a decline in real interest rates. Indeed, in many countries – Belgium, Canada, Denmark, the Dutch Indies, Finland, New Zealand, Peru, South Africa, and Switzerland – expected inflation had actually been flat or declining, and real interest rates flat or rising, prior to departure, so leaving gold coincided with a turning point in expectations. In the UK case inflationary expectations were very volatile for some time following the departure from gold (which makes the figure difficult to read) but they eventually increased; September 1931 was more clearly a turning point for real interest rates in that country. Leaving gold was less obviously a turning point for inflationary expectations in India, Japan, and Sweden, since they had already been on an upward trajectory, but a priori that does not invalidate our

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[19] We are grateful to Gianni Toniolo for pointing this out to us.

argument since other forces may have been at work in those countries raising inflationary expectations. In the following section we will take a closer look at the experiences of Belgium, Japan, and South Africa.
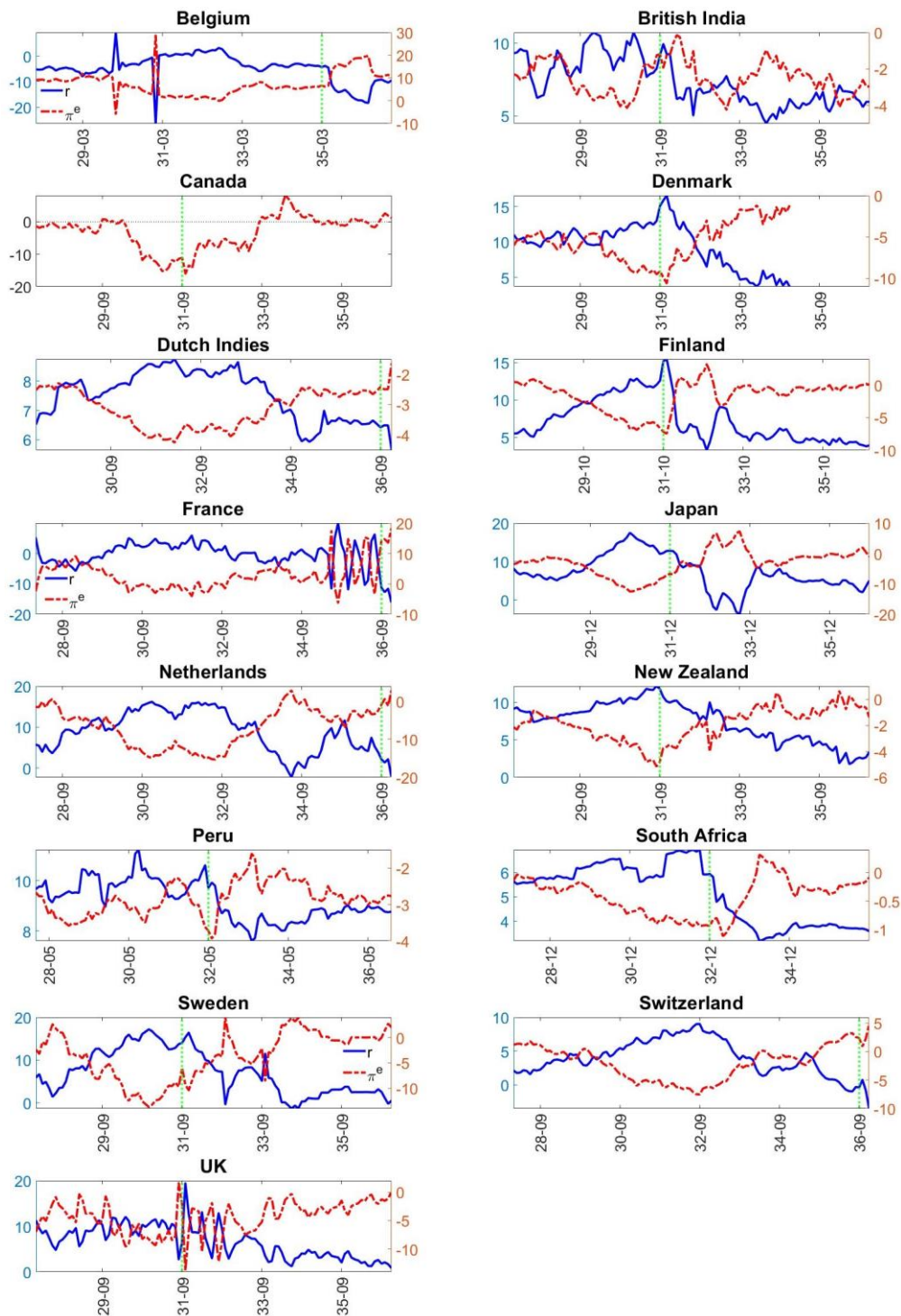
Figure 4. Real interest rates (solid blue) and expected inflation (dash-dotted red), Group A

Figure 5 plots inflationary expectations and real interest rates for the four countries in Group B. Recall that these imposed exchange controls on well-defined dates (indicated by black vertical dashed lines) but never formally suspended the link with gold. In Germany real interest rates declined sharply after July 1931, but inflationary expectations remained highly volatile thereafter: the accession of Hitler to power in January

1933 (indicated by the cyan vertical dash-dotted line) seems to have been more important in permanently shifting expectations. In Bulgaria and Hungary inflationary expectations had already been on an upward trajectory, and real interest rates on a downward trajectory, prior to the imposition of exchange controls: if anything the imposition of exchange controls in Hungary may have temporarily arrested this process. In Lithuania inflationary expectations rose, and real interest rates fell, following the imposition of capital controls in October 1935. Overall, it is unclear that imposing exchange controls had the consistent positive impact on inflationary expectations that seems to have been associated with devaluation or suspension.
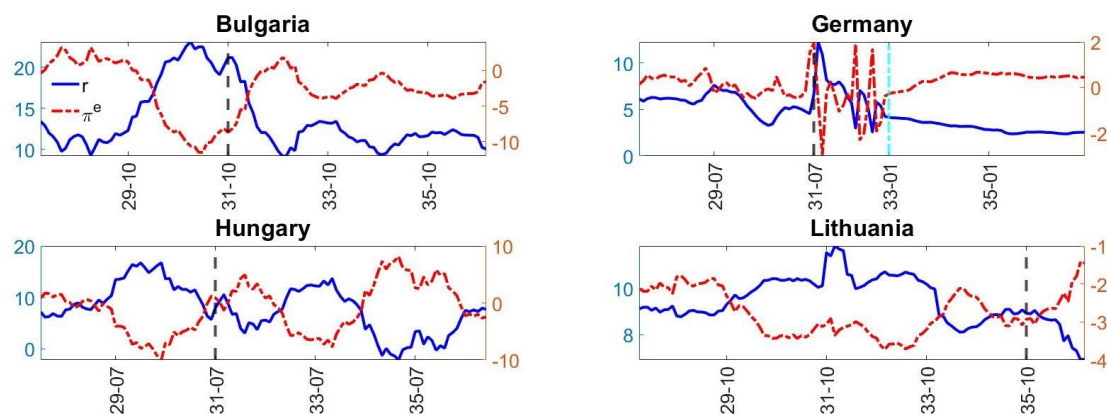
Figure 5. Real interest rates (solid blue) and expected inflation (dash-dotted red), Group B
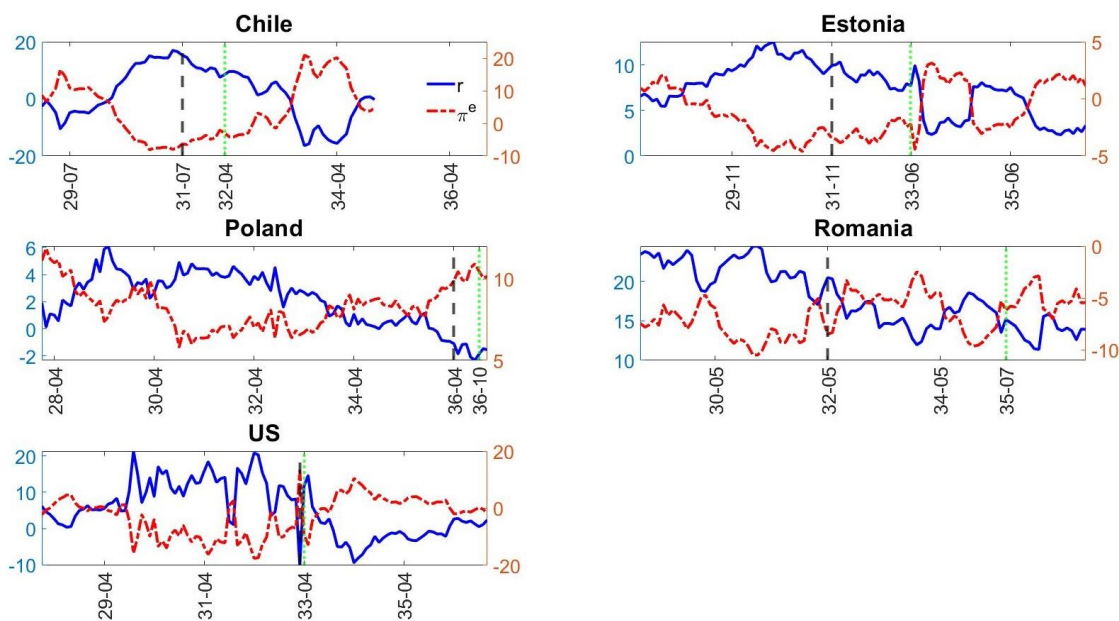
Figure 6. Real interest rates (solid blue) and expected inflation (dash-dotted red), Group C

That impression is reinforced by Figure 6, which considers those countries that first imposed exchange controls and later devalued. Once again suspension or devaluation is indicated by a vertical green dotted line, while exchange controls are indicated by the black dashed line. In the US case it is difficult to disentangle the two events since they occurred in successive months: consistent with the argument of Temin and Wigmore inflationary expectations clearly rose, and real interest rates fell, following this policy shift. Perhaps capital controls coincided with a turnaround in Chilean interest rates, and they did not interrupt declines in real interest rates, and rises in inflationary expectations, underway in the other three countries, but Chile aside there is no evidence of the systematic reversal of expectations evident in Figure

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4. There does seem to have been a dramatic shift in expectations in Estonia following that country's departure from gold, but in Poland, and to a lesser extent Romania, breaking the link with gold seems to have had little or no impact: perhaps the signal provided by suspension or devaluation was muted in countries that were already withdrawing from international financial markets.

Figure 7. Real interest rates (solid blue) and expected inflation (dash-dotted red), Group D

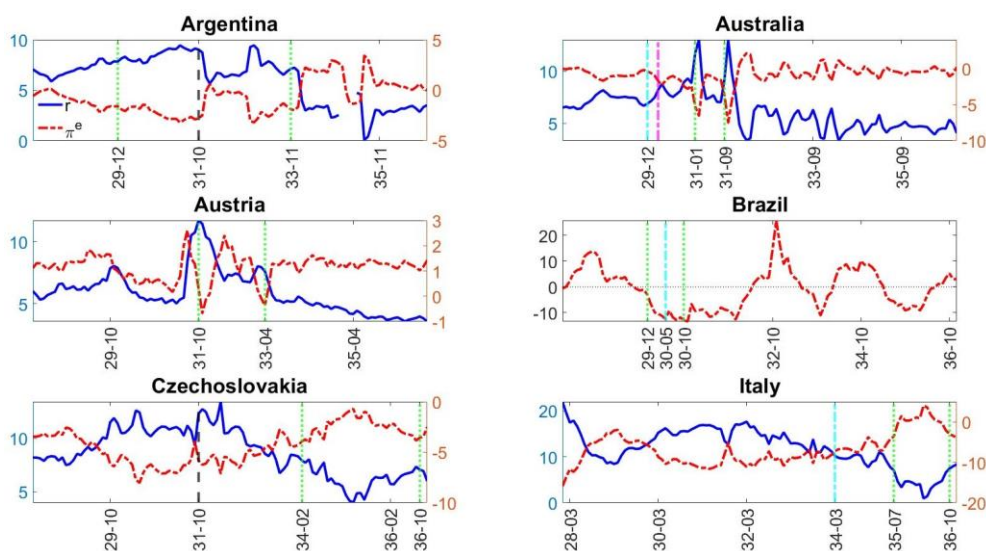Finally, Figure 7 gives the results for those countries where the timing of departure is genuinely ambiguous. Once again capital controls are indicated by black dashed lines, and candidate dates are indicated by green dotted lines. Other dates mentioned in the text are plotted in cyan and magenta dash-dotted lines. In Argentina the 1929 departure had no impact on expectations; the imposition of exchange controls in October 1931, and the second departure in November 1933, clearly did. In Australia both the devaluation of January 1931, and sterling's departure from gold in September 1931, were followed by a rise in inflationary expectations and a decline in the real interest rate, but it was the latter date that marked the real turning point, as in the case of New Zealand. The earlier dates that have been previously discussed in the literature on Australia had no impact. In the Austrian case there was a major reversal of expectations in December 1931, two months after our first candidate departure date, and a second, smaller reversal in April 1933. October 1930, rather than December 1929, seems to have been the turning point in the Brazilian case. Given that our data end in 1936, it is hard to see whether October 1936 was a real turning point in Czechoslovakia, but in any event inflationary expectations rose after that date (and continued to rise in February 1934). Non-Italian scholars rarely mention July 1935, but our results suggest that Luigi Einaudi may have been right to argue that this marked the real rupture with the gold standard in that country.

6. Three case studies

In this section we study the experiences of Japan, South Africa and Belgium in greater detail. We choose these three countries since, although they have an unambiguously clearly defined date for leaving the gold standard and hence belong to our Group A of countries, they left the gold standard at different times, had rather different economic structures, varied in terms of the amount of data available to us, and have not been as extensively studied as countries such as France, Germany, the UK, and the US. In all the figures below, the date when the country left the gold standard is marked by green vertical dotted lines.

Japan in Figure 8 was the last of these three countries to join the gold standard, and the first of the three to leave. The 1920's saw a prolonged effort by successive Japanese governments to restore the gold convertibility of the yen, a goal that was finally achieved by finance minister Inoue Junnosuke in January 1930. The timing was unfortunate as the world was already tipping into recession. The 1920s had already seen deflation in Japan as policymakers tried to restore pre-war price levels, and this trend now accelerated. In December 1931 the liberal government fell and the gold standard was abandoned; Inoue was assassinated the following year. The episode undermined liberal politicians in Japan and strengthened their nationalist opponents (Metzler 2006).
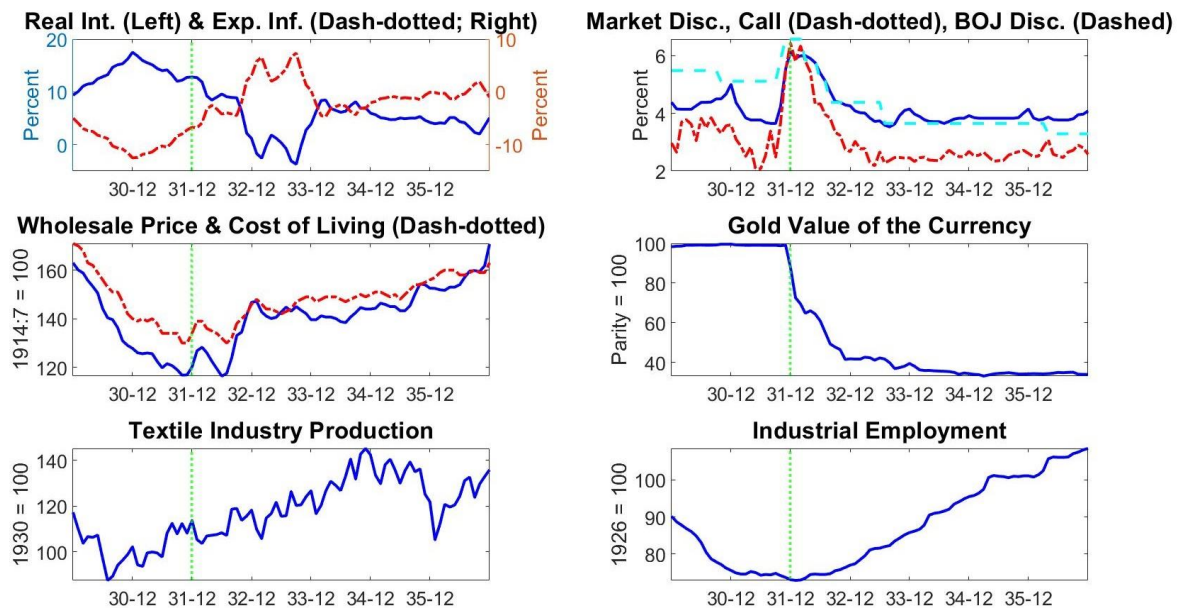
Figure 8: Japan 1929:12-1936:12

The gold value of the yen plunged following the decision to abandon gold, and industrial employment soon started to recover. Deflation was replaced with inflation; inflationary expectations rose and real interest rates fell. However, as can be seen from the figure, inflationary expectations had been on an upward trend since January 1931, and so in the Japanese case it is hard to immediately discern the impact of the abandonment of gold on inflationary expectations. Furthermore, three months after the abandonment of gold, Bank of Japan (nominal) discount rates began a downward trajectory, falling from a peak of 6.6% to 3.7% by July 1933, and with market (nominal) interest rates following suit. Falling real interest rates in Japan were therefore due both to falling nominal interest rates, and to rising inflationary expectations. Nevertheless, when we decompose the 16.5 percentage point decline in Japanese real interest rates which occurred between November 1931 and September 1933, we find that it was due to only a 1.90 percentage point cut in nominal interest rates, but to a huge 14.6 percentage point increase in inflationary expectations.

South Africa in Figure 9 was to a large extent a primary commodity producer. A member of the British Empire, it might have been expected to leave gold along with the UK in September 1931, but the nationalist Afrikaner government was determined to pursue an independent economic policy, and the country's status as a major gold producer, whose central bank held large gold reserves, made staying on gold seem the natural choice. Eventually, however, pressure from agricultural interests and gold producers, all of whom wanted higher local currency prices for their exports, led the government to reverse course. In December 1932 the country quit gold and joined the sterling area, remaining a member until the 1970s (Henshaw 2009).
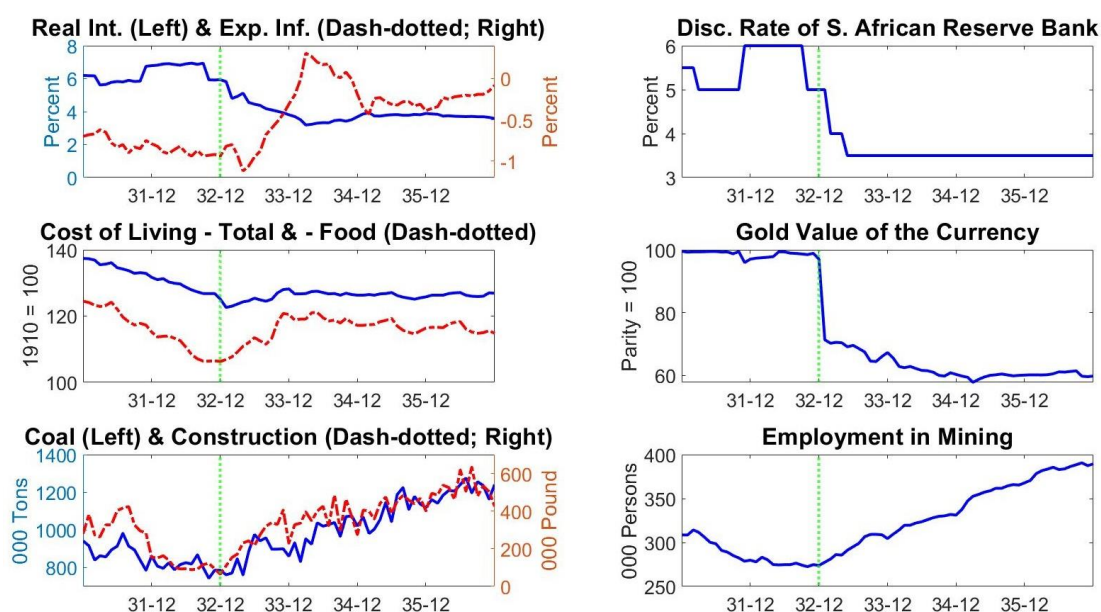
Figure 9: South Africa 1930:12-1936:12

Real interest rates started falling almost immediately, and inflationary expectations rose, although there was a brief reversal in March and April 1933. The cost of living stopped falling and food prices rose. The qualitative impact of the abandonment of gold on inflationary expectations and real interest rates seems clear in this instance. However, the magnitude of the fall in the real interest rate, and the rise in inflationary expectations, was relatively small: as a primary commodity producer, South Africa remained badly hit by weak overseas demand and protectionism and prices remained under pressure (Minnaar 1990). Between September 1932 and March 1934, South African real interest rates fell by 3.75 percentage points, of which 2.5 percentage points was due to a fall in nominal interest rates, and just 1.25 percentage points to a rise in expected inflation. Nevertheless, coal production soon recovered, along with other measures of real economic activity such as construction.

Belgium in Figure 10 was a mature industrial producer. A member of the gold bloc centred on France, it was much slower than either of the other two countries considered here to devalue. Unemployment rose sharply during the Depression and remained high: the rate among industrial manual workers reached 20% in 1932 and remained at that level until 1935. Fiscal policy was contractionary, with the government attempting to balance the budget: adjustment, such as it was, involved cuts to nominal wages. With the country in addition facing banking and balance of payments problems, the country finally gave up the fight to stay on gold in March 1935 (Eichengreen 1992, pp. 358-63).
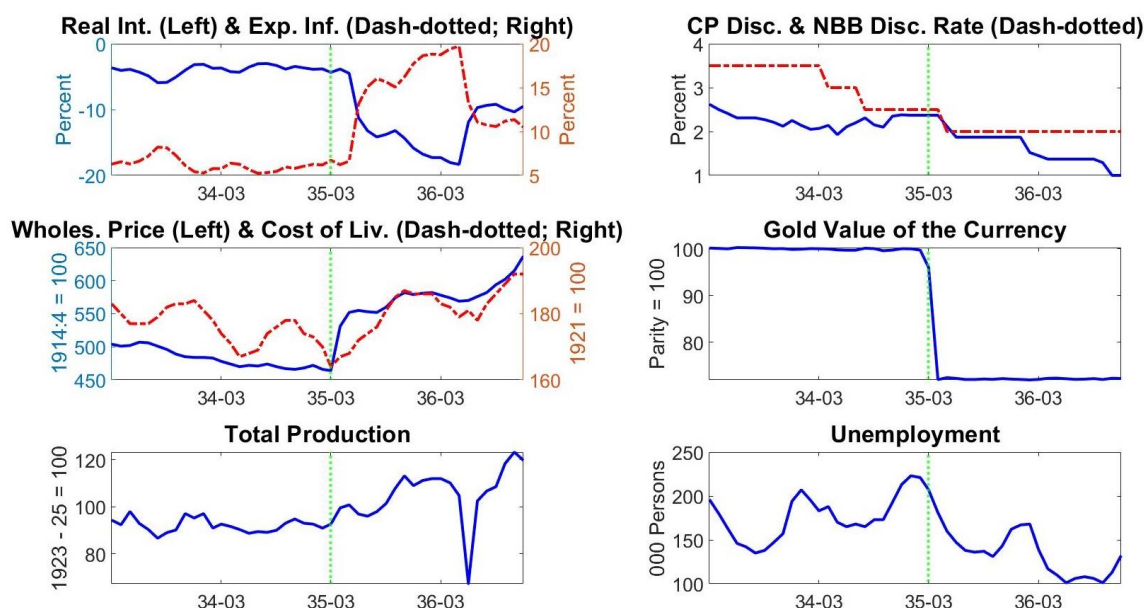
Figure 10: Belgium 1933:3-1936:12

Within two months nominal interest rates were cut, inflationary expectations were on the rise, and real interest rates were falling. Between December 1934 and May 1936, Belgian real interest rates fell by 14.7 percentage points; just 1.01 percentage points of this reduction was due to falling nominal rates, with the remainder (13.7 percentage points) being due to a rise in inflationary expectations. Belgian prices immediately recovered and production expanded, although there was a very severe contraction due to a general strike in June 1936; in the 12 months following the devaluation industrial production rose more rapidly in Belgium than in any other Western country (Eichengreen 1992, p. 363).

