

The Classical Gold Standard : A Miracle or a Myth ?

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The Classical Gold Standard :

A Miracle or a Myth ?

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Abstract

This paper investigates the working of the classical gold standard during the period 1885–1913. On the basis of historical data for Britain and the U. S. the paper presents empirical evidence refuting the effectiveness of the price adjustment mechanism. The results also show that the income adjustment mechanism played a complementary role, and that there was no such thing as a common price level under the gold standard. The overall conclusion is that the gold standard does not provide a magic formula to solve current international monetary problems.

I. Introduction

The gold standard is often remembered with nostalgia, and, on the surface of things, justifiably so. During the period extending roughly between 1870 and the outbreak of World War I in 1914, world trade and investment flourished, economic growth ran at a remarkably rapid pace, while economic policy conflicts among countries were extremely rare. Moreover, the balance of payments adjustment mechanism seemed to be working smoothly. This is why following World War I and again in the 1980s, there were calls from politicians and scholars to return to the gold standard.¹ The more recent calls are partly due to frustration caused by the failure of the current system of flexible exchange rates to deliver what we have been led to expect from it.²

It is beyond any doubt the case that the world economy enjoyed prosperity under the gold standard, but the contribution of this system to prosperity has been disputed. For example, Grubel (1977, p. 436) put forward the view that the gold standard was a “passive agent”, facilitating but not influencing in any meaningful way economic development. This view is supported by the observation that the fast growth that we have witnessed since World War II took place under different monetary arrangements. Chacholiades (1990, p. 489) put forward an even stronger view, arguing that the gold standard seemed to have worked well only because it existed during a rather tranquil period, and that it was not really put to the test. More specifically, Chacholiades identifies two misconceptions about what he calls “the myth of the golden age of the gold standard” : (i) the price specie flow mechanism (the price adjustment

mechanism under a system of fixed exchange rates) worked smoothly and maintained balance of payments equilibria, and (ii) monetary authorities followed the “rules of the game”, allowing gold flows to exert full influence on the domestic money supply and price level. These propositions have been challenged by the findings of Taussig (1927) and Bloomfield (1959).

The objective of this paper is to examine, in retrospect, some of the issues pertaining to the working of the gold standard. In particular, the paper is concerned with the following issues : (i) the hypothesis of a common price level, (ii) the role of the price adjustment mechanism, and (iii) the role of the income adjustment mechanism. Apart from Taussig and Bloomfield, these issues have been examined by Morgenstern (1955), Ford (1962), Goodhart (1972), McCloskey and Zecher (1976), and Neuburger and Stokes (1979). However, only the last three of these studies presented rigorous empirical evidence albeit not related to all of these issues, and this was partly due to data-related problems. McCloskey and Zecher, for example, were unable to explore the discrete timing of the gold standard adjustment because of the use of annual data. Goodhart's work, on the other hand, did not deal adequately with the dynamics of adjustment. And while acknowledging the desirability of testing various hypotheses separately, Neuburger and Stokes could not conduct such tests because of “the lack of data or inappropriate periodisation of available data”. Instead, they examined the relationship between interest rates and gold flows on the assumption that this relationship is relevant to all other issues (Neuburger and Stokes, 1979, p. 261).

This paper presents empirical evidence on these issues based on historical data for Britain and the U. S. Since the role of interest rates has been adequately dealt with by Neuburger and Stokes, this issue will not be dealt with here. We will instead concentrate on other issues that have been neglected or not adequately or rigorously considered in previous studies. The paper is organised as follows. We start with a brief review of the history and theoretical foundations of the gold standard, then we present an informal examination of the data. This is followed by a presentation of the empirical results, then finally by some concluding remarks.

II. A Review of the Gold Standard

The classical gold standard did not encompass the entire world. Only a core of major countries were actually on the system and maintained fixed exchange rates. There is, however, widespread disagreement as to the years which define the period under which the gold standard was in operation. The gold standard came to an end abruptly, almost overnight as Cassel (1936) put it, in August 1914 when the warring countries abolished the convertibility of their currencies into gold and into each other. While the timing of its end is undisputable, the problem is to identify the year which marks the beginning of the gold standard.