In both the Belgian and South African cases the timing of the real interest rate decline leaves little doubt that going off gold was the crucial turning point, although the magnitude of the inflation expectations effect was much smaller in the latter country. In Japan real interest rates and inflationary expectations moved by similar amounts as in Belgium, but pre-existing trends mean that leaving gold stands out less obviously as a turning point. Clearly there was even more variety in the experiences of the other 27 countries considered here. In the next section we uncover common patterns in the data, pulling together the evidence in as systematic a manner as possible, while Appendix B gives full details for each country.

7. Cross-country comparisons

The case studies in the previous section suggest that leaving the gold standard was an important pre-condition for post-depression recovery in all three countries. However, the pattern of recovery was different in each case, a diversity in experiences that widens still further when we consider all 30 countries in our sample. To draw general conclusions and allow for comparisons across countries, we therefore adopt a systematic approach that uses a simple and robust method to summarise what happened in each country. The aim in this section is to make cross-country comparisons that are as clean as possible, so we take a conservative approach and only compare those countries that belong to our Group A, i.e. the countries that unambiguously left the gold standard on a single clearly-defined date.

The first object of interest is the behaviour of the *ex ante* real interest rate. Table 3 reports the change in the real interest rate after each of our Group A countries left the gold standard. The reference point is always the average real interest rate in the three months prior to departure. Taking Belgium as an example,

the reference point is the average real interest rate between December 1934 and February 1935, the three months before departure in March 1935, and the first two entries show a 0.6 percentage point fall between then and March 1935 and a 7.5 percentage point fall between then and June 1935. For Belgium there is no information on the change in the real interest rate two years out because they left the gold standard so late in the period for which we have data.

Country	Departure from gold standard	Cumulative change in real interest rate upon or after:				
		departure	one quarter	two quarters	one year	two years
Belgium	Mar-35	-0.6	-7.5	-10.0	-13.5	-
British India	Sep-31	1.2	1.2	-1.8	-1.1	-2.1
Denmark	Sep-31	2.4	1.9	-1.0	-4.4	-8.1
Dutch Indies	Sep-36	-0.2	-0.9	-	-	-
Finland	Oct-31	3.1	-1.1	-6.5	-7.5	-7.0
France	Sep-36	-13.7	-18.5	-	-	-
Japan	Dec-31	0.5	-3.1	-2.7	-11.2	-8.4
Netherlands	Sep-36	-3.4	-7.6	-	-	-
New Zealand	Sep-31	0.0	-1.9	-2.1	-4.2	-5.8
Peru	May-32	-0.6	-1.3	-1.5	-2.3	-2.0
South Africa	Dec-32	-0.3	-1.3	-1.8	-2.5	-2.6
Sweden	Sep-31	0.9	1.5	-1.2	-5.8	-7.9
Switzerland	Sep-36	0.4	-2.8	-	-	-
UK	Sep-31	-1.2	1.0	5.4	1.7	-2.1
Average		**-0.8**	**-2.9**	**-2.3**	**-5.1**	**-5.1**

Table 3: Change in real interest rate after leaving the gold standard

In most countries the real interest rate fell for several months after leaving the gold standard, albeit with the duration and magnitude of the fall differing across countries. One quarter out it had fallen in all but four of our 14 Group A countries, the exceptions being British India, Denmark, Sweden, and the UK. It is striking that all four exceptions left gold right at the start, in September 1931. Eichengreen (1992, pp. 292-3) notes that the early devaluers were reluctant to engage in expansionary open-market operations despite the fact that they had quit gold: sterling area money supplies remained essentially unchanged during 1932. In order to "release their golden fetters, it was necessary for policymakers to abandon not only the gold standard's institutions but also the gold standard's ethos." This monetary conservatism might help to explain sluggishly changing expectations; more speculatively, agents may have been initially uncertain about the impact of leaving gold in the first countries to attempt this.

Visual inspection of Figures 8, 9 and 10 suggests that the real interest rate in Japan was falling until September 1933, in South Africa until March 1934, and in Belgium until May 1936. Given the respective dates at which they left the gold standard, this implies that the real interest rate fell for 21 months in Japan, 15 months in South Africa and 14 months in Belgium. For the other Group A countries in our sample, the duration of the fall in the real interest rate is less clear-cut and it would be imprudent to rely solely on visual inspection. The full set of figures in Appendix B provide some guidance, but we prefer a more systematic approach inspired by techniques from the literature on dating business cycles. We are interested in the date when the real interest rate stops falling, akin to a desire to date the first trough of a business cycle. We therefore adopt a simplified version of the famous Bry-Boschan method (see Harding and Pagan, 2002) and use it to identify the first trough in the real interest rate subsequent to the country in question leaving gold. The method is well-understood and ubiquitous as a means of analysing turning

points in time series data. As a consistency check, we verify that the results of the dating procedure align with the visual evidence. For example, the procedure dates the end of falling real interest rates in Japan, South Africa and Belgium at exactly the dates suggested by visual inspection.

The number of months from leaving the gold standard to the first trough in the real interest rate is reported in the second column of Table 4. For example, applying the dating algorithm to Belgium identifies the first trough as occurring in May 1936 and we conclude that the real interest rate was falling for 14 months after Belgium left the gold standard. Only afterwards did the fall in the real interest rate start to be reversed. For some countries it is not possible to identify the first trough because of missing data: this is true of gold bloc countries which left the gold standard very late in the decade (France, the Netherlands, and Switzerland), or what Mitchener and Wandschneider (2015) refer to as "gold stalwarts" that also stayed on gold until 1935 or later (in our sample the Dutch Indies).

Country	Number of months to trough	Change in real interest rate	Change in nominal interest rate	Change in expected inflation
Belgium	14	-14.5	-1.0	13.5
British India	10	-3.0	-2.3	0.7
Denmark	43	-12.5	-1.0	11.5
Dutch Indies	-	-0.9	0.0	0.9
Finland	13	-8.8	0.5	9.3
France	-	-18.5	-1.9	16.6
Japan	21	-16.0	-0.8	15.2
Netherlands	-	-7.6	-1.6	6.0
New Zealand	35	-8.3	-3.0	5.3
Peru	13	-2.7	-1.0	1.7
South Africa	15	-3.1	-1.8	1.2
Sweden	13	-13.4	-0.2	13.3
Switzerland	-	-2.8	-1.0	1.8
UK	33	-6.5	-1.9	4.6
Average	**21**	**-8.5**	**-1.2**	**7.3**

Table 4: Duration and magnitude of falls in the real interest rate after leaving the gold standard

The third column of Table 4 gives the change in the real interest rate from the three months before leaving the gold standard to the afore-mentioned first trough at which the real interest rate stopped falling.[20] The fourth and fifth columns of Table 4 indicate the changes in the nominal interest rate and inflationary expectations over the same period. Following the Fisher equation, if the *ex ante* real interest rate fell then it must have been the case that the nominal interest rate fell, or that inflationary expectations rose. The changes in the fourth and fifth columns thus provide a decomposition of the changes in the third column.

The decomposition offered by the Fisher equation gives an insight into whether falling real interest rates were associated more with falling nominal interest rates or with rising expectations of inflation. The stacked bar plot in Figure 11 decomposes the change in the real interest rate in each group A country on the basis of the numbers in Table 4. The countries are presented chronologically in order of the date at which they left the gold standard, British India first and Switzerland last. The green striped bars indicate

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[20] For those countries for which we are unable to date the first trough, we report the change from the three months before the gold standard suspension to the end of the sample period (Dutch Indies, France, the Netherlands, and Switzerland).

the contribution from changes in the nominal interest rate, positive for a rise and negative for a fall. The red filled bars show the contribution from changes in expected inflation, positive for a fall and negative for a rise.

The red bars dominate the green bars in Figure 11. The evidence is thus overwhelmingly in favour of falling real interest rates being driven more by rising inflationary expectations than by falling nominal interest rates. Nominal interest rates did not fall much after countries lefts the gold standard, and even rose in some countries. By contrast, inflationary expectations increased in all Group A countries. The rise in inflation expectations was so large that the sum of the stacked bars is always negative: and the real interest rate fell in every country after leaving the gold standard. There are only two countries for which real interest rates fell more because of falling nominal rates than because of rising inflationary expectations: South Africa (as noted in the previous section) and British India. Real interest rates on average fell by 8.5% in the period between the abandonment of gold and the first subsequent real interest rate trough: 7.3% of this was due to rising inflationary expectations.
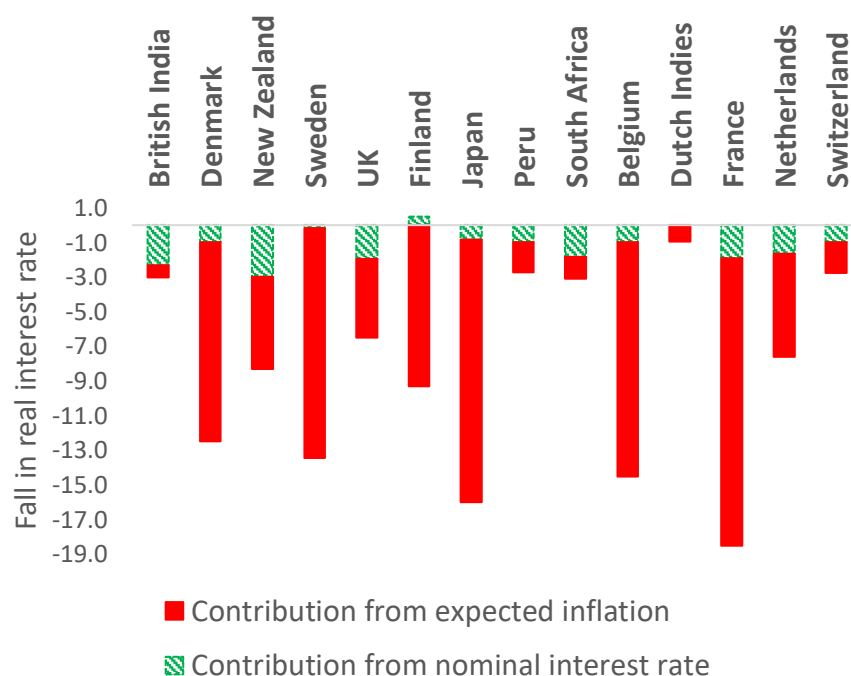
Figure 11: Decomposition of fall in real interest rate after leaving the gold standard

The second object of interest is the response of interest-rate-sensitive expenditures to falling real interest rates. Tables 5 and 6 report the change in real output and total trade after each of our Group A countries left the gold standard.[21] As can be seen, both variables rose strongly following the abandonment of gold: on average output was 6.9% higher after one quarter, 12.3% higher after six months, 6.0% higher after a year, and 21.3% higher after two years. Two years out output had risen in all countries for which we have data. Total trade also rose strongly.

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[21] Countries missing from Table 5 are due to the lack of output data.

Country	Departure from gold standard	Cumulative change in real output upon or after:				
		departure	one quarter	two quarters	one year	two years
Belgium	Mar-35	0.5	5.1	10.0	21.5	-
Canada	Sep-31	4.2	-8.8	-11.8	-17.5	3.4
Dutch Indies	Sep-36	4.7	-1.1	-	-	-
Finland	Oct-31	-4.4	17.6	25.3	15.4	33.0
France	Sep-36	-3.1	2.0	-	-	-
Japan	Dec-31	3.9	-2.3	-1.0	8.0	15.7
Netherlands	Sep-36	6.6	6.9	-	-	-
South Africa	Dec-32	1.2	9.1	25.7	10.8	31.5
Sweden	Sep-31	28.9	19.0	39.2	7.0	38.2
Switzerland	Sep-36	12.1	32.0	-	-	-
UK	Sep-31	-3.8	-3.3	-1.5	-3.3	5.7
Average		**4.6**	**6.9**	**12.3**	**6.0**	**21.3**

Table 5: Change in real output after leaving the gold standard

Country	Departure from gold standard	Cumulative change in total trade upon or after:				
		departure	one quarter	two quarters	one year	two years
Belgium	Mar-35	2.5	29.1	26.8	56.5	-
British India	Sep-31	-7.9	7.4	2.8	3.2	-13.5
Canada	Sep-31	-7.4	-4.7	-0.1	-19.3	1.8
Denmark	Sep-31	2.8	5.5	-12.9	-14.1	6.9
Dutch Indies	Sep-36	7.2	56.3	-	-	-
Finland	Oct-31	-2.9	-42.8	-33.2	12.4	25.2
France	Sep-36	3.4	57.6	-	-	-
Japan	Dec-31	10.7	53.0	23.7	88.8	103.4
Netherlands	Sep-36	11.3	40.2	-	-	-
New Zealand	Sep-31	-9.0	23.9	35.1	-7.5	13.4
Peru	May-32	-6.5	33.4	18.8	49.2	121.8
South Africa	Dec-32	-7.3	53.3	32.7	45.4	55.1
Sweden	Sep-31	4.8	16.7	-31.9	-14.3	-0.8
Switzerland	Sep-36	8.2	72.2	-	-	-
UK	Sep-31	-0.7	0.3	-13.1	-18.2	-8.4
Average		**0.6**	**26.8**	**4.4**	**16.6**	**30.5**

Table 6: Change in total trade (exports plus imports) after leaving the gold standard

8. Five counterfactuals

The previous section compared economic conditions before and after each country left the gold standard. We concluded that leaving is accompanied by an increase in expected inflation, a concomitant reduction in the real interest rate and a subsequent recovery in real activity. Whilst indicative, the results so far do not identify the causal effect of leaving, a shortcoming shared by much of the existing literature on the interwar gold standard. We know that the real interest rate fell after countries left the gold standard, but

was the fall caused by leaving or by something else? In this section, we address causality by applying the synthetic control matching methods of Abadie and Gardeazabal (2003) and Abadie et al. (2010). We construct counterfactuals that predict what would have happened in selected countries if they had not left the gold standard at the time they did.

The synthetic control matching method divides countries into two groups, those in the treatment group who receive the treatment and those in a control group who do not. Each country in the treatment group is matched to a synthetic counterpart, constructed by taking a suitable weighted average of the pool of countries in the control group. The weights are chosen so that economic conditions in the synthetic counterpart reflect those in the treatment country as closely as possible in the period *before* it is treated. The behaviour of a country's synthetic counterpart in the period *after* treatment acts as our counterfactual. The method is similar in spirit to Choudhri and Kochin (1980), whose comparative study of European countries during the Great Depression uses Spain as a control because it did not return to the gold standard after World War I. The synthetic control matching method is more general because it allows all untreated countries to act as potential controls.

In our case the treatment group is all the countries that had unambiguously left the gold standard by December 1931 (Australia, British India, Bulgaria, Denmark, Finland, Japan, New Zealand, Sweden and UK) and the control group is those countries that were still unambiguously on the gold standard in the middle of 1932 (Belgium, Czechoslovakia, Dutch Indies, France, Italy, Netherlands, Poland, Romania, Switzerland and US). The treatment and control groups are drawn from countries in Group A and those countries in other groups that, whilst not having one clearly-defined date on which they left the gold standard, were unambiguously either early or late leavers. The economic conditions the synthetic counterparts are constructed to reproduce in the treated countries are population size, GDP per capita in 1930, average inflation between January 1929 and August 1931, and the behaviour of the *ex ante* real interest rate before the country left the gold standard.[22] Minimising the quadratic distance from these variables defines the weights with which control countries are combined to produce the synthetic counterparts. The precise detail of how we apply the synthetic control matching method is in Appendix C.

The method produces satisfactory synthetic counterparts for Australia, Denmark, Finland, New Zealand and Sweden. For other countries in the treatment group, there is no weighted average of control group countries that comes close to reproducing the economic conditions that prevailed before leaving the gold standard. Table 7 presents the weights assigned to control countries when constructing the synthetic counterpart for real interest rates in our five countries. Reading the second column, we see that Australia's synthetic counterpart is a weighted average of Czechoslovakia, Netherlands, Poland, Romania and Switzerland. The weight on all other control group countries is negligible.

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[22] Data on population size and GDP per capita are taken from the Maddison Project Database at the Groningen Growth and Development Centre: https://www.rug.nl/ggdc/historicaldevelopment/maddison/.

	Australia	Denmark	Finland	New Zealand	Sweden
Belgium			0.003	0.023	
Czechoslovakia	0.029		0.196	0.239	0.032
Italy			0.349	0.218	
Netherlands	0.090	0.101	0.045		0.927
Poland	0.293				
Romania	0.146	0.327	0.064	0.103	0.042
Switzerland	0.442	0.572	0.343	0.417	

Table 7: Weights used to construct synthetic counterparts for real interest rates

The results for **Denmark**, **Finland** and **Sweden** are in Figure 12. In each case the blue solid line is for the country of interest and the red dashed line is for its synthetic counterpart. Our success in constructing appropriate synthetic counterparts is apparent in the proximity of the blue and red lines in the period before leaving the gold standard, which is marked as before with a green vertical dotted line. The proximity of the blue and red lines is by design: we relinquished other countries in the treatment group precisely because we were unable to construct synthetic counterparts that matched the behaviour of real interest rates before leaving. Our counterfactuals begin after the green vertical line marking when the countries left the gold standard. In Figure 12 there is a consistent story for what would have happened to real interest rates and inflation if Denmark, Finland and Sweden had not left the gold standard at the times they did. Following the behaviour of the synthetic counterparts, real interest rates would have remained elevated for at least 12 months and inflation would have picked up by less than it did. In a counterfactual sense, we confirm that leaving the gold standard *caused* a fall in real interest rates and a turnaround in inflation in these countries.
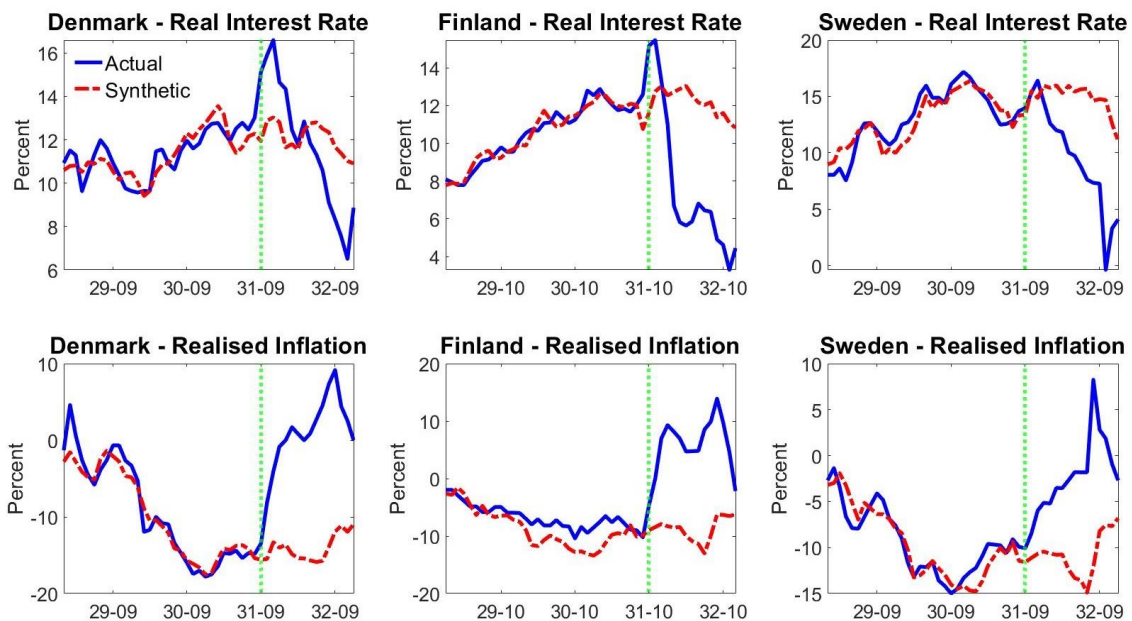
Figure 12: Actual and counterfactual (synthetic) real interest rates and inflation in Denmark, Finland and Sweden

The results for **Australia** and **New Zealand** are in Figure 13. The economic conditions before both these countries left the gold standard differed from those in the control countries to such an extent that it was not possible to construct satisfactory synthetic counterparts for anything other than real interest rates. The message from these restricted counterfactuals is the same, though. Leaving the gold standard caused real interest rates to fall in Australia and New Zealand.
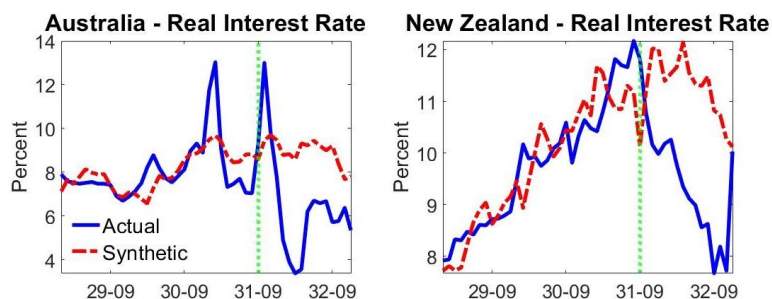
Figure 13: Actual and counterfactual (synthetic) real interest rates in Australia and New Zealand

9. Conclusions

Fifteen of our thirty countries unambiguously left the gold standard on clearly defined dates. While we can only make strong causal statements about five of them, our results confirm that in all fifteen leaving gold was associated with an increase in inflationary expectations and a decline in real interest rates. Although the timing is less clear, leaving gold also seems to have had similar effects in several other countries, including Argentina, Australia, Austria, Estonia, Italy, and the United States – the country about which the argument was first made.

Abandoning the institution that had helped to stabilize inflationary expectations in the 1920s was thus an important precursor to recovery in many countries in the 1930s. But leaving the gold standard was not the only thing that countries did during this period, and inflationary expectations may have increased for different reasons as well. In Germany, for example, Hitler's ascension to power seems to have been the crucial watershed. We hope that future research will deal more comprehensively with the causes and consequences of such shifts in expectations during the 1930s.

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Appendix A: Model specifications and data sources

This appendix contains model specifications and data sources for our sample countries. The data sources are labelled as follows:

	Source	Editors
FRB	Federal Reserve Bulletin (FRASER)	
IA	International Abstract of Economic Statistics (Two Volumes)	Edited by J. Tinbergen (Volume 1) and J.B.D. Derksen (Volume 2)
SHW	Statistisches Handbuch Der Weltwirtschaft (Two Volumes)	
NBER	NBER Macrohistory Database	

The table below, which largely follows Bok et al.'s specification for the New York Fed nowcasting model, shows how variables under each category are assigned to the latent factors in our dynamic factor models:

Category	Global Factor	Real Factor	Financial Factor	Labour Factor
Housing and Construction	X	X		
International Trade	X	X		
Labour	X			X
Money, Banking, and Finance	X		X	
Prices	X			
Production	X	X		
Retail and Consumption	X	X		
Transport	X	X		

As discussed in Section 3, for countries which lack suitable labour data, we use the dynamic factor model without the labour factor block. In this case, available labour variables are assumed to be driven by the global and real factors whenever possible.

In what follows, we provide information about the model specification and the data sources as well as the sample period used for estimation of the model parameters for each country studied in the paper. We also include the release delay convention for each variable included in the model as discussed in Section 3.

A.1 Argentina (Estimation sample 1925:01-1929:10)

Series Name	Category	Release Delay (in Month)	Source
Building Permits (in Buenos Aires)	Housing and Construction	2	SHW
Total Exports	International Trade	3	SHW
Total Imports	International Trade	3	SHW
All Banks - Advances	Money, Banking, and Finance	2	SHW
All Banks - Balances of Receivables and Liabilities vis-a-vis Foreign Countries	Money, Banking, and Finance	2	SHW
All Banks - Deposits	Money, Banking, and Finance	2	SHW
All Banks - Bills of Exchange	Money, Banking, and Finance	2	SHW
All Banks - Savings	Money, Banking, and Finance	2	SHW
All Banks - Securities	Money, Banking, and Finance	2	SHW
Banco de la Nacion - Bills of Exchange and Advances	Money, Banking, and Finance	2	SHW
Banco de la Nacion - Deposits	Money, Banking, and Finance	2	SHW
Notes in Circulation	Money, Banking, and Finance	2	SHW
Gold Stock	Money, Banking, and Finance	2	SHW
Clearings	Money, Banking, and Finance	2	SHW
Gold Value of the Currency	Money, Banking, and Finance	0	SHW
Bank Discount Rate of Banco de la Nacion (Promissory Notes)	Money, Banking, and Finance	0	SHW
Stock Exchange - Share Turnover	Money, Banking, and Finance	2	SHW
Stock Exchange - Turnover of Fixed-income Securities	Money, Banking, and Finance	2	SHW
Bankruptcies	Money, Banking, and Finance	2	SHW
Wholesale Price Index - Total	Prices	2	SHW
Wholesale Price Index - Agricultural and Forestry Products	Prices	2	SHW
Wholesale Price Index - Non-agricultural Products	Prices	2	SHW
Wholesale Price Index - Skins	Prices	2	SHW
Wholesale Price Index - Wool	Prices	2	SHW
Wholesale Price Index - Meat	Prices	2	SHW
Cattle Slaughtering	Production	3	SHW
Turnover of Land Sales (in Buenos Aires)	Retail and Consumption	2	SHW
Turnover in Department Stores (in Buenos Aires)	Retail and Consumption	2	SHW
Railways - Freights Carried	Transport	2	SHW

A.2 Australia (Estimation sample 1925:01-1929:10)

Series Name	Category	Release Delay (in Month)	Source
Construction Activity in Sydney (Without City) - Approved Buildings	Housing and Construction	2	SHW
Total Exports	International Trade	3	SHW
Total Imports	International Trade	3	SHW
Unemployed Union Members - Number	Labour	3	SHW
Unemployed Union Members - Percent	Labour	3	SHW
Weekly Average Wages (in 12 Industries)	Labour	2	SHW
Commonwealth Bank of Australia - Notes in Circulation	Money, Banking, and Finance	2	SHW
Commonwealth Bank of Australia - Gold	Money, Banking, and Finance	2	SHW
Commonwealth Bank of Australia - Discount Rate	Money, Banking, and Finance	0	SHW
Gold Value of the Currency	Money, Banking, and Finance	0	SHW
Clearings	Money, Banking, and Finance	2	SHW
Cost of Living - Total	Prices	2	SHW
Wholesale Price Index - Total	Prices	2	SHW
Wholesale Price Index - Agricultural Products	Prices	2	SHW
Wholesale Price Index - Dairy Products	Prices	2	SHW
Wholesale Price Index - Meat	Prices	2	SHW
Wholesale Price Index - Wool	Prices	2	SHW
Butter Production	Production	3	SHW
Observable Wheat Stocks	Production	3	SHW
Maritime Shipping - Inbound Traffic	Transport	2	SHW
State Railways - Freights Carried	Transport	2	SHW

A.3 Austria (Estimation sample 1919:01-1928:10)

Series Name	Category	Release Delay (in Month)	Source
Total Exports	International Trade	3	SHW
Total Imports	International Trade	3	SHW
Unemployed - Registered	Labour	3	SHW
Number of Unemployed Relieved - Austria	Labour	3	IA
Labour Exchange - Vacancies Filled	Labour	3	IA
Austrian National Bank - Notes in Circulation and Demand Deposits	Money, Banking, and Finance	2	IA
Austrian National Bank - Foreign Exchange	Money, Banking, and Finance	2	IA
Austrian National Bank - Gold	Money, Banking, and Finance	2	SHW
Gold Value of the Currency	Money, Banking, and Finance	0	SHW
Austrian National Bank - Official Discount Rate	Money, Banking, and Finance	0	IA
Monthly Money Rate	Money, Banking, and Finance	0	SHW
Stock Exchange - Stock Prices	Money, Banking, and Finance	0	SHW
Stock Exchange - Total Value of Turnover	Money, Banking, and Finance	2	IA
Payment Difficulties - Initiated Compensation Procedures	Money, Banking, and Finance	2	SHW
Payment Difficulties - Opened Bankruptcies	Money, Banking, and Finance	2	SHW
Cost of Living - Total (Vienna)	Prices	2	SHW
Retail Prices - Total	Prices	2	SHW
Wholesale Price Index - Total	Prices	2	IA
Wholesale Price Index - Food	Prices	2	IA
Wholesale Price Index - Industrial Goods	Prices	2	IA
Order Backlog - Cotton-spinning Mills	Retail and Consumption	2	SHW
Order Backlog - Iron Industry	Retail and Consumption	2	SHW
Turnovers - Production Goods	Retail and Consumption	2	SHW
Turnovers - Consumption Goods	Retail and Consumption	2	SHW
Index of General Business	Production	3	SHW
Production - Crude Steel	Production	3	NAI
Production - Electricity	Production	3	SHW
Production - Coal	Production	3	IA
Railways - Freight Car Provision	Transport	2	SHW

A.4 Belgium (Estimation sample 1919:01-1928:10)

Series Name	Category	Release Delay (in Month)	Source
Exports Value	International Trade	3	IA
Imports Value	International Trade	3	IA
Wholly Unemployed	Labour	3	IA
Unemployment on Part Time	Labour	3	IA
Days Lost by Insured Workers	Labour	3	IA
Proportion of Applicants to Vacancies	Labour	3	IA
Gold Value of the Currency	Money, Banking, and Finance	0	SHW
CGER Savings	Money, Banking, and Finance	2	SHW
National Bank of Belgium - Discount Rate	Money, Banking, and Finance	0	SHW
Call Money Rate	Money, Banking, and Finance	0	SHW
Private Discount Rate (Commercial Paper)	Money, Banking, and Finance	0	IA
Issues - Shares of Belgian Stock Companies	Money, Banking, and Finance	2	SHW
National Bank of Belgium - Advances to the State	Money, Banking, and Finance	2	SHW
National Bank of Belgium - Notes in Circulation	Money, Banking, and Finance	2	IA
National Bank of Belgium - Gold	Money, Banking, and Finance	2	IA
Mortgages Registered	Money, Banking, and Finance	2	IA
Postal Cheques Total Turnover	Money, Banking, and Finance	2	IA
Stock Exchange - Share Prices	Money, Banking, and Finance	0	SHW
Bankruptcies	Money, Banking, and Finance	2	SHW
Unpaid Bills of Exchange	Money, Banking, and Finance	2	SHW
Cost of Living - Total	Prices	2	IA
Cost of Living - Food	Prices	2	SHW
Wholesale Price Index - Total	Prices	2	IA
Retail Prices - Total	Prices	2	IA
Sensitive Goods Price Index	Prices	2	SHW
Tax Receipts Total	Retail and Consumption	2	IA
Production - Total	Production	3	SHW
Railways - Freights Carried	Transport	2	SHW

A.5 Brazil (Estimation sample 1925:01-1929:10)

Series Name	Category	Release Delay (in Month)	Source
Total Exports	International Trade	3	SHW
Total Imports	International Trade	3	SHW
Banco do Brasil - Advances	Money, Banking, and Finance	2	SHW
Banco do Brasil - Deposits	Money, Banking, and Finance	2	SHW
Banco do Brasil - Bills of Exchange	Money, Banking, and Finance	2	SHW
Banco do Brasil - Foreign Exchange	Money, Banking, and Finance	2	SHW
Banco do Brasil - Stabilization Fund	Money, Banking, and Finance	2	SHW
Gold Value of the Currency	Money, Banking, and Finance	0	SHW
Notes in Circulation	Money, Banking, and Finance	2	SHW
Wholesale Price Index - Coffee (in New York)	Prices	2	SHW

A.6 British India (Estimation sample 1925:01-1929:10)

Series Name	Category	Release Delay (in Month)	Source
Total Exports	International Trade	3	SHW
Total Imports	International Trade	3	SHW
Gold Value of the Currency	Money, Banking, and Finance	0	SHW
Bonds of British Government, Colonies, Etc.	Money, Banking, and Finance	2	SHW
Gold Stock	Money, Banking, and Finance	2	SHW
Notes in Circulation	Money, Banking, and Finance	2	SHW
Central Bank of India - Discount Rate	Money, Banking, and Finance	0	SHW
Issues - Securities	Money, Banking, and Finance	2	SHW
Stock Exchange - Value of Five Indian Railway Bonds (in London)	Money, Banking, and Finance	0	SHW
Cost of Living - Total (in Bombay)	Prices	2	SHW
Cost of Living - Clothing (in Bombay)	Prices	2	SHW
Cost of Living - Food (in Bombay)	Prices	2	SHW
Wholesale Price Index - Total (in Bombay)	Prices	2	SHW
Production - Cotton Fabrics	Production	3	SHW
Production - Cotton Yarn	Production	3	SHW
Sea Freight Index	Transport	2	SHW

A.7 Bulgaria (Estimation Sample: 1925:01-1929:10)

Series Name	Category	Release Delay (in Month)	Source
Total Exports	International Trade	3	SHW
Total Imports	International Trade	3	SHW
Employed Workers and Employees	Labour	3	SHW
Bulgarian National Bank - Notes in Circulation	Money, Banking, and Finance	2	SHW
Bulgarian National Bank - Bills of Exchange and Advances	Money, Banking, and Finance	2	SHW
Bulgarian National Bank - Deposits	Money, Banking, and Finance	2	SHW
Bulgarian National Bank - Foreign Exchange	Money, Banking, and Finance	2	SHW
Bulgarian National Bank - Gold	Money, Banking, and Finance	2	SHW
Average Market Discount Rate	Money, Banking, and Finance	0	SHW
Gold Value of the Currency	Money, Banking, and Finance	0	SHW
Clearings	Money, Banking, and Finance	2	SHW
Protested Bills of Exchange	Money, Banking, and Finance	2	SHW
Cost of Living - Total	Prices	2	SHW
Wholesale Price Index - Total	Prices	2	SHW
Wholesale Price Index - Corn	Prices	2	SHW
Wholesale Price Index - Wheat	Prices	2	SHW
Production - Coal	Production	3	SHW
Shipping - Inbound	Transport	2	SHW

A.8 Canada (Estimation Sample: 1919:01-1928:10)

Series Name	Category	Release Delay (in Month)	Source
Construction Contracts Awarded	Housing and Construction	2	IA
Building Permits	Housing and Construction	2	IA
Production - Construction Industry	Housing and Construction	2	SHW
Total Exports	International Trade	3	IA
Total Imports	International Trade	3	IA
Index of Employment	Labour	3	IA
Unemployment in Trade Unions	Labour	3	IA
Employment - Applications	Labour	3	IA
Employment - Placements	Labour	3	IA
Employment - Vacancies	Labour	3	IA
Strikes - Days Lost	Labour	3	IA
Strikes - Disputes in Existence	Labour	3	IA
Strikes - Number of Employees	Labour	3	IA
Bank Debits	Money, Banking, and Finance	2	IA
Chartered Banks - Commercial Loans	Money, Banking, and Finance	2	IA
Chartered Banks - Call Loans - Canada	Money, Banking, and Finance	2	IA
Chartered Banks - Call Loans - Elsewhere	Money, Banking, and Finance	2	IA
Chartered Banks - Short-term Deposits	Money, Banking, and Finance	2	IA
Chartered Banks - Long-term Deposits	Money, Banking, and Finance	2	IA
Chartered Banks - Total Securities	Money, Banking, and Finance	2	IA
Gold Value of the Currency	Money, Banking, and Finance	0	SHW
Clearings	Money, Banking, and Finance	2	SHW
Notes in Circulation	Money, Banking, and Finance	2	SHW
Stock Exchange - Number of Shares Sold	Money, Banking, and Finance	2	IA
Stock Exchange - Share Prices - Common Stocks	Money, Banking, and Finance	0	IA
Stock Exchange - Share Prices - Preferred Stocks	Money, Banking, and Finance	0	IA
Stock Exchange - Share Prices - Banking	Money, Banking, and Finance	0	IA
Stock Exchange - Share Prices - Industrial	Money, Banking, and Finance	0	IA
Stock Exchange - Share Prices - Mining	Money, Banking, and Finance	0	SHW
Stock Exchange - Share Prices - Iron and Steel	Money, Banking, and Finance	0	IA
Stock Exchange - Share Prices - Utilities	Money, Banking, and Finance	0	IA
Stock Exchange - Share Turnover	Money, Banking, and Finance	2	SHW
Bankruptcies - Number	Money, Banking, and Finance	2	IA
Bankruptcies - Liabilities	Money, Banking, and Finance	2	IA
Retail Cost Per Week of Family Budget - Cost of Living	Prices	2	IA
Wholesale Price Index - Total	Prices	2	IA
Wholesale Price Index - Raw Materials	Prices	2	IA
Wholesale Price Index - Finished Goods	Prices	2	IA
Wholesale Price Index - Non-ferrous Metals	Prices	2	IA
Wholesale Price Index - Food and Tobacco	Prices	2	IA
Sales of Agricultural Products - Cattle	Retail and Consumption	2	SHW
Sales of Agricultural Products - Grain	Retail and Consumption	2	SHW
Production - Total	Production	3	SHW

Series Name	Category		Source
Production - Steel Ingots and Castings	Production	3	IA
Production - Newsprint	Production	3	IA
Production - Pig Iron	Production	3	IA
Production - Coal	Production	3	IA
Railways - Car Loadings	Transport	2	IA
Railways - Freight Ton Miles	Transport	2	IA
Railways - Operating Revenues	Transport	2	IA

A.9 Chile (Estimation Sample: 1925:01-1929:10)

Series Name	Category	Release Delay (in Month)	Source
Construction Activity - Building Permits	Housing and Construction	2	SHW
Total Exports	International Trade	3	SHW
Total Imports	International Trade	3	SHW
Employed Workers in Copper Mining	Labour	3	SHW
Average Daily Wage	Labour	2	SHW
Central Bank - Credit Abroad	Money, Banking, and Finance	2	SHW
Central Bank - Notes in Circulation	Money, Banking, and Finance	2	SHW
Central Bank - Deposits	Money, Banking, and Finance	2	SHW
Central Bank - Gold	Money, Banking, and Finance	2	SHW
Central Bank - Rediscounts of Credit Banks	Money, Banking, and Finance	2	SHW
Central Bank - Discount Rate	Money, Banking, and Finance	0	SHW
Credit Banks - Bills of Exchange and Advances	Money, Banking, and Finance	2	SHW
Credit Banks - Deposits	Money, Banking, and Finance	2	SHW
Gold Value of the Currency	Money, Banking, and Finance	0	SHW
Stock Exchange - Mortgage Pfandbriefe Rate	Money, Banking, and Finance	0	SHW
Stock Exchange - Share Prices	Money, Banking, and Finance	0	SHW
Protested Bills of Exchange	Money, Banking, and Finance	2	SHW
Wholesale Price Index - Copper, Electrolytes (in New York)	Prices	2	SHW
Production - Copper	Production	3	SHW
Department Store Sales (in Santiago)	Retail and Consumption	2	SHW
Maritime Shipping	Transport	2	SHW
Railways - Freights Carried	Transport	2	SHW

A.10 Czechoslovakia (Estimation Sample: 1919:01-1928:10)

Series Name	Category	Release Delay (in Month)	Source
Total Exports	International Trade	3	IA
Total Imports	International Trade	3	IA
Average Hourly Wage Rates of Industry	Labour	2	SHW
Unemployed Jobseekers	Labour	3	SHW
Czechoslovak National Bank - Notes in Circulation	Money, Banking, and Finance	2	SHW
Czechoslovak National Bank - Deposits	Money, Banking, and Finance	2	SHW
Czechoslovak National Bank - Gold	Money, Banking, and Finance	2	SHW
Czechoslovak National Bank - Official Discount Rate	Money, Banking, and Finance	0	IA
Market Discount Rate	Money, Banking, and Finance	0	SHW
Clearings	Money, Banking, and Finance	2	SHW
Giro Turnover	Money, Banking, and Finance	2	SHW
Turnover of the Postal Savings Bank	Money, Banking, and Finance	2	IA + SHW
Stock Exchange - Bond Prices	Money, Banking, and Finance	0	SHW
Stock Exchange - Share Prices - Industrial and Transportation	Money, Banking, and Finance	0	SHW
Liquidations	Money, Banking, and Finance	2	IA
Bankruptcies	Money, Banking, and Finance	2	IA
Wholesale Price Index - Total	Prices	2	IA
Wholesale Price Index - Food and Fodder	Prices	2	IA
Wholesale Price Index - Industrial Goods	Prices	2	IA
Production - Total	Production	3	SHW
Production - Coke	Production	3	SHW
Railways - Car Loadings in International Traffic	Transport	2	IA

A.11 Denmark (Estimation Sample: 1925:01-1929:10)

Series Name	Category	Release Delay (in Month)	Source
Total Exports	International Trade	3	SHW
Total Imports	International Trade	3	SHW
Hourly Earnings of Workers	Labour	3	SHW
Unemployed Union Members - Number	Labour	3	SHW
Unemployed Union Members - Percent	Labour	3	SHW
Central Bank of Denmark - Notes in Circulation	Money, Banking, and Finance	2	SHW
Central Bank of Denmark - Bills of Exchange and Advances	Money, Banking, and Finance	2	SHW
Central Bank of Denmark - Gold	Money, Banking, and Finance	2	SHW
Central Bank of Denmark - Discount Rate	Money, Banking, and Finance	0	SHW
Credit Banks - Advances	Money, Banking, and Finance	2	SHW
Credit Banks - Bills of Exchange	Money, Banking, and Finance	2	SHW
Gold Value of the Currency	Money, Banking, and Finance	0	SHW
Clearings	Money, Banking, and Finance	2	SHW
Stock Exchange - Bond Prices	Money, Banking, and Finance	0	SHW
Stock Exchange - Share Prices	Money, Banking, and Finance	0	SHW
Total Foreclosures	Money, Banking, and Finance	2	SHW
Agriculture Foreclosures	Money, Banking, and Finance	2	SHW
Cost of Living - Total	Prices	2	SHW
Cost of Living - Clothing	Prices	2	SHW
Cost of Living - Food	Prices	2	SHW
Wholesale Price Index - Total	Prices	2	SHW
Wholesale Price Index - Import Goods	Prices	2	SHW
Wholesale Price Index - Animal Feed	Prices	2	SHW
Wholesale Price Index - Fertilizer	Prices	2	SHW
Wholesale Price Index - Butter	Prices	2	SHW
Wholesale Price Index - Heifers and Oxen	Prices	2	SHW
Pig Slaughtering	Production	3	SHW
Sea Freight Rate	Transport	2	SHW

A.12 Dutch Indies (Estimation Sample: 1925:01-1929:10)

Series Name	Category	Release Delay (in Month)	Source
Total Exports	International Trade	3	SHW
Total Imports	International Trade	3	SHW
Java Bank - Notes in Circulation	Money, Banking, and Finance	2	SHW
Java Bank - Bills of Exchange and Advances	Money, Banking, and Finance	2	SHW
Java Bank - Deposits	Money, Banking, and Finance	2	SHW
Java Bank - Foreign Exchange	Money, Banking, and Finance	2	SHW
Java Bank - Gold	Money, Banking, and Finance	2	SHW
Java Bank - Discount Rate	Money, Banking, and Finance	0	SHW
Mortgage Institutions - Loans	Money, Banking, and Finance	2	SHW
Mortgage Institutions - Repayments	Money, Banking, and Finance	2	SHW
Clearings	Money, Banking, and Finance	2	SHW
Post Office Savings - Payments	Money, Banking, and Finance	2	SHW
Post Office Savings - Proceeds	Money, Banking, and Finance	2	SHW
Stock Exchange - Share Prices	Money, Banking, and Finance	0	SHW
Cost of Living - Total	Prices	2	SHW
Cost of Living - Food for Non-Europeans	Prices	2	SHW
Wholesale Price Index - Total	Prices	2	SHW
Wholesale Price Index - Export Goods	Prices	2	SHW
Wholesale Price Index - Import Goods	Prices	2	SHW
Production - Hard Coal	Production	3	SHW
Shipping - With Europe	Transport	2	SHW
Shipping - With US	Transport	2	SHW
Railways - Freight Revenue	Transport	2	SHW

A.13 Estonia (Estimation Sample: 1925:01-1929:10)

Series Name	Category	Release Delay (in Month)	Source
Total Exports	International Trade	3	SHW
Total Exports	International Trade	3	SHW
Employed Workers	Labour	3	SHW
Unemployed	Labour	3	SHW
Bank of Estonia - Notes in Circulation	Money, Banking, and Finance	2	SHW
Bank of Estonia - Bills of Exchange and Advances	Money, Banking, and Finance	2	SHW
Bank of Estonia - Gold	Money, Banking, and Finance	2	SHW
Bank of Estonia - Discount Rate	Money, Banking, and Finance	0	SHW
Gold Value of the Currency	Money, Banking, and Finance	0	SHW
Cost of Living - Total (in Tallinn)	Prices	2	SHW
Cost of Living - Food (in Tallinn)	Prices	2	SHW
Wholesale Price Index - Total	Prices	2	SHW
Wholesale Price Index - Export Goods	Prices	2	SHW
Wholesale Price Index - Import Goods	Prices	2	SHW
Production - Oil Shale	Production	3	SHW
Railways - Freights Carried	Transport	2	SHW

A.14 Finland (Estimation Sample: 1925:01-1929:10)

Series Name	Category	Release Delay (in Month)	Source
Total Exports	International Trade	3	SHW
Total Imports	International Trade	3	SHW
Unemployed - Partial Disclosure	Labour	3	SHW
Bank of Finland - Notes in Circulation	Money, Banking, and Finance	2	SHW
Bank of Finland - Bills of Exchange and Advances	Money, Banking, and Finance	2	SHW
Bank of Finland - Discount Rate	Money, Banking, and Finance	0	SHW
Credit Banks - Bills of Exchange and Advances	Money, Banking, and Finance	2	SHW
Gold Value of the Currency	Money, Banking, and Finance	0	SHW
Clearings	Money, Banking, and Finance	2	SHW
Stock Exchange - Share Prices (in Helsinki)	Money, Banking, and Finance	0	SHW
Stock Exchange - Share Turnover (in Helsinki)	Money, Banking, and Finance	2	SHW
Bankruptcies - Total	Money, Banking, and Finance	2	SHW
Protested Bills of Exchange - Value	Money, Banking, and Finance	2	SHW
Cost of Living - Total	Prices	2	SHW
Cost of Living - Food	Prices	2	SHW
Cost of Living - Clothing	Prices	2	SHW
Wholesale Price Index - Total	Prices	2	SHW
Wholesale Price Index - Export Goods	Prices	2	SHW
Wholesale Price Index - Import Goods	Prices	2	SHW
Production - Export Industries	Production	3	SHW
Wholesale Turnover	Retail and Consumption	2	SHW
Maritime Shipping	Transport	2	SHW
State Railways - Freights Carried	Transport	2	SHW