Britain went on the gold standard in 1821 when the Bank of England was legally required to redeem its notes and coins in gold and when the prohibition of the melting of coins and export of gold was repealed. In doing so, Britain formally met the conditions of being on the gold standard. An important event causing the move of other countries towards the gold standard was the fall in the price of gold relative to silver

in the 1850s which, according to Gresham's Law, caused the disappearance of silver coins in several countries. By the mid 1870s France had abandoned bimetallism in favour of gold. In 1870, Germany was still on the silver standard, but war reparations, in the form of gold payments from France, enabled her to adopt the gold standard. And in 1879, the U. S. returned to the gold standard after the suspension of gold convertibility in the Civil War.³

McKinnon (1993) identifies the period 1879–1913 as the period of the gold standard on the grounds that in 1879 the system became genuinely international. Since, in general, the decade of the 1870s witnessed the return of the remaining major countries to the gold standard, most observers — including Bloomfield (1959) — consider the year 1880 to be the beginning of the “universal gold standard era” (Grubel, 1977). But even this is not universally accepted because some countries (including Russia, Austria-Hungary, India and Japan) did not meet the requirements of the gold standard until after 1895, and for this reason some observers put the beginning of the gold standard era as late as 1900.

The gold standard is based on a set of rules that boil down to three pillars (McKinnon, 1993). The first pillar is the convertibility of domestic currency into gold at a fixed price. The second is that central banks are obliged to restore the traditional mint parity in the long run, should an unforeseen crisis force a (temporary) suspension of gold convertibility. Finally, a common price level (nominal anchor) is endogenously determined by the worldwide demand for and supply of gold. The last point implies symmetry in the system which is sometimes disputed in view of the distinguished role played by Britain.⁴

Theoretically, the working of the gold standard is based on the assumptions made in classical economic theory, including the following: (i) perfect competition (ii) perfect flexibility of prices and wages, (iii) full employment, and (iv) money is held for transaction purposes only. Given that these assumptions are satisfied, the quantity theory of money holds and constitutes the basis of the price adjustment mechanism, the so-called price specie flow mechanism. This adjustment mechanism is perceived to have several advantages. First is the expectation that price levels across countries may diverge only occasionally and temporarily, implying the existence of a stable long-run relationship between the prices of different countries.⁵ Such stability is conducive to the development of international trade and the free flow of capital. Second, the system gives rise to a beneficial flow of real resources. Third, the system functions without any government intervention.

This sounds too good to be true, and this is why some economists have strived to examine the various pillars of the system. Taussig (1927) examined statistics of price and gold movements in the light of the predictions of the price specie flow mechanism and found that prices in the major trading countries moved in the same direction rather than in a divergent fashion as required by the adjustment mechanism. He also found that small gold flows and relative price changes seemed to restore payments equilibria. Moreover, Bloomfield (1959) demonstrated that central banks did not follow the “rules of the game” required for the price adjustment mechanism to work smoothly. Rather, they sterilised payments imbalances, insulating the money supply from the balance of payments. McCloskey and Zecher (1976) have also shown that the relatively modest gold flows that did occur responded to shifts in the demand for money relative to the availability of new gold supplies. These findings gave rise to the

need to find some other economic forces that contributed to restoring equilibrium.

The first of these forces is found in short-term capital movements. Under the gold standard, short-term capital was highly interest elastic because of the confidence investors had in the stability of exchange rates and price levels. Given a high interest elasticity, a small rise in the interest rate caused sufficient capital inflows to prevent any further price increases and gold losses. However, it is arguable that there was a significant asymmetry in this respect, and that the system only worked for the benefit of Britain as the Bank of England manipulated the bank rate. Other countries resorted to some discretionary policies such as the use of reserves, manipulation of the gold points, intervention in the foreign exchange market and borrowing from abroad. The role of interest rates is dealt with comprehensively by Neuberger and Stokes (1979).