A.15 France (Estimation Sample: 1919:01-1928:10)

Series Name	Category	Release Delay (in Month)	Source
Activity in Building Construction	Housing and Construction	2	IA
Total Exports (Quantity)	International Trade	3	IA
Total Exports (Value)	International Trade	3	IA
Total Imports (Quantity)	International Trade	3	IA
Total Imports (Value)	International Trade	3	IA
Unemployed on Benefits	Labour	3	SHW
Coefficient of Placement Index	Labour	3	NBER
Unsettled Job Applications	Labour	3	SHW
Bank of France - Advances to the State	Money, Banking, and Finance	2	SHW
Bank of France - Gold and Silver Cash and Bullion	Money, Banking, and Finance	2	IA
Bank of France - Notes in Circulation	Money, Banking, and Finance	2	IA
Bank of France - Discounts	Money, Banking, and Finance	2	IA
Commercial Banks - Acceptances	Money, Banking, and Finance	2	SHW
Commercial Banks - Advances	Money, Banking, and Finance	2	SHW
Commercial Banks - Credits	Money, Banking, and Finance	2	SHW
Commercial Banks - Cash	Money, Banking, and Finance	2	SHW
4 Banking Institutions Deposits	Money, Banking, and Finance	2	IA
Commercial Banks - Bills of Exchange Discounted	Money, Banking, and Finance	2	SHW
Deposits of Private Banks at Caisse des Depots	Money, Banking, and Finance	2	IA
Gold Price of 1000 Francs (at the Paris Exchange)	Money, Banking, and Finance	0	IA
Bank of France - Official Discount Rate	Money, Banking, and Finance	0	IA
Private Discount Rate	Money, Banking, and Finance	0	SHW
Private Prime Paper Rate	Money, Banking, and Finance	0	IA
Collateral Loan Rate	Money, Banking, and Finance	0	IA
Returns of Paris Bankers Clearing House	Money, Banking, and Finance	2	IA
Bankruptcies	Money, Banking, and Finance	2	SHW
Stock Exchange - Price of Banking Stocks (4 Commercial Banks)	Money, Banking, and Finance	0	IA
Stock Exchange - Price of Variable Dividend Stocks (300 Domestic)	Money, Banking, and Finance	0	IA
Stock Exchange - Price of Metallurgical Stocks (13 Companies)	Money, Banking, and Finance	0	IA
Taxable Exchange Operations	Money, Banking, and Finance	2	IA
Capital Issuances - Variable Dividend Existing	Money, Banking, and Finance	2	IA
Capital Issuances - Variable Dividend New	Money, Banking, and Finance	2	IA
Cost of Living (Paris)	Prices	2	IA
Retail Price (Paris)	Prices	2	IA
Wholesale Price Index - Total	Prices	2	IA
Wholesale Price Index - Food	Prices	2	IA
Wholesale Price Index - Industrial Materials	Prices	2	IA
Receipts of Post Telegraphs and Telephones	Retail and Consumption	2	IA
Orders - Cotton Spinning	Retail and Consumption	2	IA
Orders - Cotton Weaving (Pieces Per Loom)	Retail and Consumption	2	IA
Yield of Entertainment Tax (Paris)	Retail and Consumption	2	IA
Turnover of Internal Commerce	Retail and Consumption	2	IA

Production - Total	Production	3	IA
Production - Coal	Production	3	IA
Production - Pig Iron	Production	3	IA
Production - Steel	Production	3	IA
Railways - Daily Carloads	Transport	2	IA
Railways - Weekly Receipts	Transport	2	IA
Shipping - Tonnage Cleared	Transport	2	IA

A.16 Germany (Estimation Sample: 1924:01-1929:10)

Series Name	Category	Release Delay (in Month)	Source
Urban Construction Activity	Housing and Construction	2	SHW
Total Exports	International Trade	3	IA
Total Imports	International Trade	3	IA
Unemployed - Main Beneficiary in Unemployment Insurance	Labour	3	SHW
Male Applicants Per Hundred Positions	Labour	3	NBER
Hourly Wages	Labour	2	SHW
Major Banks - Acceptances	Money, Banking, and Finance	3	SHW
Major Banks - Accounts Payable	Money, Banking, and Finance	3	SHW
Major Banks - Accounts Receivable	Money, Banking, and Finance	3	SHW
Major Banks - Cash and Bank Balance	Money, Banking, and Finance	3	SHW
Major Banks - Bills of Exchange	Money, Banking, and Finance	3	SHW
Major Banks - Advances on Goods	Money, Banking, and Finance	3	SHW
Major Banks - Reports and Lombards	Money, Banking, and Finance	3	SHW
Major Banks - Securities and Syndicate Participations	Money, Banking, and Finance	3	SHW
Reichsbank - Gold and Foreign Exchange Holding	Money, Banking, and Finance	2	IA
Debt Rate of Banks	Money, Banking, and Finance	0	SHW
Merchandise Bill Rate	Money, Banking, and Finance	0	SHW
Loan Rate of Banks	Money, Banking, and Finance	0	SHW
Prime Banker's Acceptance Rate	Money, Banking, and Finance	0	SHW
Reichsbank - Official Rate	Money, Banking, and Finance	0	IA
Issues - Domestic Fixed-income Securities	Money, Banking, and Finance	2	SHW
Issues - Domestic Shares	Money, Banking, and Finance	2	SHW
Reichsbank - Clearings	Money, Banking, and Finance	2	IA
Reichsbank - Transfers	Money, Banking, and Finance	2	IA
Reichsbank - Giro Transactions	Money, Banking, and Finance	2	SHW
Money in Circulation	Money, Banking, and Finance	2	IA
Postal Cheque Payments	Money, Banking, and Finance	2	IA
Stock Prices - Mining and Heavy Industries	Money, Banking, and Finance	0	IA
Stock Prices - Trade and Transport	Money, Banking, and Finance	0	IA
Bankruptcies	Money, Banking, and Finance	2	SHW
Composition Proceedings	Money, Banking, and Finance	2	SHW
Number of New Firms Established	Money, Banking, and Finance	2	NBER
Cost of Living - Total	Prices	2	IA
Cost of Living - Food	Prices	2	SHW
Wholesale Price Index - Total	Prices	2	IA
Wholesale Price Index - Agricultural	Prices	2	IA
Retail Sales - Total	Retail and Consumption	2	SHW
Production - Total	Production	3	SHW
Tonnage of Vessels under Construction	Production	3	NBER
Freight Rates - River	Transport	2	SHW
Freight Rates - Maritime	Transport	2	SHW
Railways - Waggon Loadings (Per Working Day)	Transport	2	IA
Railways - Revenue Ton-Kilometres	Transport	2	NBER

A.17 Hungary (Estimation Sample: 1921:01-1929:10)

Series Name	Category	Release Delay (in Month)	Source
Total Exports	International Trade	3	IA
Total Imports	International Trade	3	IA
Job Seekers	Labour	3	SHW
Unemployed Union Members - Number	Labour	3	SHW
Unemployed Union Members - Percent	Labour	3	SHW
Gold Value of the Currency	Money, Banking, and Finance	0	SHW
Hungarian National Bank - Notes in Circulation	Money, Banking, and Finance	2	SHW
Hungarian National Bank - Bills of Exchange and Advances	Money, Banking, and Finance	2	SHW
Hungarian National Bank - Foreign Exchange	Money, Banking, and Finance	2	SHW
Hungarian National Bank - Gold	Money, Banking, and Finance	2	SHW
Hungarian National Bank - Discount Rate	Money, Banking, and Finance	0	IA
Prime Commercial Paper Rate	Money, Banking, and Finance	0	IA
Day to Day Rate	Money, Banking, and Finance	0	IA
Clearings	Money, Banking, and Finance	2	SHW
Stock Exchange - Share Prices	Money, Banking, and Finance	0	SHW
Bankruptcies - Number	Money, Banking, and Finance	2	IA
Compositions - Number	Money, Banking, and Finance	2	IA
Cost of Living - Total	Prices	2	SHW
Cost of Living - Clothing	Prices	2	SHW
Cost of Living - Food	Prices	2	SHW
Wholesale Price Index - Total	Prices	2	IA
Wholesale Price Index - Agricultural and Food Products	Prices	2	SHW
Wholesale Price Index - Industrial Materials and Products	Prices	2	SHW
Production - Total	Production	3	SHW
Production - Cotton Goods and Finish	Production	3	SHW
Postage - Letters	Retail and Consumption	2	IA
Postage - Telephone Calls	Retail and Consumption	2	IA
State Railways - Freights Carried	Transport	2	IA

A.18 Italy (Estimation Sample: 1925:01-1929:10)

Series Name	Category	Release Delay (in Month)	Source
Total Exports	International Trade	3	SHW
Total Imports	International Trade	3	SHW
Unemployed - Total	Labour	3	SHW
Unemployed - Insured	Labour	3	SHW
Short-time Workers	Labour	3	SHW
Bank of Italy - Notes in Circulation	Money, Banking, and Finance	2	SHW
Bank of Italy - Foreign Exchange	Money, Banking, and Finance	2	SHW
Bank of Italy - Gold	Money, Banking, and Finance	2	SHW
Gold Value of the Currency	Money, Banking, and Finance	0	SHW
Bank of Italy - Discount Rate	Money, Banking, and Finance	0	SHW
Market Discount Rate in Milan	Money, Banking, and Finance	0	SHW
Stock Exchange - Share Prices	Money, Banking, and Finance	0	SHW
Stock Exchange - Share Sales	Money, Banking, and Finance	2	SHW
Bankruptcies	Money, Banking, and Finance	2	SHW
Protested Bills of Exchange	Money, Banking, and Finance	2	SHW
Wholesale Price Index - Total	Prices	2	SHW
Wholesale Price Index - Finished Goods	Prices	2	SHW
Wholesale Price Index - Semi-finished Goods	Prices	2	SHW
Electricity Industry - Power Consumption	Retail and Consumption	3	SHW
Production - Crude Steel	Production	3	SHW
Production - Pig Iron	Production	3	SHW
Railways - Freights Carried	Transport	2	SHW
Shipping - Sea Freight - Incoming Goods	Transport	2	SHW
Shipping - Sea Freight - Outgoing Goods	Transport	2	SHW

A.19 Japan (Estimation Sample: 1919:01-1929:10)

Series Name	Category	Release Delay (in Month)	Source
Total Exports - Including Colonies	International Trade	3	IA
Total Imports - Including Colonies	International Trade	3	IA
Wage Rates - Industrial Workers	Labour	2	SHW
Employment - Industrial	Labour	3	SHW
Bank of Japan - Notes in Circulation (Daily Average)	Money, Banking, and Finance	2	IA
Bank of Japan - Gold	Money, Banking, and Finance	2	SHW
Bank of Japan - Advances (Daily Average)	Money, Banking, and Finance	2	IA
Bank of Japan - Discount Rate	Money, Banking, and Finance	0	SHW
Call Money Rate	Money, Banking, and Finance	0	SHW
Market Discount Rate (Average of Lowest, Tokyo)	Money, Banking, and Finance	0	IA
Stock Exchange - Average Price of 50 Industrial Shares	Money, Banking, and Finance	0	IA
Gold Value of the Currency	Money, Banking, and Finance	0	SHW
Clearing Banks - Bills of Exchange and Advances	Money, Banking, and Finance	2	SHW
Commercial Banks - Advances	Money, Banking, and Finance	2	IA
Clearings	Money, Banking, and Finance	2	SHW
Cost of Living - Total (in Tokyo)	Prices	2	SHW
Cost of Living - Clothing (in Tokyo)	Prices	2	SHW
Cost of Living - Food (in Tokyo)	Prices	2	SHW
Wholesale Price Index - Total	Prices	2	SHW
Wholesale Price Index - Cotton Yarn	Prices	2	SHW
Wholesale Price Index - Raw Silk (in Tokyo)	Prices	2	SHW
Inventory - Raw Silk Warehouse	Retail and Consumption	2	SHW
Production - Total	Production	3	SHW
Production - Textile Industry - Total	Production	3	SHW
Production - Cotton Fabrics	Production	3	SHW
Production - Cotton Yarn	Production	3	SHW
Production - Raw Silk	Production	3	SHW
Railways - Freights Carried	Transport	2	SHW

A.20 Lithuania (Estimation Sample: 1925:01-1929:10)

Series Name	Category	Release Delay (in Month)	Source
Total Exports	International Trade	3	SHW
Total Imports	International Trade	3	SHW
Bank of Lithuania - Notes in Circulation	Money, Banking, and Finance	2	SHW
Bank of Lithuania - Bills of Exchange and Advances	Money, Banking, and Finance	2	SHW
Bank of Lithuania - Gold	Money, Banking, and Finance	2	SHW
Bank of Lithuania - Discount Rate	Money, Banking, and Finance	0	SHW
Gold Value of the Currency	Money, Banking, and Finance	0	SHW
Protested Bills of Exchange	Money, Banking, and Finance	2	SHW
Cost of Living - Total	Prices	2	SHW
Wholesale Price Index - Total	Prices	2	SHW
Wholesale Price Index - Flax	Prices	2	SHW
Railways - Freights Carried	Transport	2	SHW

A.21 Netherlands (Estimation Sample: 1919:01-1928:10)

Series Name	Category	Release Delay (in Month)	Source
Construction Activity - Completion	Housing and Construction	2	SHW
Total Exports	International Trade	3	SHW
Total Imports	International Trade	3	SHW
Unemployment - Total Job Seekers	Labour	3	SHW
Unemployment - Insured Workers	Labour	3	SHW
Unemployment - Lost Workdays	Labour	3	SHW
Netherlands Bank - Notes in Circulation	Money, Banking, and Finance	2	SHW
Netherlands Bank - Foreign Currency	Money, Banking, and Finance	2	SHW
Netherlands Bank - Gold	Money, Banking, and Finance	2	SHW
Netherlands Bank - Discount Rate	Money, Banking, and Finance	0	SHW
Private Discount Rate	Money, Banking, and Finance	0	SHW
Collateral Loan Rate	Money, Banking, and Finance	0	SHW
Issues - Domestic Shares	Money, Banking, and Finance	2	SHW
Stock Exchange - Domestic Share Prices	Money, Banking, and Finance	0	SHW
Bankruptcies	Money, Banking, and Finance	2	SHW
Cost of Living - Total (Amsterdam)	Prices	2	IA
Cost of Living - Food (Amsterdam)	Prices	2	SHW
Wholesale Price Index - Total	Prices	2	IA + SHW
Wholesale Price Index - Food	Prices	2	IA + SHW
Production - Coal	Production	3	IA

A.22 New Zealand (Estimation Sample: 1925:01-1929:10)

Series Name	Category	Release Delay (in Month)	Source
Construction Activity - Building Permits	Housing and Construction	2	SHW
Total Exports	International Trade	3	SHW
Total Imports	International Trade	3	SHW
Weekly Wages - Total	Labour	3	SHW
Unemployed	Labour	3	SHW
Notes in Circulation	Money, Banking, and Finance	2	SHW
Credit Banks - Bills of Exchange and Advances	Money, Banking, and Finance	2	SHW
Credit Banks - Gold	Money, Banking, and Finance	2	SHW
Gold Value of the Currency	Money, Banking, and Finance	0	SHW
Bank Discount Rate	Money, Banking, and Finance	0	SHW
Stock Exchange - Share Prices	Money, Banking, and Finance	0	SHW
Bankruptcies	Money, Banking, and Finance	2	SHW
Cost of Living - Total	Prices	2	SHW
Cost of Living - Food	Prices	2	SHW
Wholesale Price Index - Total	Prices	2	SHW
Wholesale Price Index - Exporting Goods Total	Prices	2	SHW
Wholesale Price Index - Exporting Dairy Products	Prices	2	SHW
Wholesale Price Index - Exporting Meat	Prices	2	SHW
Wholesale Price Index - Exporting Wool	Prices	2	SHW
Wholesale Price Index - Importing Goods Total	Prices	2	SHW
Butter - Consignments	Retail and Consumption	2	SHW
Butter - Stocks	Retail and Consumption	2	SHW
Cheese - Consignments	Retail and Consumption	2	SHW
Cheese - Stocks	Retail and Consumption	2	SHW
Maritime Shipping - Inbound Traffic	Transport	2	SHW

A.23 Peru (Estimation Sample: 1925:01-1929:10)

Series Name	Category	Release Delay (in Month)	Source
Total Exports	International Trade	3	SHW
Total Imports	International Trade	3	SHW
Central Bank - Notes in Circulation	Money, Banking, and Finance	2	SHW
Central Bank - Bills of Exchange and Advances	Money, Banking, and Finance	2	SHW
Central Bank - Deposits	Money, Banking, and Finance	2	SHW
Central Bank - Gold and Foreign Exchange	Money, Banking, and Finance	2	SHW
Central Bank - Discount Rate	Money, Banking, and Finance	0	SHW
Gold Value of the Currency	Money, Banking, and Finance	0	SHW
Cost of Living - Total	Prices	2	SHW
Wholesale Price Index - Total	Prices	2	SHW
Wholesale Price Index - Building Materials	Prices	2	SHW
Wholesale Price Index - Import Goods	Prices	2	SHW
Wholesale Price Index - Food	Prices	2	SHW
Wholesale Price Index - Metals	Prices	2	SHW
Wholesale Price Index - Textiles	Prices	2	SHW

A.24 Poland (Estimation Sample: 1925:01-1929:10)

Series Name	Category	Release Delay (in Month)	Source
Construction	Housing and Construction	2	SHW
Total Exports	International Trade	3	SHW
Total Imports	International Trade	3	SHW
Registered Unemployed	Labour	3	SHW
Employed Workers	Labour	3	SHW
Bank of Poland - Notes in Circulation	Money, Banking, and Finance	2	SHW
Bank of Poland - Foreign Exchange	Money, Banking, and Finance	2	SHW
Bank of Poland - Gold	Money, Banking, and Finance	2	SHW
Gold Value of the Currency	Money, Banking, and Finance	0	SHW
Bank of Poland - Discount Rate	Money, Banking, and Finance	0	SHW
Discount Rate of Joint-Stock Banks	Money, Banking, and Finance	0	SHW
Clearings	Money, Banking, and Finance	2	SHW
Postal Check Turnover	Money, Banking, and Finance	2	SHW
Savings - Deposits	Money, Banking, and Finance	2	SHW
Stock Exchange - Share Prices	Money, Banking, and Finance	0	SHW
Issues - New Stocks	Money, Banking, and Finance	2	IA
Bankruptcies	Money, Banking, and Finance	2	SHW
Cost of Living - Total	Prices	2	SHW
Cost of Living - Food	Prices	2	SHW
Wholesale Price Index - Total	Prices	2	SHW
Wholesale Price Index - Agricultural Products	Prices	2	SHW
Production - Total	Production	3	SHW
Production - Chemical Industry	Production	3	SHW
Production - Hard Coal	Production	3	SHW
Production - Consumer Goods	Production	3	SHW
Railways - Freight Car Traffic	Transport	2	SHW

A.25 Romania (Estimation Sample: 1925:01-1929:10)

Series Name	Category	Release Delay (in Month)	Source
Total Exports	International Trade	3	SHW
Total Imports	International Trade	3	SHW
Unemployed - Seasonal Workers	Labour	3	SHW
Unemployed - Total	Labour	3	SHW
Savings Banks - Savings (in Bucharest)	Money, Banking, and Finance	2	SHW
Gold Value of the Currency	Money, Banking, and Finance	0	SHW
Private Discount Rate	Money, Banking, and Finance	0	SHW
National Bank of Romania - Discount Rate	Money, Banking, and Finance	0	SHW
National Bank of Romania - Notes in Circulation	Money, Banking, and Finance	2	SHW
National Bank of Romania - Bills of Exchange and Advances	Money, Banking, and Finance	2	SHW
National Bank of Romania - Demand Deposits	Money, Banking, and Finance	2	SHW
National Bank of Romania - Gold	Money, Banking, and Finance	2	SHW
Clearings (in Bucharest)	Money, Banking, and Finance	2	SHW
Stock Exchange - Fixed-income Securities Prices	Money, Banking, and Finance	0	SHW
Stock Exchange - Share Prices	Money, Banking, and Finance	0	SHW
Approved Moratoria	Money, Banking, and Finance	2	SHW
Opened Bankruptcies	Money, Banking, and Finance	2	SHW
Protested Bills of Exchange	Money, Banking, and Finance	2	SHW
Wholesale Price Index - Kerosene	Prices	2	SHW
Wholesale Price Index - Benzine	Prices	2	SHW
Wholesale Price Index - Heavy Fuel	Prices	2	SHW
Production - Oil	Production	3	SHW
Consumption - Cement	Retail and Consumption	2	SHW

A.26 South Africa (Estimation Sample: 1925:01-1929:10)

Series Name	Category	Release Delay (in Month)	Source
Construction Activity - Residential Buildings Commenced	Housing and Construction	2	SHW
Total Exports Including Gold Bullions and Coins	International Trade	3	SHW
Total Imports	International Trade	3	SHW
Employed in Mining - Gold Mining, Indigenous and Other Coloured	Labour	3	SHW
Employed in Mining - Total Mining, Indigenous and Other Coloured	Labour	3	SHW
Agricultural Credit Banks - Advances	Money, Banking, and Finance	2	SHW
Credit Banks - Bills of Exchange and Advances	Money, Banking, and Finance	2	SHW
Credit Banks - Long-term Deposits	Money, Banking, and Finance	2	SHW
Gold Value of the Currency	Money, Banking, and Finance	0	SHW
Clearings	Money, Banking, and Finance	2	SHW
Postal Savings Banks - Deposits	Money, Banking, and Finance	2	SHW
South African Reserve Bank - Discount Rate	Money, Banking, and Finance	0	SHW
South African Reserve Bank - Notes in Circulation	Money, Banking, and Finance	2	SHW
South African Reserve Bank - Gold	Money, Banking, and Finance	2	SHW
Bankruptcies	Money, Banking, and Finance	2	SHW
Cost of Living - Total	Prices	2	SHW
Cost of Living - Food	Prices	2	SHW
Wholesale Price Index - Export Prices for Agricultural Products	Prices	2	SHW
Production - Hard Coal	Production	3	SHW
Production - Gold	Production	3	SHW
Railways - Freights Carried - Total Excluding Coal	Transport	2	SHW
Railways - Freights Carried - Coal	Transport	2	SHW

A.27 Spain (Estimation Sample: 1919:01-1929:10)

Series Name	Category	Release Delay (in Month)	Source
Bank of Spain - Notes in Circulation	Money, Banking, and Finance	2	SHW
Bank of Spain - Bills of Exchange and Advances	Money, Banking, and Finance	2	SHW
Bank of Spain - Deposits	Money, Banking, and Finance	2	SHW
Bank of Spain - Foreign Exchange	Money, Banking, and Finance	2	SHW
Bank of Spain - Gold	Money, Banking, and Finance	2	SHW
Bank of Spain - Discount Rate	Money, Banking, and Finance	0	IA
Gold Value of the Currency	Money, Banking, and Finance	0	SHW
Clearings	Money, Banking, and Finance	2	SHW
Stock Exchange - Fixed Interest Security Prices (in Barcelona)	Money, Banking, and Finance	0	IA
Stock Exchange - Stock Prices	Money, Banking, and Finance	0	IA
Cost of Living - Total (in Madrid)	Prices	2	SHW
Wholesale Price Index - Total (in Barcelona)	Prices	2	IA + SHW
Wholesale Price Index - Food	Prices	2	SHW
Wholesale Price Index - Industrial Materials	Prices	2	SHW
Production - Coal and Lignite	Production	3	IA
Production - Copper Ore	Production	3	IA
Production - Iron Ore	Production	3	IA
Production - Lead Ore	Production	3	IA
Production - Pig Iron	Production	3	IA
Production - Steel	Production	3	IA

A.28 Sweden (Estimation Sample: 1919:01-1929:10)

Series Name	Category	Release Delay (in Month)	Source
Total Exports	International Trade	3	IA
Total Imports	International Trade	3	IA
Unemployed - Support Seekers	Labour	3	SHW
Unemployed - Union Members - Number	Labour	3	SHW
Unemployed - Union Members - Percent	Labour	3	IA
Credit Banks - Domestic Bills of Exchange	Money, Banking, and Finance	2	SHW
Credit Banks - Advances	Money, Banking, and Finance	2	IA
Yield on Inconvertible State Bonds	Money, Banking, and Finance	0	IA
Riksbank - Discount Rate	Money, Banking, and Finance	0	IA
Riksbank - Clearings	Money, Banking, and Finance	2	SHW
Riksbank - Notes in Circulation	Money, Banking, and Finance	2	IA
Riksbank - Bills of Exchange and Advances	Money, Banking, and Finance	2	SHW
Riksbank - Foreign Exchange	Money, Banking, and Finance	2	SHW
Riksbank - Gold	Money, Banking, and Finance	2	IA
Stock Exchange - Share Prices - All Shares	Money, Banking, and Finance	0	IA
Stock Exchange - Turnover - Total	Money, Banking, and Finance	2	IA
Bankruptcies	Money, Banking, and Finance	2	IA + SHW
Cost of Living - Total	Prices	2	IA
Wholesale Price Index - Total (Board of Trade)	Prices	2	IA
Wholesale Price Index - Raw Materials	Prices	2	IA
Wholesale Price Index - Semi-finished Goods	Prices	2	IA
Wholesale Price Index - Finished Goods	Prices	2	IA
Wholesale Price Index - Consumer Goods	Prices	2	SHW
Wholesale Price Index - Production Goods	Prices	2	SHW
Production - Total	Production	3	SHW
Production - Production Goods Industries	Production	3	SHW
Production - Consumer Goods Industries	Production	3	SHW
Production - Crude Steel	Production	3	SHW
Production - Rolling Mill Products	Production	3	SHW
Production - Pig Iron	Production	3	SHW
Shipping - Inbound	Transport	2	IA
Shipping - Outbound	Transport	2	IA
Railways - Freights Carried	Transport	2	SHW

A.29 Switzerland (Estimation Sample: 1925:01-1929:10)

Series Name	Category	Release Delay (in Month)	Source
Total Exports	International Trade	3	SHW
Total Imports	International Trade	3	SHW
Average Employment Level	Labour	3	SHW
Short-time Workers	Labour	3	SHW
Unemployed	Labour	3	SHW
Cantonal Banks - Current Accounts Payable	Money, Banking, and Finance	2	SHW
Swiss National Bank - Discount Rate	Money, Banking, and Finance	0	SHW
Private Discount Rate	Money, Banking, and Finance	0	SHW
Stock Exchange - Share Prices	Money, Banking, and Finance	0	SHW
Swiss National Bank - Notes in Circulation	Money, Banking, and Finance	2	SHW
Swiss National Bank - Gold Currency	Money, Banking, and Finance	2	SHW
Swiss National Bank - Gold	Money, Banking, and Finance	2	SHW
Composition Agreements	Money, Banking, and Finance	2	SHW
Cost of Living - Total	Prices	2	SHW
Cost of Living - Food	Prices	2	SHW
Wholesale Price Index - Total	Prices	2	SHW
Wholesale Price Index - Feed and Fertilizers	Prices	2	SHW
Wholesale Price Index - Food	Prices	2	SHW
Wholesale Price Index - Raw and Auxiliary Materials	Prices	2	SHW
Hallmarking of Watch Cases	Production	3	SHW

A.30 United Kingdom (Estimation Sample: 1919:01-1928:10)

Series Name	Category	Release Delay (in Month)	Source
Estimated Cost of Buildings for Which Plans Were Passed - 146 Cities	Housing and Construction	2	IA
Total Imports (Including Miscellaneous)	International Trade	3	IA
Total Exports (Including Miscellaneous)	International Trade	3	IA
Total Insured Persons Unemployed - Male	Labour	3	IA
Total Insured Persons Unemployed - Female	Labour	3	IA
Percentage of Insured Persons Unemployed - Male and Female	Labour	3	IA
Security Price Index - London	Money, Banking, and Finance	0	NBER
British Railway Common Shares Index	Money, Banking, and Finance	0	NBER
Three Months Rate	Money, Banking, and Finance	0	IA
Day to Day Rate	Money, Banking, and Finance	0	IA
Bank of England - Minimum Discount Rate	Money, Banking, and Finance	0	NBER
Yield on Consols	Money, Banking, and Finance	0	NBER
Gold Value of the Currency	Money, Banking, and Finance	0	SHW
Outstanding Treasury Bills	Money, Banking, and Finance	2	IA
Nine Clearing Banks - Advances	Money, Banking, and Finance	2	IA
Nine Clearing Banks - Deposits	Money, Banking, and Finance	2	IA
Nine Clearing Banks - Discounts	Money, Banking, and Finance	2	IA
Nine Clearing Banks - Investments	Money, Banking, and Finance	2	IA
Nine Clearing Banks - Cash to Deposits	Money, Banking, and Finance	2	IA
Bank Clearings - London (London Bankers Clearing House)	Money, Banking, and Finance	2	IA
Bank of England - Notes in Circulation	Money, Banking, and Finance	2	IA
Bank of England - Gold	Money, Banking, and Finance	2	SHW
Bank of England - Government Securities	Money, Banking, and Finance	2	SHW
Bank of England - Other Securities	Money, Banking, and Finance	2	SHW
New Capital Issues	Money, Banking, and Finance	2	IA
Bankruptcies	Money, Banking, and Finance	2	SHW
Retail Prices - Cost of Living (Ministry of Labour)	Prices	2	IA
Retail Prices - Food (Ministry of Labour)	Prices	2	IA
Wholesale Price Index - Total (Board of Trade)	Prices	2	IA
Wholesale Price Index Board of Trade - Food	Prices	2	IA
Production - Coal	Production	3	IA
Shipbuilding - Tonnage Commenced	Production	3	IA
Index of Business Activity	Retail and Consumption	3	NBER
Index of Consumption of Raw Cotton	Retail and Consumption	2	IA
Railways - Receipts - All Goods	Transport	2	IA
Railways - Weight of Freight Transported - General Merchandise	Transport	2	IA
Railways - Weight of Freight Transported - Fuel	Transport	2	IA
Shipping - Entered	Transport	2	IA
Shipping - Cleared	Transport	2	IA
Shipping - Index of Time Chartered Rates	Transport	2	IA
Shipping - Index of Freight Rates	Transport	2	IA

A.31 United States (Estimation Sample: 1919:01-1928:10)

Series Name	Category	Release Delay (in Month)	Source
Construction Contracts	Housing and Construction	2	IA
Building Permits	Housing and Construction	2	IA
Merchandise Imports	International Trade	3	IA
Merchandise Exports	International Trade	3	IA
Employment Index 1929 Revision	Labour	3	FRB
Employment Index 1934 Revision	Labour	3	FRB
Employment Index 1936 Revision *	Labour	3	FRB
Payroll Index 1929 Revision	Labour	3	FRB
Payroll Index 1934 Revision	Labour	3	FRB
Payroll Index 1936 Revision *	Labour	3	FRB
Prime Commercial Paper Rate	Money, Banking, and Finance	0	IA
Bank Rate on Customer Loans - Leading Cities	Money, Banking, and Finance	0	NBER
Banker's Acceptance Rate for New York	Money, Banking, and Finance	0	NBER
New York Fed - Discount Rate	Money, Banking, and Finance	0	NBER
Yield on Long-term US Bonds	Money, Banking, and Finance	1	NBER
Gold Stock	Money, Banking, and Finance	2	IA
Money in Circulation	Money, Banking, and Finance	2	IA
Federal Reserve System Reporting Member Banks - Loans on Securities	Money, Banking, and Finance	2	IA
Federal Reserve System Reporting Member Banks - All Other Loans	Money, Banking, and Finance	2	IA
Federal Reserve System Reporting Member Banks - Investments	Money, Banking, and Finance	2	IA
Combined Federal Reserve Banks - Bills Discounted	Money, Banking, and Finance	2	IA
Combined Federal Reserve Banks - Bills Bought in Open Market	Money, Banking, and Finance	2	IA
Volume of Commercial Paper Outstanding	Money, Banking, and Finance	2	IA
Business Failures	Money, Banking, and Finance	2	IA
Average Stock Price - Industrials	Money, Banking, and Finance	0	NBER
Average Stock Price - Railroads	Money, Banking, and Finance	0	NBER
Wholesale Price Index (PPI)	Prices	2	IA
Raw Materials Price Index	Prices	2	IA
Semi Manufactured Goods Price Index	Prices	2	IA
Finished Goods Price Index	Prices	2	IA
Industrial Production	Production	3	FRB
Department Store Sales	Retail and Consumption	2	IA
Total Freight Car Loadings	Transport	2	IA
Revenue Per Freight Ton-Mile	Transport	2	NBER

* The labour variables from the 1936 revision are used for estimation. Using the previous editions of the variables instead does not alter the results.

Appendix B: illustrations of key variables

Here, we plot key macroeconomic and financial variables to illustrate the evolution of economic conditions in our sample countries. The first row contains ex ante real interest rate(s), nominal interest rate(s), and expected year-on-year inflation rate, the second row price level, money supply, and output (or its proxy), the third row exports, imports, and trade balance, and the last row stock price, clearing, and bankruptcies. The entries are omitted if the corresponding variables are not available (with the resulting shifts in the locations of the rest of the variables if appropriate). For detailed information regarding the key event date(s) (the vertical line(s) on the figures below; the green vertical dotted line gives our dating of the end of the gold standard regime), refer to Section 4.

B.1 Argentina
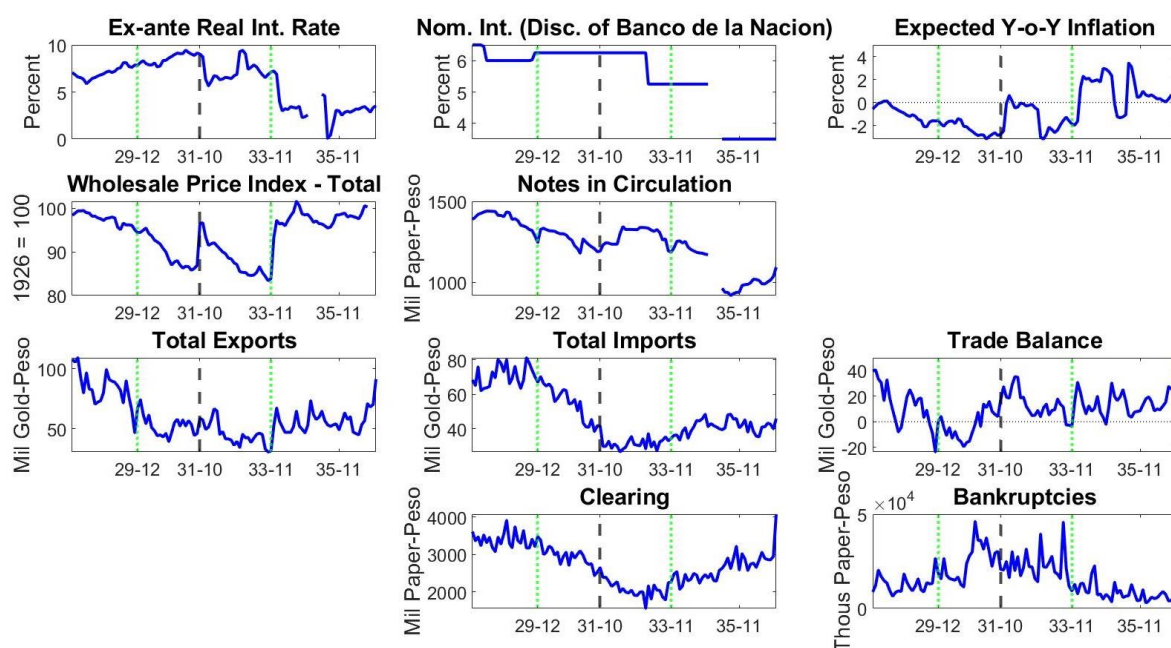
December 1929 – suspension of the currency board.
October 1931 – exchange control.
November 1933 – devaluation and currency reforms.

B.2 Australia
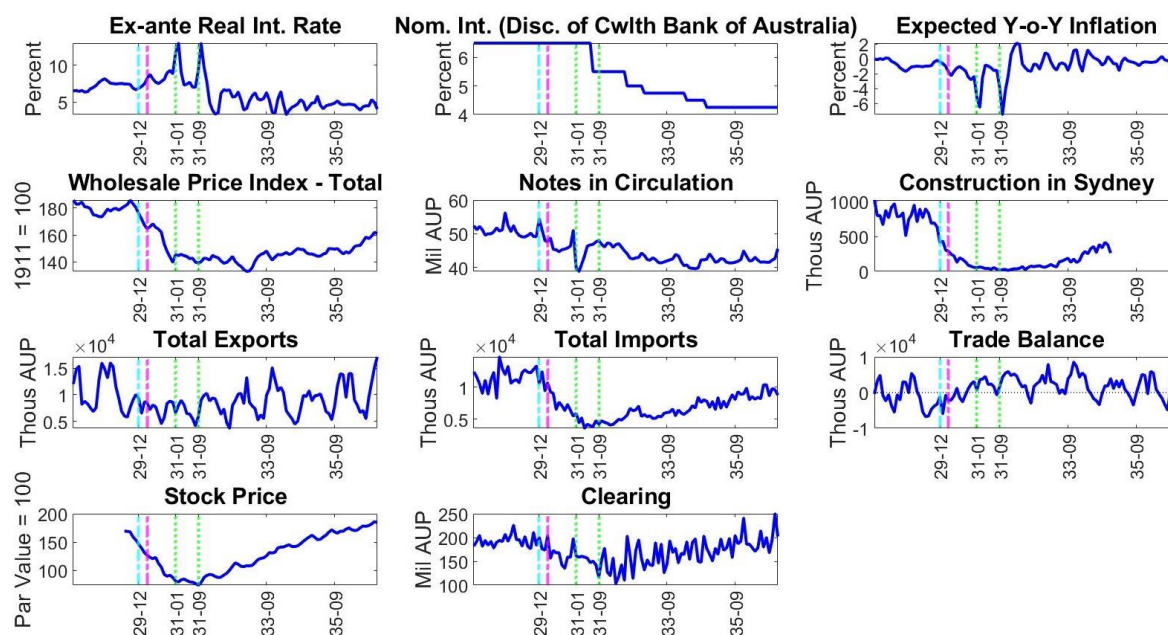
December 1929 – official suspension of the gold standard.
March 1930 – devaluation (corresponding to the magenta vertical dash-dotted line).
January 1931 – devaluation.
September 1931 – UK suspension of the gold standard.

B.3 Austria
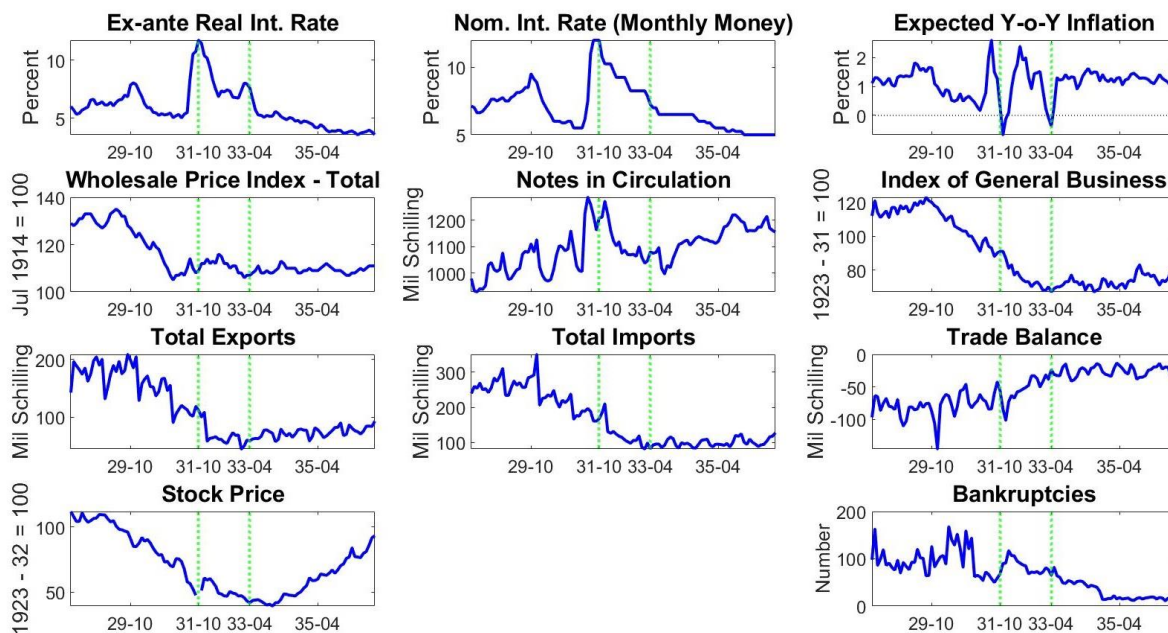
October 1931 – devaluation.
April 1933 – devaluation.

B.4 Belgium
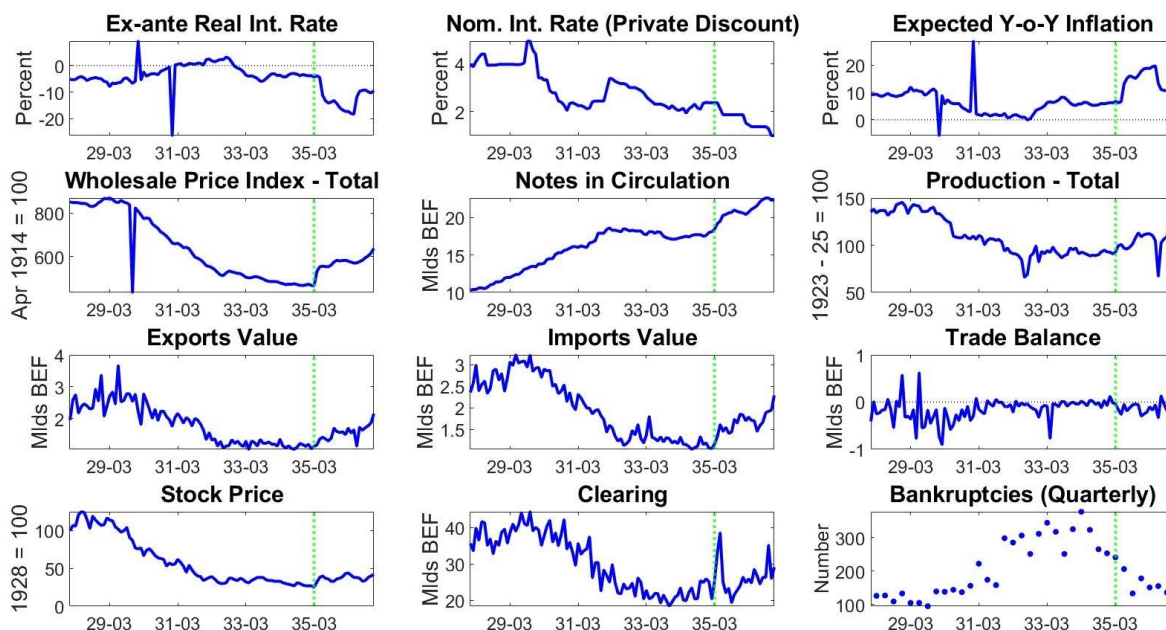
March 1935 – official suspension of the gold standard, devaluation, and exchange control.

B.5 Brazil
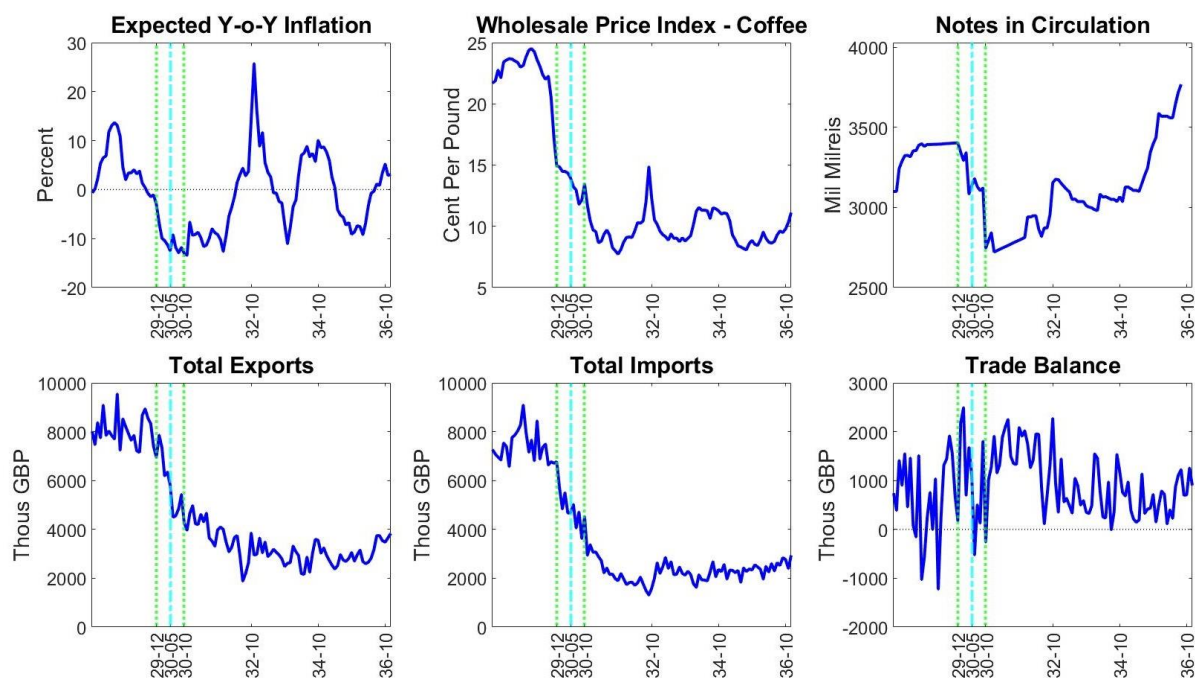
December 1929 – devaluation.
May 1930 – suspension of gold shipments.
October 1930 – suspension of the redemption of notes into gold.