The other element, the so-called "missing link", which is the income adjustment mechanism, was recognised after the publication of Keynes' *General Theory* in 1936. Taussig (1927) had earlier suspected that some economic forces were ignored by classical economic theory. Indeed, during the gold standard price flexibility decreased progressively and income adjustment tended to assume greater importance.⁶

The other pillar of the gold standard, that of a common price level, has also been questioned. The common price level, which is defined as what gold would buy in terms of other goods and services, is supposed to be autonomously determined by the worldwide supply and demand for gold. It is true that there is a systematic tendency for the common price level to be equilibrated in the long run, and this phenomenon was known to classical economists like Mill (McKinnon, 1993, p. 10). However, Barro (1979) has formally shown that the common price level would tend towards complete stability in the long run only if the price of gold relative to a basket of all other commodities was constant.

In general, the whole idea of the gold standard being an automatic self-equilibrating adjustment mechanism has been questioned. It is now more widely accepted that the gold standard was actually managed. And even what seemed to be adherence to the rules by member countries is interpreted to be from the limited perspective of "national monetary management linked to a common external standard" (McKinnon, 1993). The contribution of this paper is to shed some more light on, and to subject to empirical testing, some of these controversial issues.

III. An Informal Examination of the Data

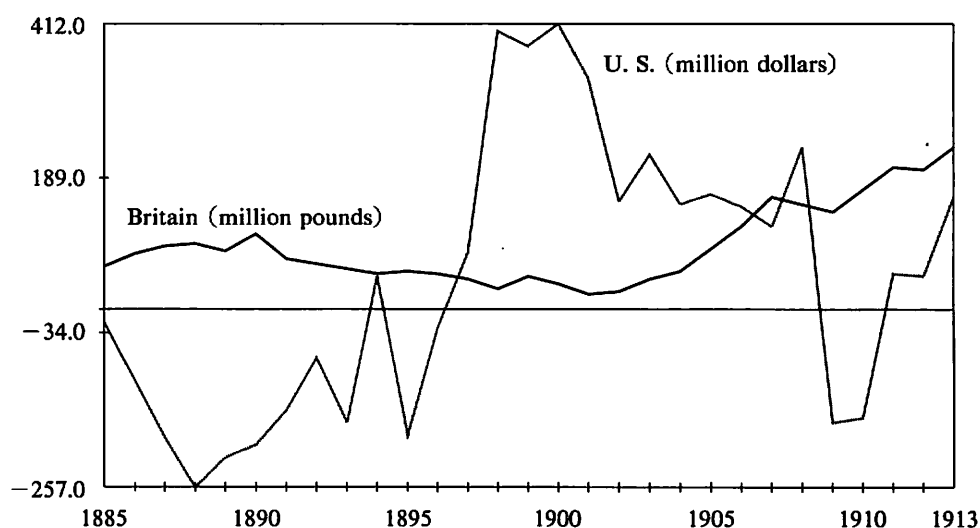
Data on four variables for Britain and the U. S. were obtained from Liesner (1989). These variables include the current account of the balance of payments, B , producer prices, P , consumer prices, C , and real income, Y . The notation that is used here is that a subscript b indicates Britain while a subscript u indicates the U.S. Thus, B_b and B_u respectively represent the current accounts of Britain and the U. S.⁷ With few exceptions the data period extends between 1885 and 1913, which from the previous discussion is well within the time span of the gold standard. The corresponding quarterly series were derived by applying a continuous time interpolation method.⁸

The choice of Britain and the U. S. in this study is warranted by several reasons apart from the availability of good quality data on these two countries. First of all,

the choice of Britain is imperative given the pivotal role played by this country in the gold standard. The choice of the U. S. is appropriate since it was a major industrial country with a high rate of economic growth and strong trading links with Britain. The choice of Britain and the U. S. as a combination is highly suitable for this study since Britain was a surplus country for the whole period under consideration while the U. S. was a deficit country for most of the period. This is shown in Figure 1 which illustrates the high volatility of the U. S. current account compared with that of Britain. It is shown that the U. S. current account went through three phases: deficit in the period 1885–1896, surplus in 1897–1908 and deficit/surplus in 1909–1913.

Figure 2 and Figure 3 respectively plot producer and consumer prices with the base period changed to 1885. Figure 2 shows that both countries experienced deflation

Figure 1 The Current Account



tion until 1897 and inflation afterwards. This is roughly the same as what is indicated by consumer prices as shown in Figure 3. However, there is one notable difference in the behaviour of producer and consumer prices. While the former do not seem sticky (not even downwards), consumer prices exhibit some stickiness as shown by the relatively long periods during which they did not change. This stickiness (or rather lack of it) is very important for the working of the price specie flow mechanism whose functioning depends crucially on price and wage flexibility. The other thing to notice is that prices in the two countries moved in the same direction while the classical model predicts that whether prices move in parallel or in a divergent fashion depends on the relative position of the current account. More specifically, the model predicts that prices of a deficit country should fall while prices of a surplus country should rise. Thus, we should expect prices in Britain and the U. S. to have been negatively correlated in the period 1885–1896 and positively correlated in the period 1897–1908. Table 1, however, shows that irrespective of the period, prices were positively correlated. This result is not compatible with the predication of the price specie flow mechanism. The strong correlation may be considered as evidence in support of the hypothesis of a common price level. However, this issue needs a more rigorous

Figure 2 Producer Prices (1885 = 100)

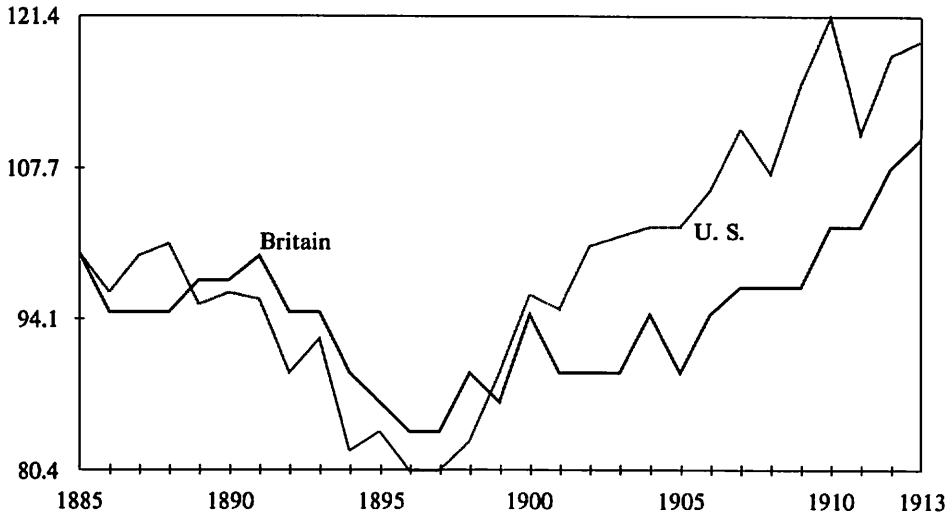


Figure 3 Consumer Prices (1885 = 100)

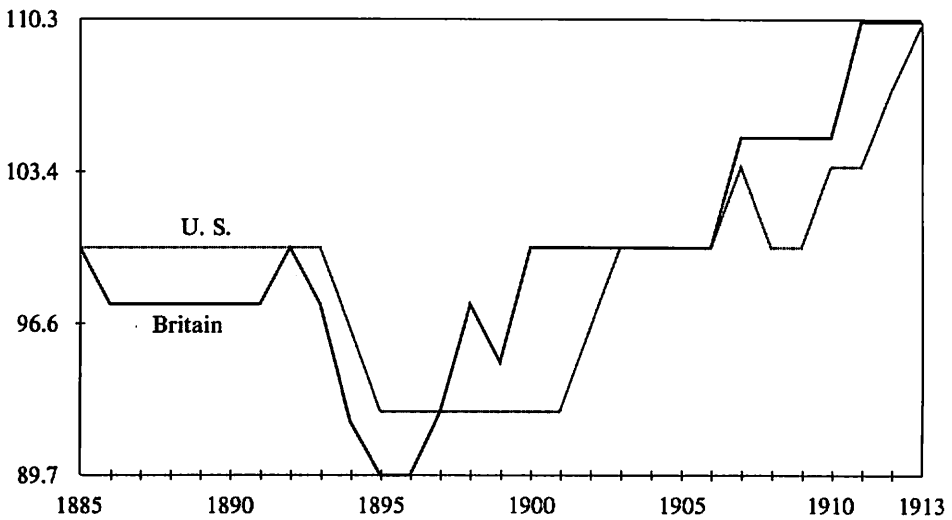


Table 1 Price Level Correlation

Period	Hypothetical	Producer Prices	Consumer Prices
1885–1913	Negative	0.82	0.81
1885–1896	Negative	0.87	0.97
1897–1908	Positive	0.84	0.74
1909–1913	?	0.24	0.74

empirical testing which will be conducted later.