B.6 British India

Ex-ante Real Int. Rate

Nom. Int. (Disc. of Central Bank of India)

Expected Y-o-Y Inflation

Wholesale Price (in Bombay)

Notes in Circulation

Sea Freight Index

Total Exports

Total Imports

Trade Balance
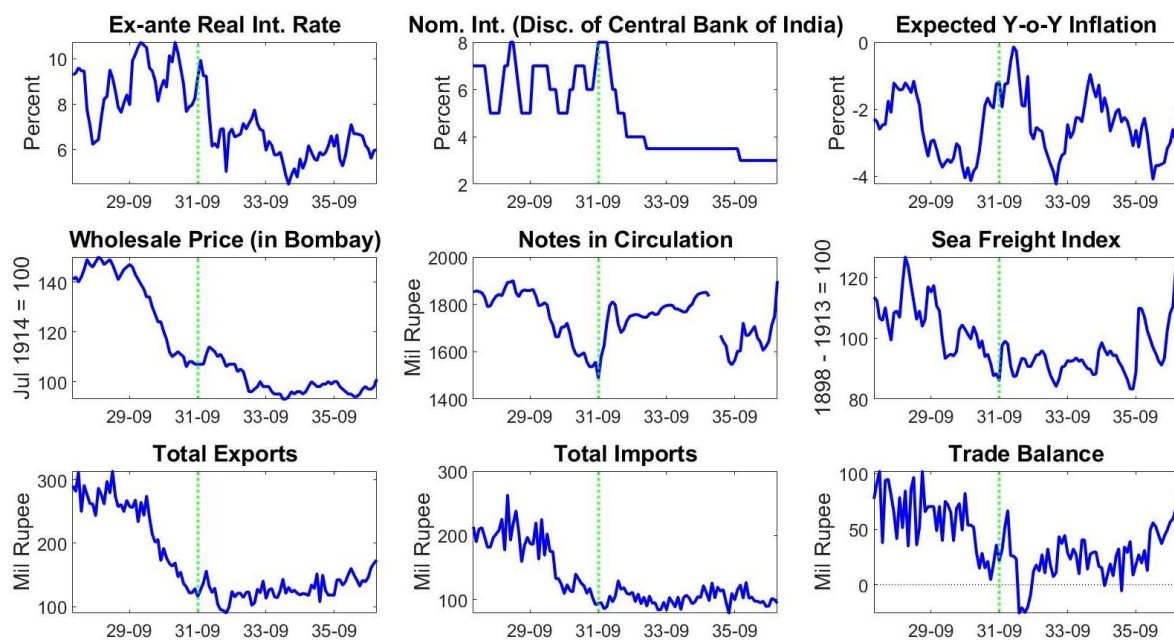
September 1931 – UK suspension of the gold standard and devaluation.

B.7 Bulgaria

Ex-ante Real Int. Rate

Nom. Int. Rate (Ave. Market Disc.)

Expected Y-o-Y Inflation

Cost of Living - Total

Notes in Circulation

Clearing

Total Exports

Total Imports

Trade Balance
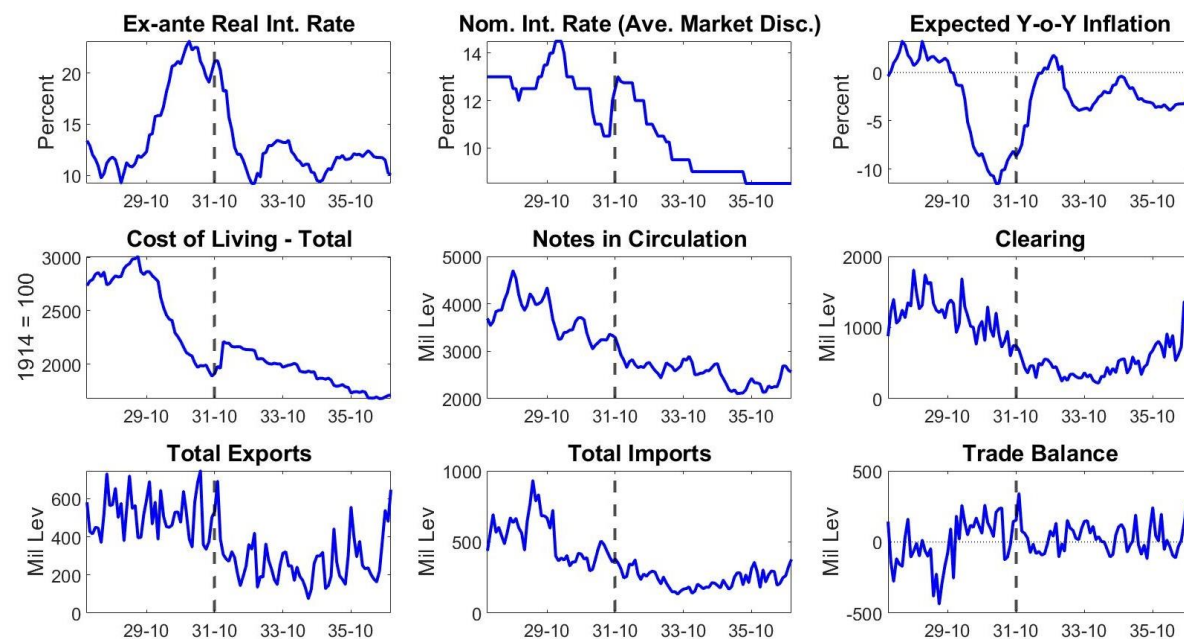
October 1931 – exchange control.

B.8 Canada
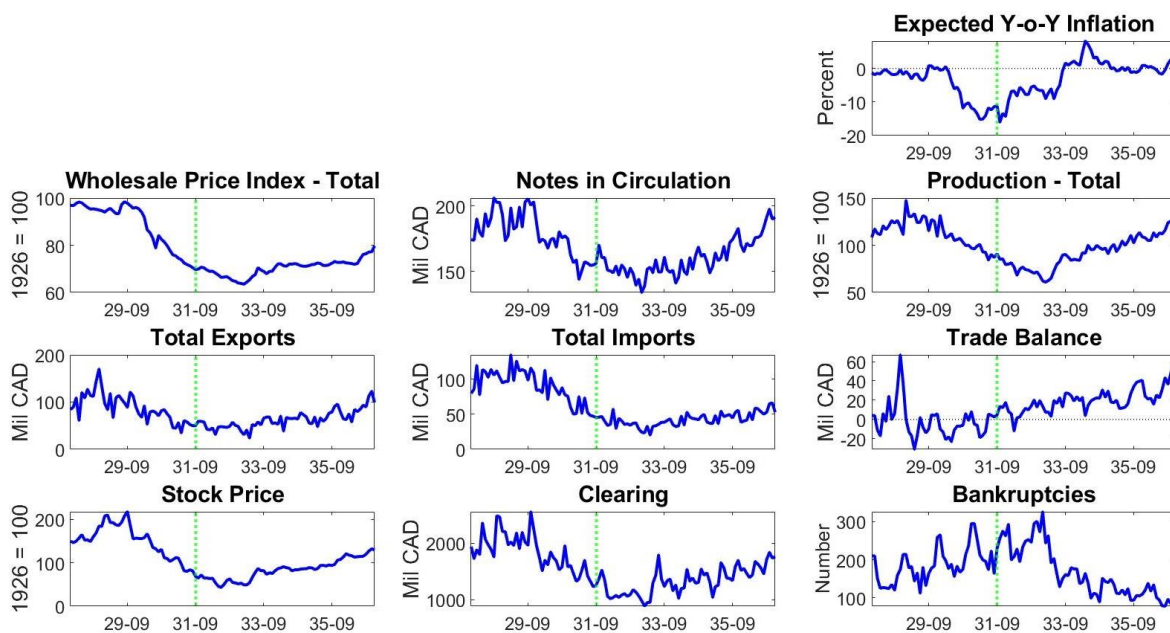
September 1931 – devaluation.

B.9 Chile
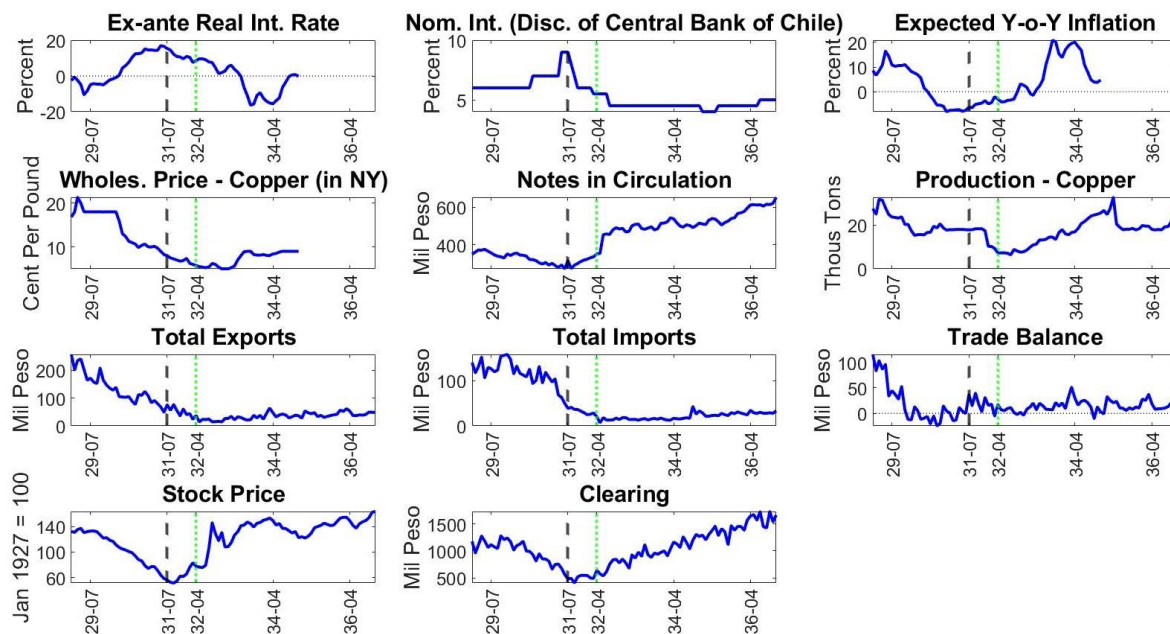
July 1931 – exchange control.
April 1932 – official suspension of the gold standard and devaluation.

B.10 Czechoslovakia
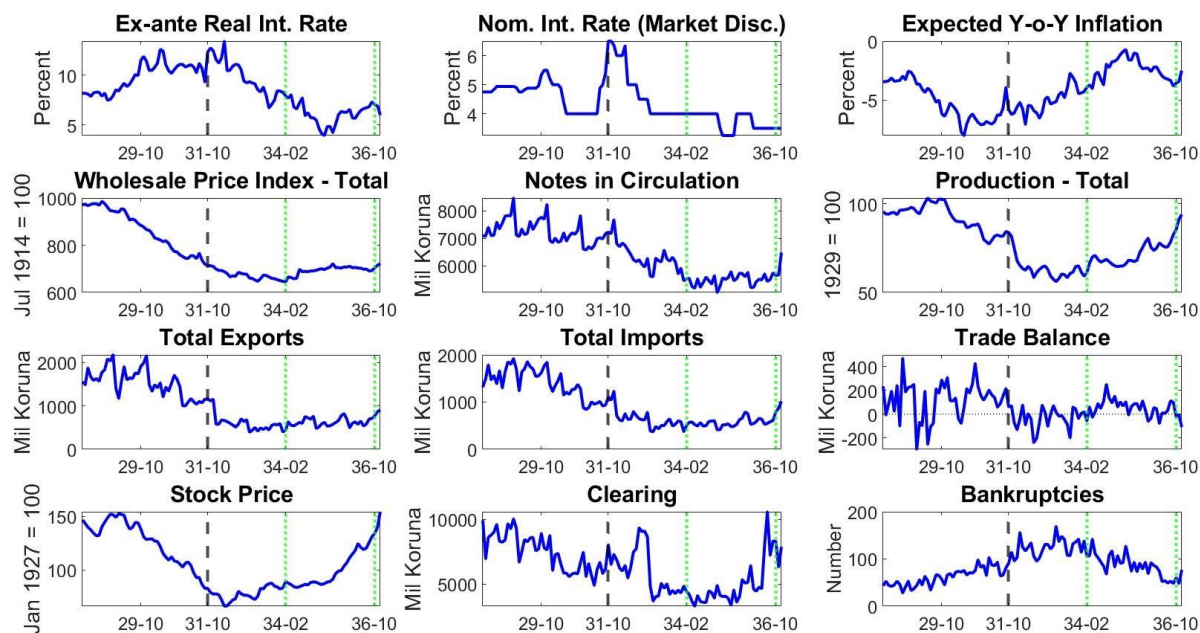
October 1931 – exchange control.
February 1934 – devaluation.
October 1936 – devaluation.

B.11 Denmark
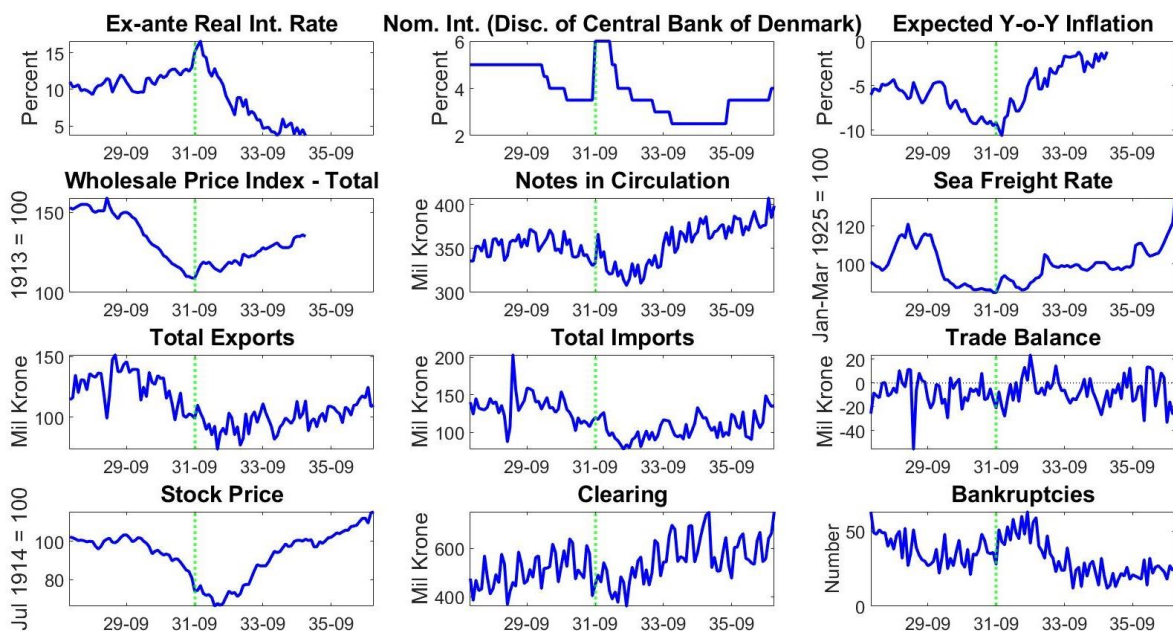
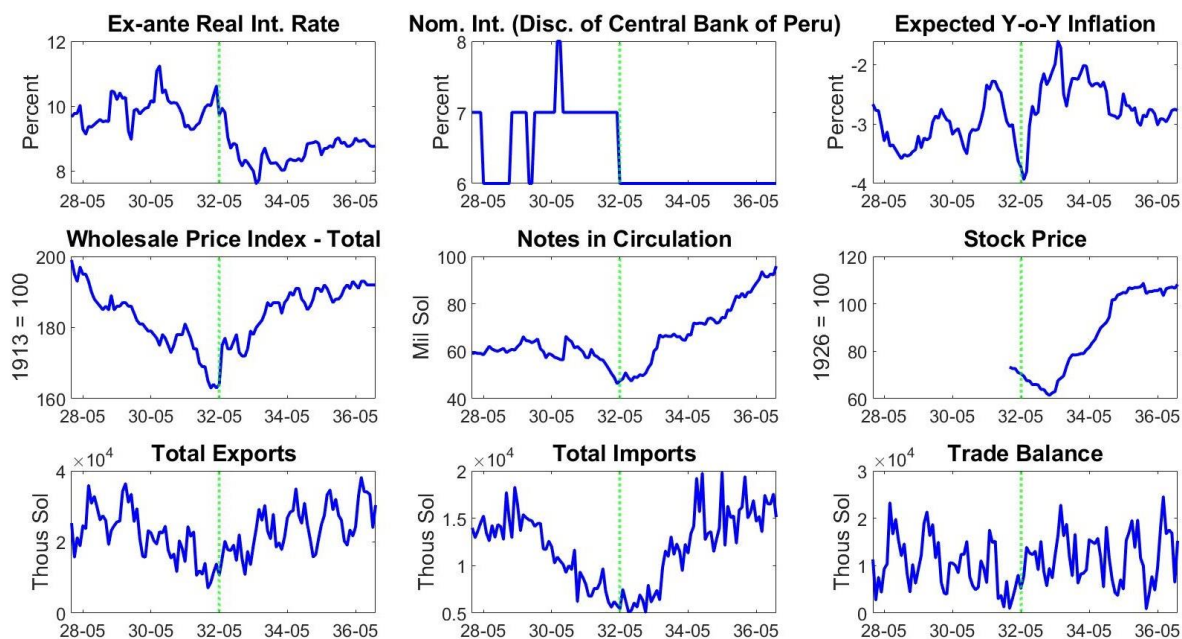September 1931 – official suspension of the gold standard and devaluation.

B.12 Dutch Indies
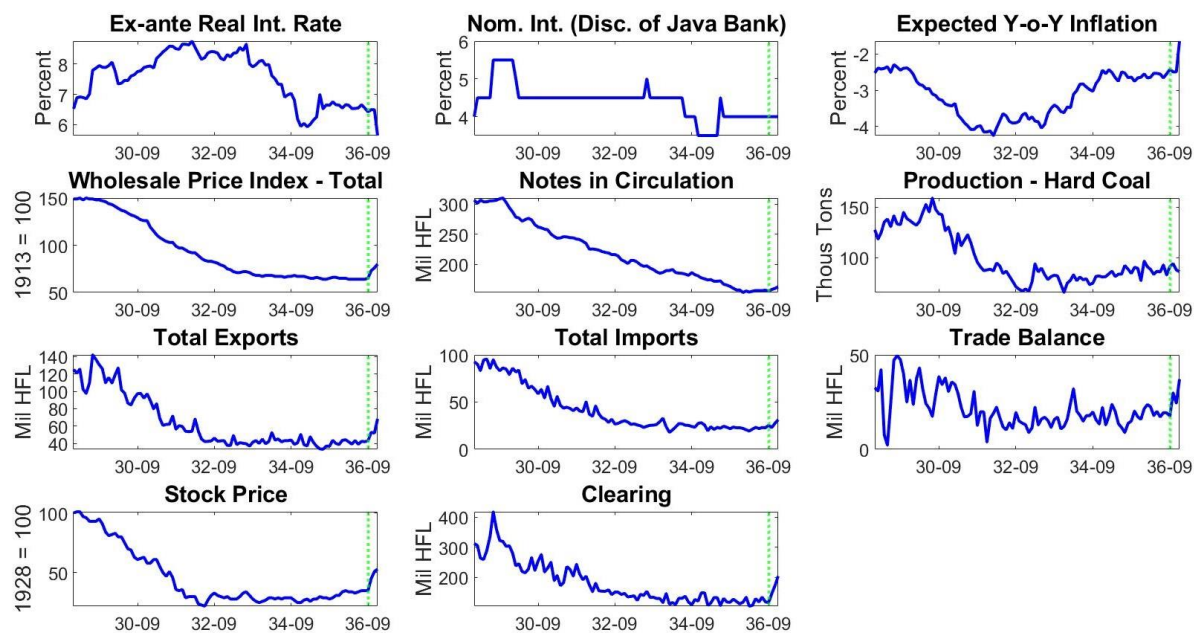
September 1936 – Dutch suspension of the gold standard.

B.13 Estonia
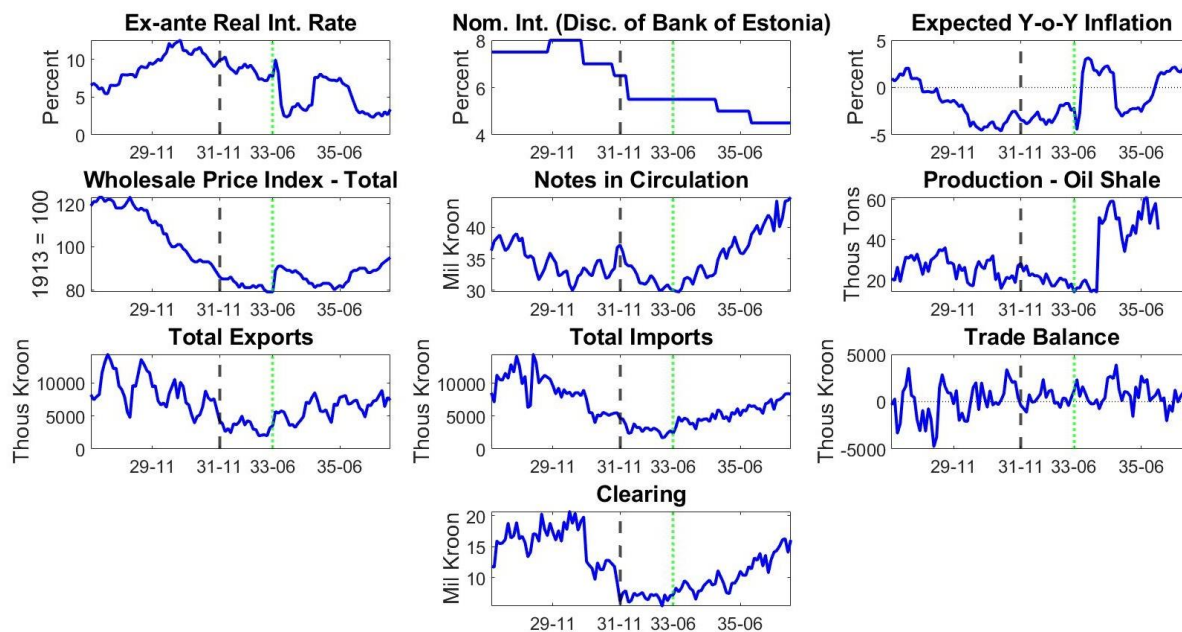
November 1931 – exchange control.
June 1933 – official suspension of the gold standard and devaluation.

B.14 Finland
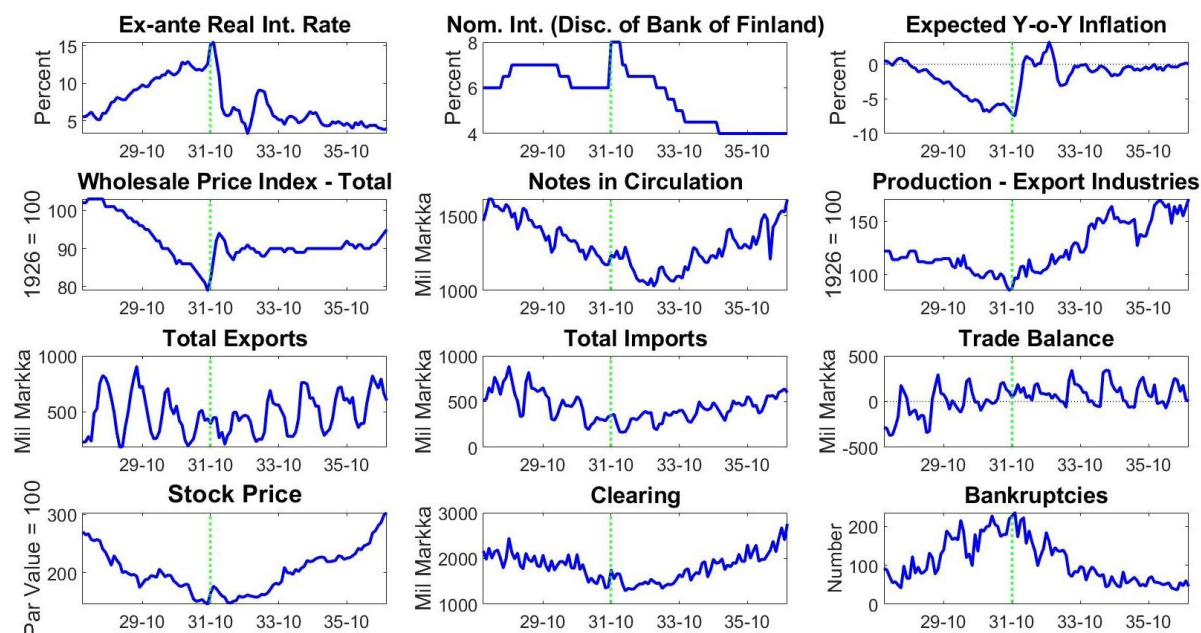
October 1931 – official suspension of the gold standard and devaluation.