Since prices in a deficit country should fall while those in a surplus country should rise, positive correlation is expected to be found between the current account

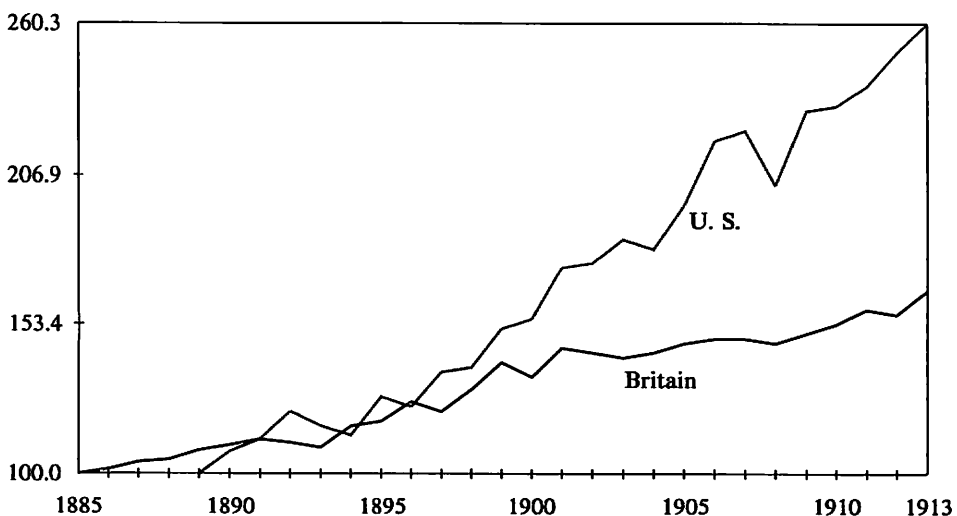
and prices in each country. Similarly, negative correlation is expected to be found between the current account of one country and the prices of the other. Table 2 shows that these predictions are not uniformly realised. While the first prediction is realised in the case of the U. K. (showing positive correlation), it is not realised in the case of the U. S. (showing negative correlation). Considering cross-country correlations, the second prediction is realised in one case only : there is negative correlation between the U. S. current account and Britain's producer prices. Again, one must warn against the hazards of jumping to conclusions on the basis of these results.

Figure 4 shows the real income of Britain (GDP) and the U. S. (GNP). It is clear that the deficit country experienced a faster growth rate, possibly reflecting the demand for imports. It is difficult to infer anything on the income adjustment mechanism from this graphical representation. This difficulty may be attributed to the nature of this mechanism which is based on feedback interaction with the balance of payments : disturbances that affect the circular flow of income give rise to income changes that tend to bring about partial (not complete) adjustment in the balance of payments. This in turn implies the presence of bidirectional causality and, therefore, needs rigorous testing.

Table 2 Correlation Between Prices and the Current Account

Price Level	Current Account	Correlation
P_b	B_b	0.79
C_b	B_b	0.79
P_u	B_u	-0.12
C_u	B_u	-0.35
P_b	B_u	-0.30
C_b	B_u	0.04
P_u	B_b	0.83
C_u	B_b	0.79

Figure 4 Real GDP/GNP (1885/89 = 100)