B.15 France
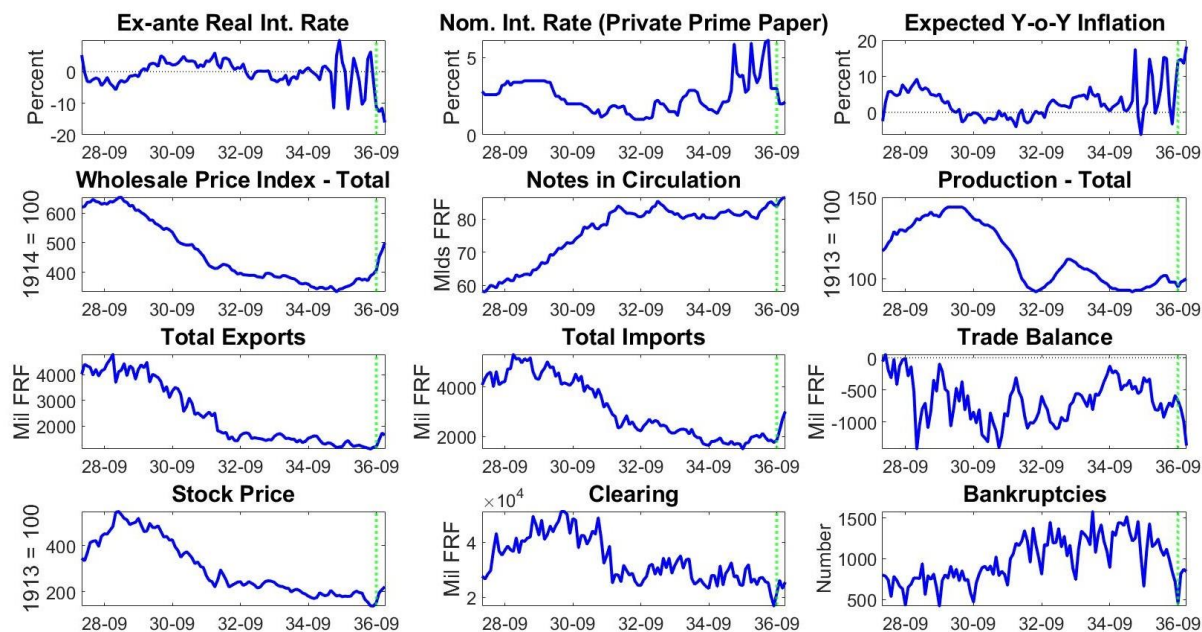
September 1936 – devaluation.

B.16 Germany
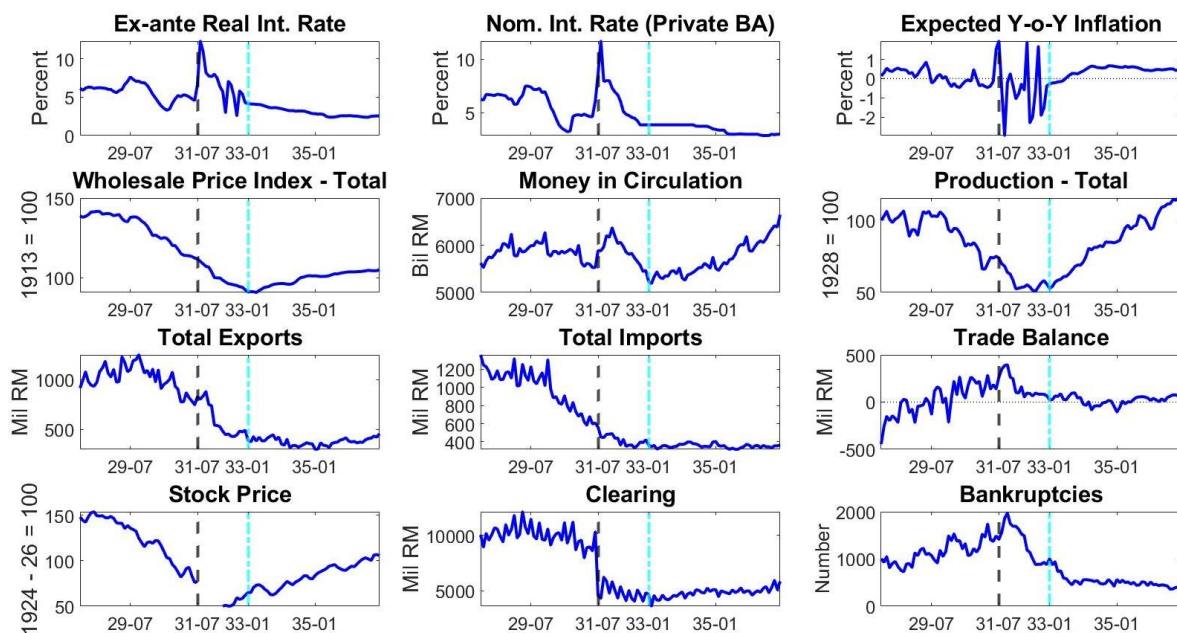
July 1931 – exchange control.
January 1933 – Adolf Hitler's rise to power.

B.17 Hungary
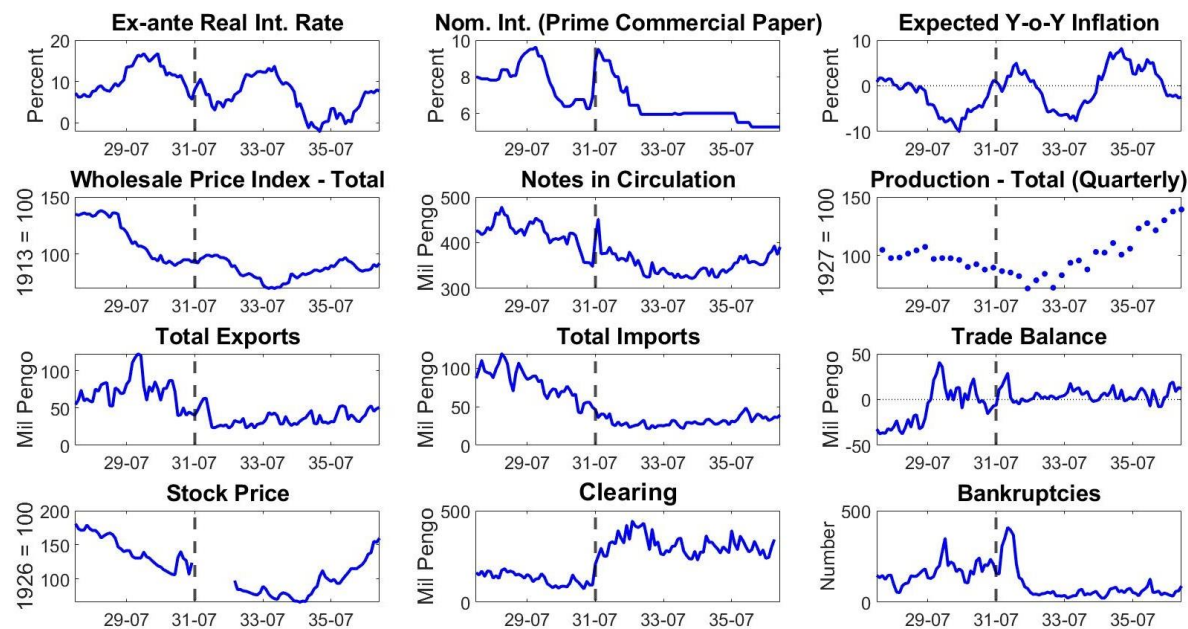
July 1931 – exchange control.

B.18 Italy
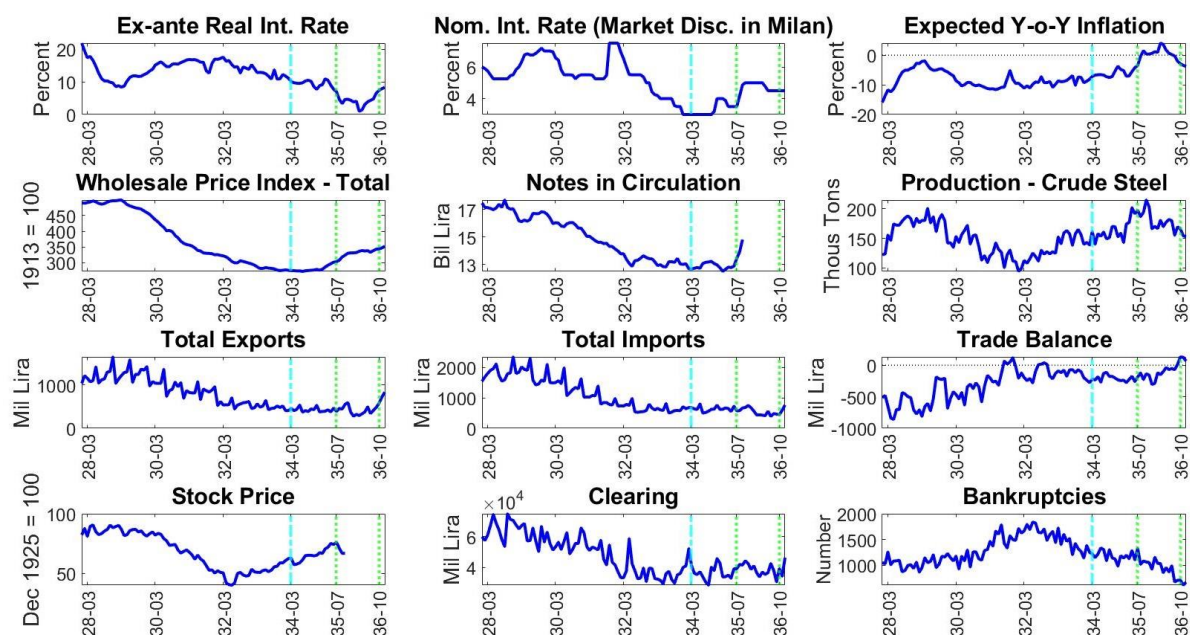
March 1934 – devaluation.
July 1935 – abolition of the 40% reserve requirement for paper money.
October 1936 – devaluation.

B.19 Japan
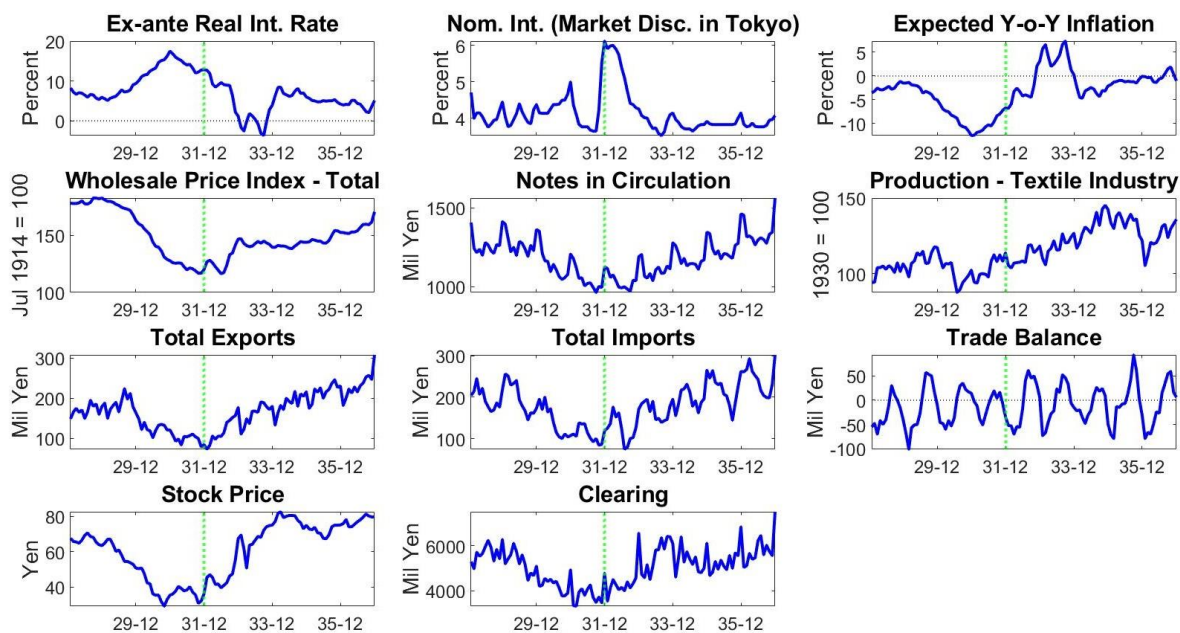
December 1931 – official suspension of the gold standard and devaluation.

B.20 Lithuania
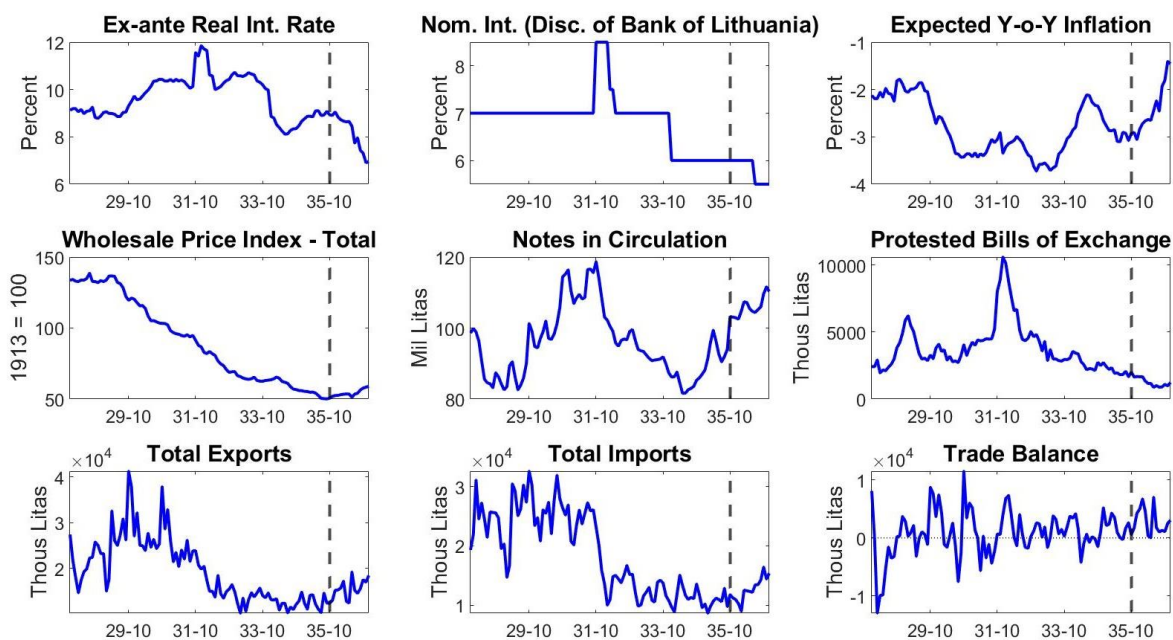
October 1935 – exchange control.

B.21 Netherlands
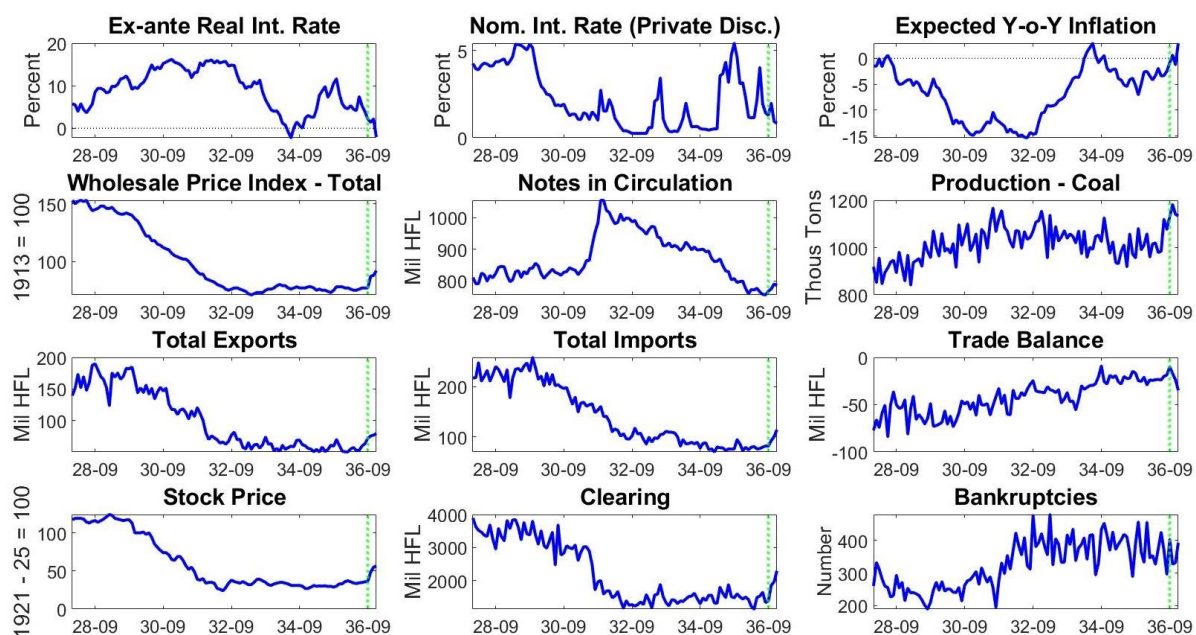
September 1936 – official suspension of the gold standard and devaluation.

B.22 New Zealand
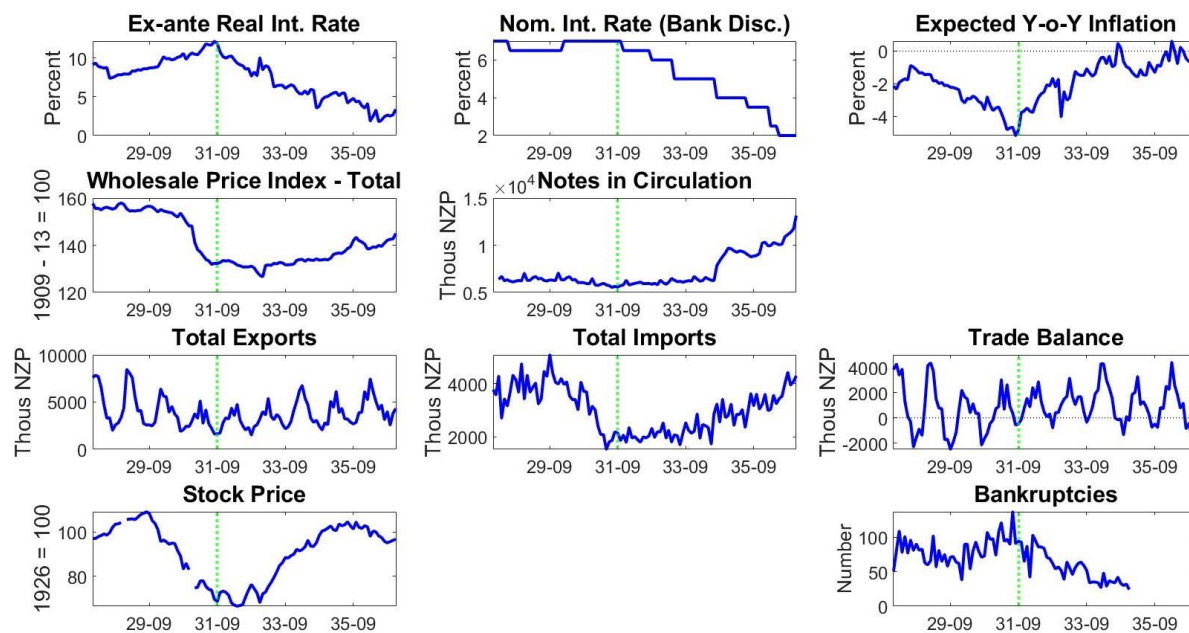
September 1931 – official suspension of the gold standard.

B.23 Peru

May 1932 – official suspension of the gold standard and devaluation.

B.24 Poland
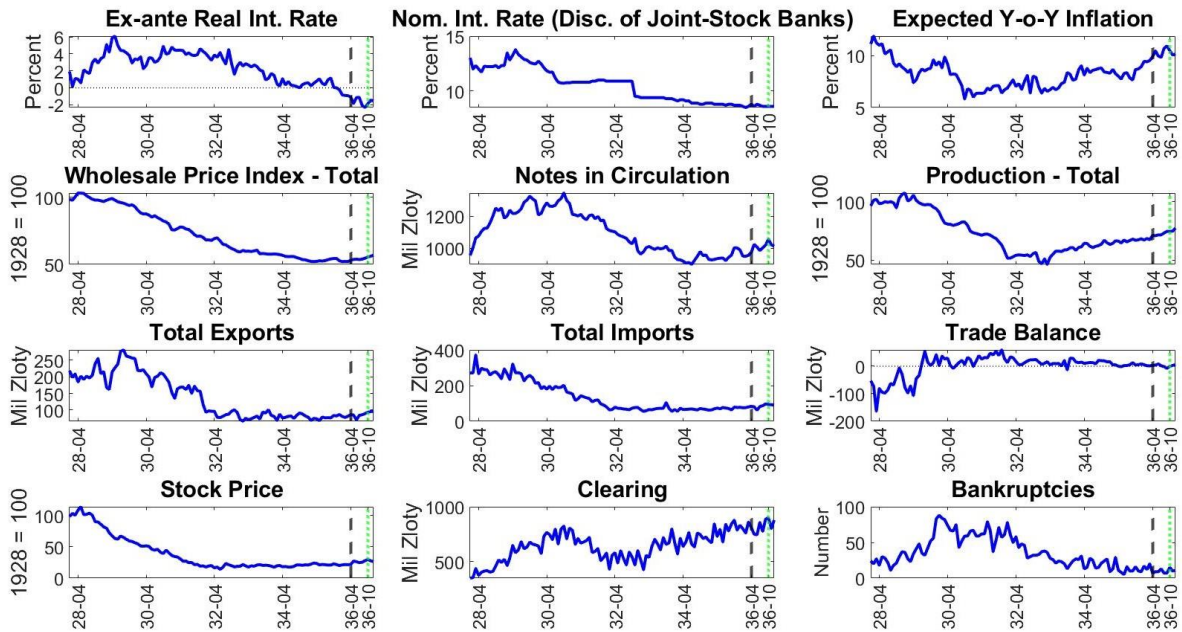
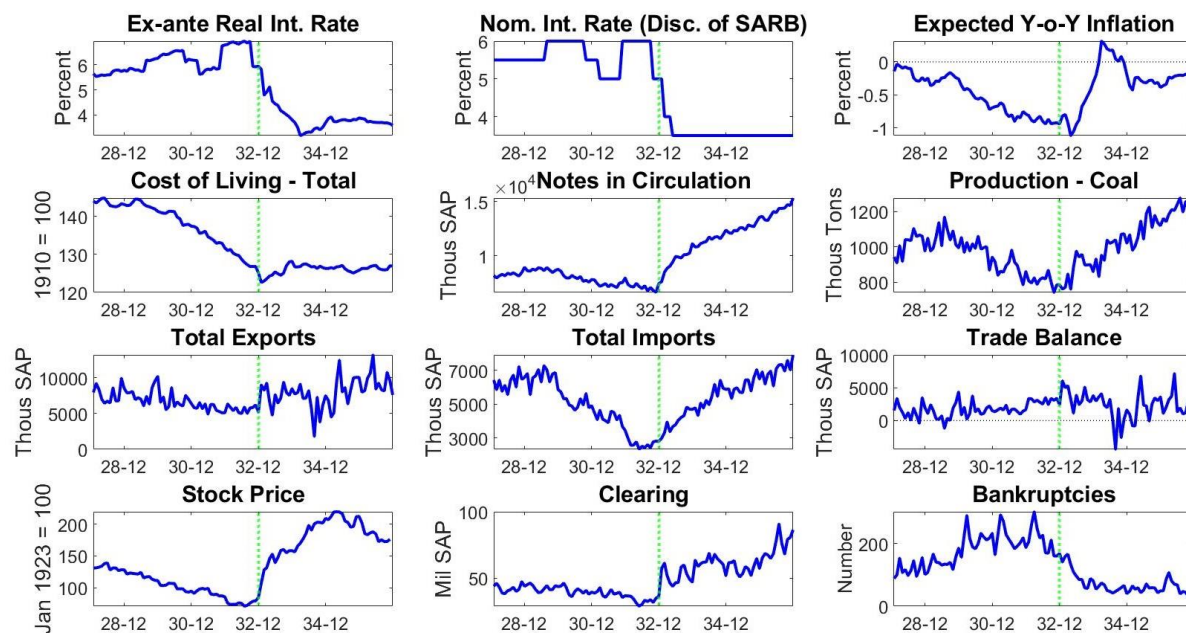April 1936 – exchange control.
October 1936 – devaluation.