IV. Empirical Results

In this section the results of empirical testing are presented. Table 3 reports the results of the Dickey-Fuller unit root test of the levels and first differences of the price series. The results show that all the series are nonstationary in levels and stationary in first differences, indicating that they are $I(1)$. Having found that the series are integrated of the same order, it is possible to proceed to testing for cointegration. For this purpose, three tests and seven statistics are presented. The Engle-Granger (1987) test (DF, ADF and CRDW), the Johansen (1988) test (Max and Trace) and the Phillips-Ouliaris (1990) test (\hat{Z}_α and \hat{Z}_t). Table 4 reports the results of cointegration tests between price levels in Britain and the U. S. such that the cointegrating regression is normalised on the U. S. variable. All of the tests indicate that the null hypothesis of no cointegration cannot be rejected at the 5 % significance

Table 3 Unit Root Test

$$\Delta y_t = \alpha + \beta t + \gamma y_{t-1} + \sum_{i=1}^m \phi_i \Delta y_{t-i}$$

Variable	DF	ADF
P_b	-0.59	-1.55
C_b	-1.58	-2.45
P_u	-1.50	-2.03
C_u	0.70	-1.26
ΔP_b	-4.99	-5.41
ΔC_b	-4.14	-4.30
ΔP_u	-4.66	-4.90
ΔC_u	-3.82	-4.04

All variables are measured in natural logarithms. The Dickey-Fuller regression contains a time trend. The 5 % critical value is -3.45.

Table 4 Cointegration Tests

$$y_t = \beta_0 + \beta_1 x_t + \varepsilon_t$$

Test Statistic	Producer Prices	Consumer Prices
DF	-1.11	-0.29
ADF	-0.99	-1.20
CRDW	0.04	0.04
Max	6.81	11.84
Trace	9.09	13.43
\hat{Z}_α	-4.87	-5.50
\hat{Z}_t	-1.59	-1.34

The DF, ADF and CRDW statistics are used in conjunction with the Engle-Granger (1987) test. The Max and Trace statistics are the Johansen (1988) test statistics. The Z statistics are the Phillips-Ouliaris test statistics. The 5 % critical values are as follows: DF, ADF = -3.39, CRDW = 0.386, Max = 14.90, Trace = 17.95, $\hat{Z}_\alpha = -21.48$, $\hat{Z}_t = -3.27$.

Table 5 Bivariate Causality Test ($x \rightarrow y$)

$$\Delta y_t = \alpha + \sum_{i=1}^m \beta_i \Delta y_{t-i} + \sum_{i=0}^m \gamma_i \Delta x_{t-i} + \varepsilon_t$$

Causality	γ_0	γ_1	γ_2	γ_3	γ_4	F
$P_b \rightarrow B_b$	-0.82	2.29	-0.35	-0.31	-0.82	1.86
$C_b \rightarrow B_b$	1.09	-1.02	0.15	0.00	0.50	0.33
$P_u \rightarrow B_u$	-2.90	2.31	-0.51	-0.67	-0.34	2.27
$C_u \rightarrow B_u$	-2.96	2.30	0.15	-0.35	0.64	2.44*
$P_b \rightarrow B_u$	-0.16	0.59	0.22	-0.17	0.74	0.45
$C_b \rightarrow B_u$	0.74	0.04	0.11	0.47	0.18	0.75
$P_u \rightarrow B_b$	-0.64	1.24	-0.08	0.11	-0.48	0.51
$C_u \rightarrow B_b$	-0.36	-0.13	0.25	0.21	-0.50	0.12
$PR \rightarrow B_b$	-0.52	1.32	-0.32	-0.37	-0.50	0.63
$PR \rightarrow B_u$	2.64	-1.66	0.75	0.78	1.01	2.86*
$CR \rightarrow B_b$	1.20	-0.71	-0.05	-0.16	0.82	0.38
$CR \rightarrow B_u$	2.51	-1.42	-0.03	0.69	-0.19	1.41
$B_b \rightarrow P_b$	-0.82	0.59	0.03	-0.15	2.46	2.74*
$B_b \rightarrow C_b$	1.08	-0.21	-0.65	-0.08	1.34	0.54
$B_u \rightarrow P_u$	-2.99	-0.03	-0.22	-1.42	1.60	4.17*
$B_b \rightarrow C_u$	-2.96	0.53	-0.02	-0.31	-2.39	2.14
$Y_b \rightarrow B_b$	-2.21	0.62	0.32	-0.33	-1.92	1.21
$Y_b \rightarrow B_u$	-0.68	-1.20	-0.85	-0.01	1.76	2.08
$Y_u \rightarrow B_b$	-2.60	-0.02	0.06	0.79	2.29	5.80*
$Y_b \rightarrow B_b$	-2.58	1.27	0.66	0.10	-2.61	1.87
$YR \rightarrow B_b$	0.35	-0.48	-0.39	-0.33	0.08	0.15
$YR \rightarrow B_u$	-1.24	1.10	0.68	0.09	-0.99	0.60
$B_b \rightarrow Y_b$	-2.21	2.08	0.75	-0.58	1.81	3.85*
$B_u \rightarrow Y_u$	-0.67	0.02	0.17	0.33	-1.00	0.22
$B_b \rightarrow Y_u$	-2.58	3.13	1.02	-0.41	2.87	7.45*
$B_u \rightarrow Y_b$	-2.60	1.94	1.01	-0.38	-0.29	2.19