B.25 Romania
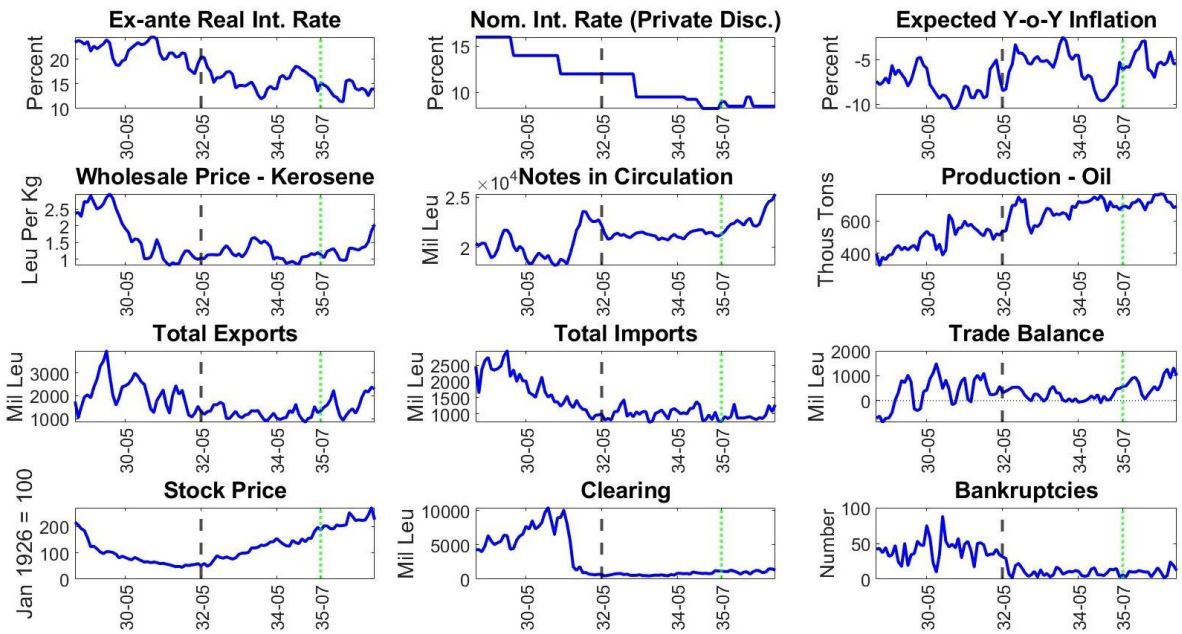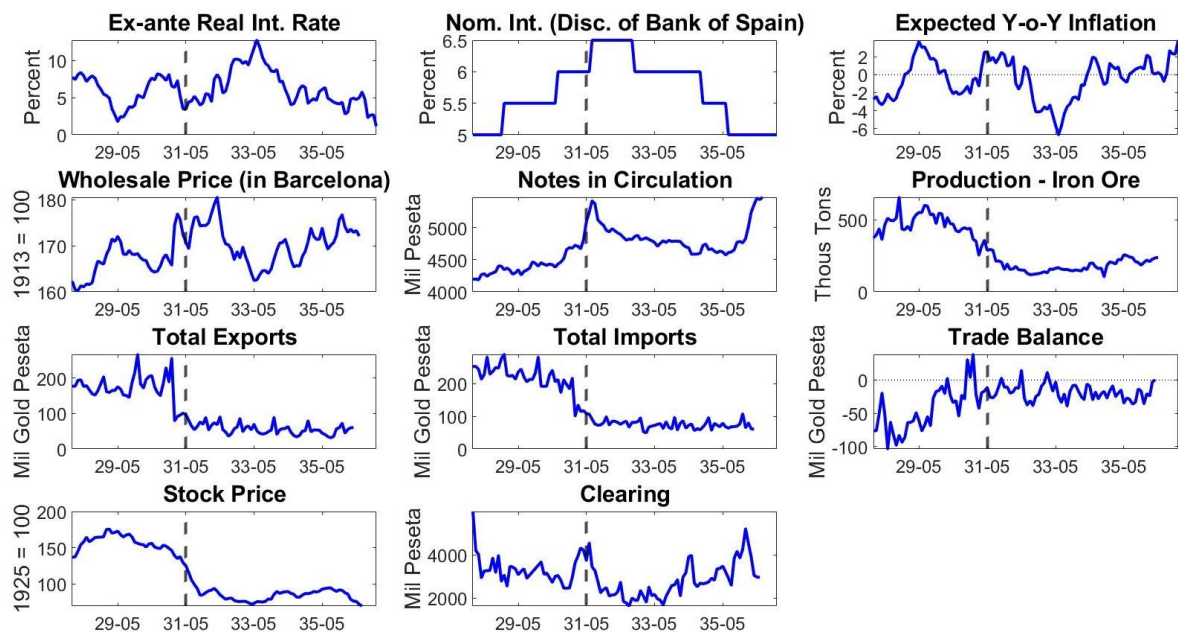

May 1932 – exchange control.
July 1935 – devaluation.

B.26 South Africa

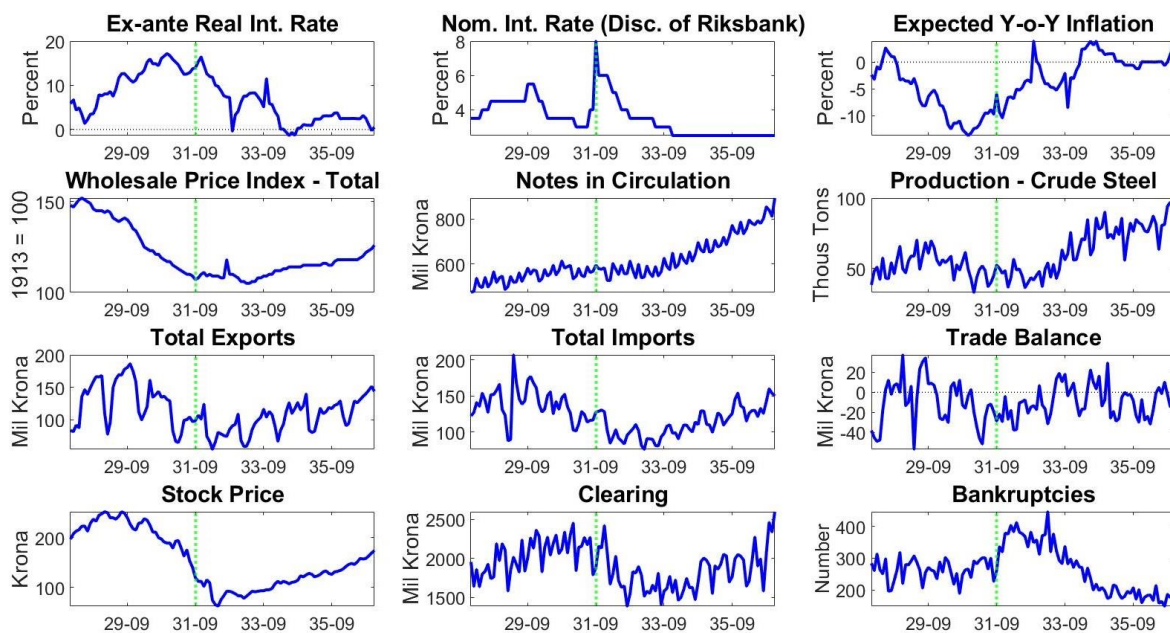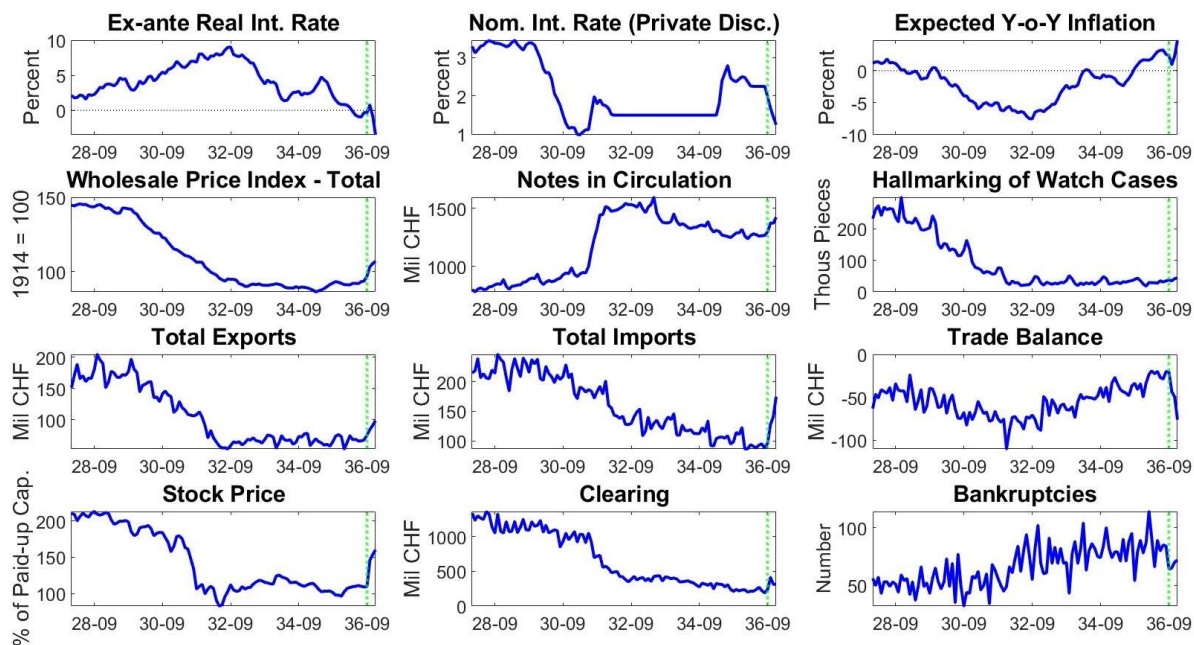December 1932 – official suspension of the gold standard.

B.27 Spain

May 1931 – exchange control.

Spain did not return to the gold standard after World War I. The data set is incomplete due to the Civil War that started in July 1936.
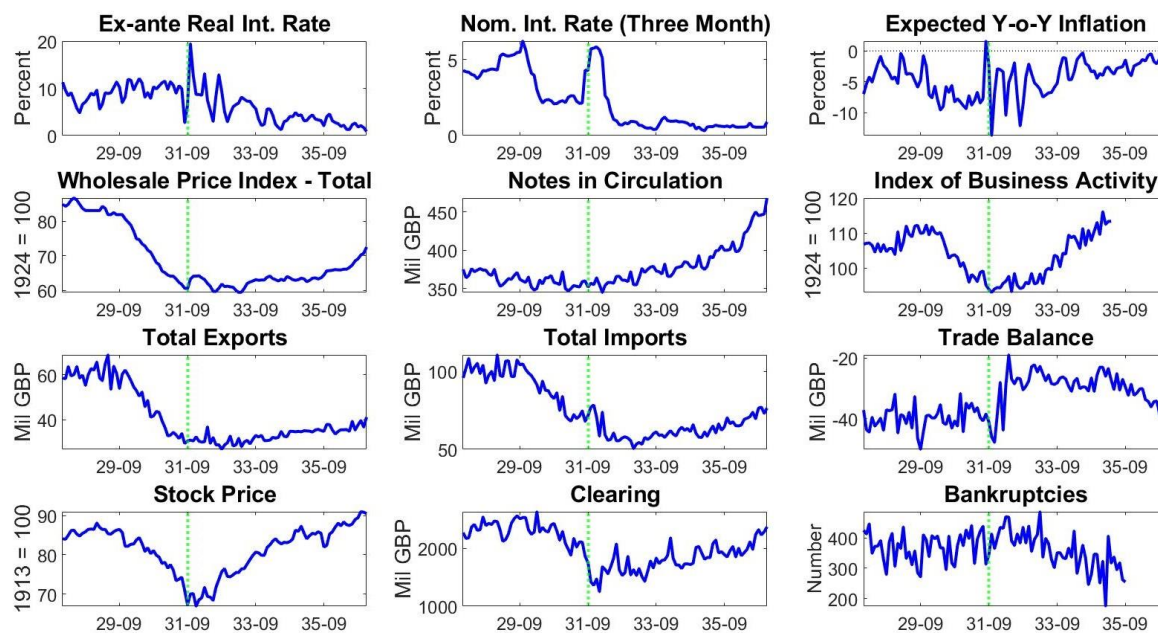
B.28 Sweden

September 1931 – official suspension of the gold standard and devaluation.

B.29 Switzerland

September 1936 – devaluation.
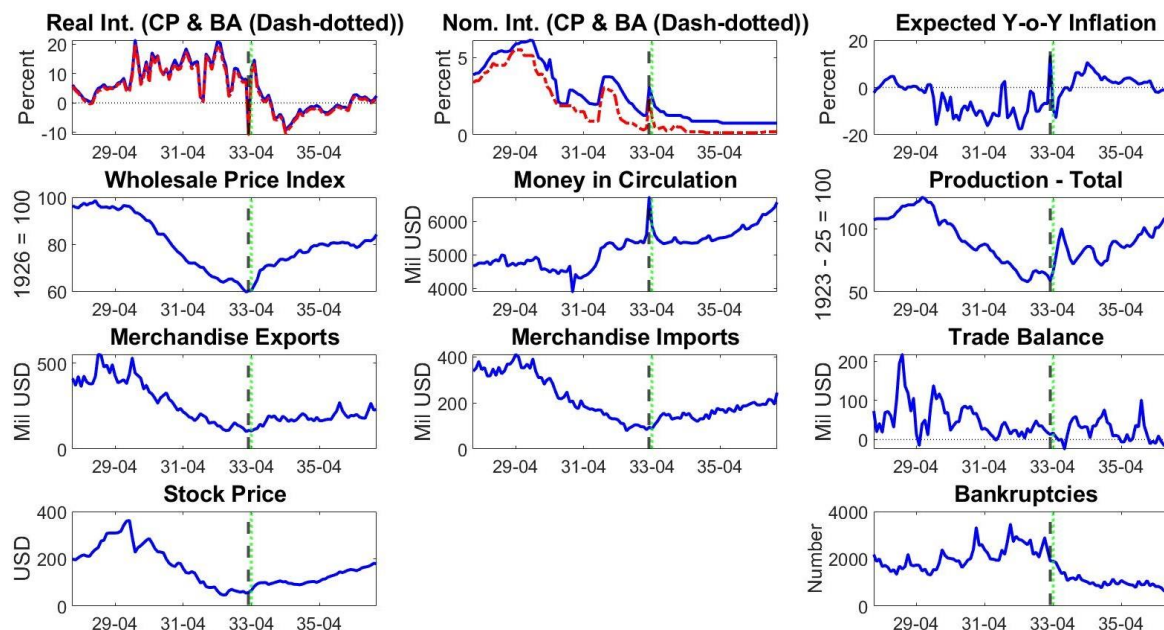
B.30 United Kingdom

September 1931 – official suspension of the gold standard and devaluation.

B.31 United States

CP - prime commercial paper rate (blue solid); BA - New York banker's acceptance rate (red dash-dotted).
March 1933 – exchange control (corresponding to the black vertical dashed line).
April 1933 – official suspension of the gold standard and devaluation.

Appendix C: Synthetic matching for constructing counterfactual outcomes

This appendix briefly explains how synthetic control works and then provides the additional detail regarding the construction of counterfactual outcomes in Section 8. For more information on the methodology, see the latest survey by Abadie (2019).

The synthetic control method, which generalises the baseline diff-in-diff treatment evaluation method to allow for the time-varying unobservable component, constructs a synthetic treatment unit that was not treated (i.e., counterfactual) using a pool of control units and compares the outcome of the actually treated to that of the synthetic counterpart to infer the causal effect of the treatment. There are two weights employed in the estimation procedure, one for the control units (denoted by w) and the other for the control variables (denoted by v). The criterion function for w is obtained by first taking the quadratic distance of the value of each control variable for the treatment unit to the weighted average (by w) of the values of the same control variable across the control units, and then taking the weighted average (by v) of these across the control variables. Minimising this determines w for a given v. v is in turn obtained by minimising the sum of the quadratic distance of the value of the dependent variable for the treatment unit to the weighted average (by w) of the values of the dependent variable across the control units, for a given w. Iterating on these minimisation routines until convergence produces the optimal w and v. Finally, taking the weighted average of the control units with the optimal w delivers the synthetic treatment unit. Naturally, we focus on w here as this informs the data-driven affinity of the control units to the treatment unit. It is important that only pre-treatment values of the control and dependent variables are used for estimation to satisfy the identifying assumption.

In our study, we use the synthetic control method to estimate what would have happened in our sample countries if they had not left the gold standard when they actually did. The data limitation constrains us to consider only the Sterling area countries whose departures from the gold standard occurred before the end of 1931. For the countries that departed the gold standard at a later time, we do not have enough control group countries to construct satisfactory synthetic counterparts. Of the Sterling area countries, we were able to produce successful synthetic counterparts for Australia, Denmark, Finland, New Zealand, and Sweden. Here, we take the UK departure from the gold standard in September 1931 as the timing of the treatment for these countries. This choice allows us to control for the anticipation effect of the UK departure on Finland (which left in October 1931) (see Abadie, 2019) whose departure was almost certainly triggered by the former. Using the actual departure date for Finland does not change the result.

Now, we present relevant information that was omitted from Section 8 in the interest of space. First, we demonstrate how well the synthetic countries approximate the treatment countries in terms of the control variables. For each treatment country, we use the most parsimonious model specification possible to produce the synthetic counterpart. First, we give the results for ex ante real interest rate which is based on the country weights (w above) in Table 7. Population, GDP per capita, and inflation are useful for matching the slope and the curvature of real interest rate, and lagged real interest rate (relative to the treatment date) for matching the level. For the latter, we choose the dates that allow us to match the pre-treatment path of real interest rate as well as possible. Note that "Pop" in the table stands for population and "GDP" per capita GDP.

Australia			Denmark			Finland		
Control	**Actual**	**Synthetic**	**Control**	**Actual**	**Synthetic**	**Control**	**Actual**	**Synthetic**
Log Pop 1930	6.81	6.98	Log Pop 1930	6.55	6.82	Log Pop 1930	6.54	7.12
Log GDP 1930	3.67	3.54	Log GDP 1930	3.73	3.56	Log GDP 1930	3.43	3.57
Ave Y-o-Y Inf.	-7.43	-12.83	Real Int. 11-29	9.76	10.46	Ave Y-o-Y Inf.	-6.65	-11.17
Real Int. 03-29	7.53	7.45	Real Int. 05-30	11.56	10.84	Real Int. 08-29	9.14	9.61
Real Int. 05-30	8.17	7.83	Real Int. 09-30	11.96	12.30	Real Int. 11-29	9.54	9.54
Real Int. 10-30	8.97	8.82	Real Int. 05-31	12.52	11.39	Real Int. 11-30	11.71	11.71
Real Int. 04-31	7.32	8.74				Real Int. 02-31	12.88	12.62

New Zealand			Sweden		
Control	**Actual**	**Synthetic**	**Control**	**Actual**	**Synthetic**
Log Pop 1930	6.17	7.02	Log Pop 1930	6.79	6.92
Log GDP 1930	3.70	3.57	Log GDP 1930	3.63	3.71
Ave Y-o-Y Inf.	-3.91	-11.75	Real Int. 09-29	11.94	11.57
Real Int. 08-29	8.60	9.04	Real Int. 04-30	15.21	13.59
Real Int. 01-30	9.49	9.46	Real Int. 11-30	17.18	16.06
Real Int. 03-31	10.79	11.56	Real Int. 04-31	13.48	14.57
Real Int. 07-31	11.66	11.30			

Broadly speaking, the synthetic treatment countries closely resemble the treatment countries in terms of the selected control variables. The data idiosyncracy does make the New Zealand case more challenging than others, but we still obtain a reasonable match as also seen in Figure 13.

Next, we present the results for realised year-on-year inflation. Due to the data characteristics, we were able to match only the three Nordic countries successfully this time. The table below compares the actual and synthetic treatment countries in terms of the selected control variables.

Denmark			Finland			Sweden		
Control	**Actual**	**Synthetic**	**Control**	**Actual**	**Synthetic**	**Control**	**Actual**	**Synthetic**
Log Pop 1930	6.55	6.78	Log Pop 1930	6.54	7.03	Log Pop 1930	6.79	7.05
Log GDP 1930	3.73	3.73	Log GDP 1930	3.43	3.55	Log GDP 1930	3.63	3.57
Inf. 02-29	4.61	-1.56	Inf. 03-29	-2.91	-1.57	Inf. 05-29	-7.89	-5.07
Inf. 10-29	-0.67	-2.77	Inf. 10-29	-4.95	-6.45	Inf. 10-29	-4.83	-6.38
Inf. 02-30	-11.95	-8.89	Inf. 03-30	-8.00	-11.56	Inf. 03-30	-13.19	-13.26
Inf. 02-31	-16.43	-15.45	Inf. 02-31	-7.53	-12.65	Inf. 10-30	-14.49	-14.53

Again, the resulting synthetic treatment countries are broadly similar to the actual treatment countries in their pre-treatment characteristics. The bottom panel of Figure 12 indicates satisfactory matches also in terms of the pre-treatment path of realised inflation.

The country weights (*w* above) used for constructing the synthetic treatment countries are as follows:

	Denmark	Finland	Sweden
Czechoslovakia		0.7482	0.6482
Netherlands	0.2854		0.2347
Poland	0.0893		0.0058
Romania	0.0156		
Switzerland	0.6097	0.2518	0.1113

Note that large countries in the control group such as France, Germany, and the US receive zero weights in all the cases. Given the small open economy characteristics of the treatment countries, it is reassuring to see this because the result otherwise may indicate an identification failure.

The results above are robust to alternative selections of the control group, for instance if we include Bulgaria, Germany, and Hungary which imposed exchange controls but did not leave the gold standard formally, and furthermore Argentina and Austria whose gold standard departure dates are also ambiguous. They also pass placebo tests in which the control group countries are treated as if they belong to the treatment group.[23]

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[23] Because these are routine robustness checks, they are not included here.