* Significant at the 5 % level. PR , CR and YR are respectively the ratios of producer prices, consumer prices and real incomes. The t statistics are given for the individual coefficients $\gamma_0, \dots, \gamma_4$.

level. This result, which is valid for producer as well as consumer prices, means that prices in Britain and the U. S. were not linked by a long-run relationship and that they drifted without bound from each other. In this case, the close correlation between price levels as shown by Figure 2, Figure 3 and Table 1 may be interpreted as spurious correlation. Thus, the hypothesis of a common price level under the gold standard is rejected.

Table 5 reports the results of bivariate causality testing. Allowance for contemporaneous causality is made in the model specification because both the price and the income adjustment mechanisms require bidirectional causality.⁹ The first set of results indicates little evidence of causality from prices to the current account (the price adjustment mechanism). Only one case shows causality running from U. S. consumer

Table 6 Multivariate Causality Test
 $[(x_1, x_2, \dots, x_k) \rightarrow y]$

$$\Delta y_t = \alpha + \sum_{i=1}^m \beta_i \Delta y_{t-i} + \sum_{j=1}^k \sum_{i=0}^m \gamma_{ij} x_{j,t-i} + \varepsilon_t$$

Causality	F
$(P_b, Y_b) \rightarrow B_b$	1.51
$(C_b, Y_b) \rightarrow B_b$	0.84
$(P_u, Y_u) \rightarrow B_u$	2.10*
$(C_u, Y_u) \rightarrow B_u$	2.24*
$(P_b, P_u, Y_b, Y_u) \rightarrow B_b$	1.92*
$(C_b, C_u, Y_b, Y_u) \rightarrow B_b$	1.31
$(P_b, P_u, Y_b, Y_u) \rightarrow B_u$	2.95*
$(C_b, C_u, Y_b, Y_u) \rightarrow B_u$	2.23*
$(PR, YR) \rightarrow B_b$	0.09
$(CR, YR) \rightarrow B_b$	0.25
$(PR, YR) \rightarrow B_u$	1.59
$(CR, YR) \rightarrow B_u$	0.89

* Significant at the 5 % level.

prices to the current account. The second set of results shows that there is evidence for causality running from the producer price ratio to the U. S. current account in one case only. The third set of results shows some evidence for causality from the current account to producer prices in both countries. Cross country causality testing produced some evidence for causality running from U. S. income to Britain's current account, possibly reflecting U. S. demand for British exports. The last set of results shows that causality ran from Britain's current account to income in both countries. These results in general show highly fragmented evidence for the working of the price and income adjustment mechanisms. They also show asymmetry as reflected in the difference between the results related to Britain and the U. S.

The possibility that needs to be examined here is that while the price and income adjustment mechanisms are not influential individually, they might be so jointly. To test this hypothesis the technique of multivariate causality testing is used (see for example, Hamilton, 1983). In this case we test whether or not prices and incomes jointly cause the current account. The results of this test, which are reported in Table 6, show that U. S. (producer and consumer) prices and income jointly cause the U. S. current account. For Britain there is some evidence that when the two price levels and two income variables are put together, they cause the current account. These results are stronger than those presented in Table 5, and they support the hypothesis that adjustment in the balance of payments takes place via price and income changes, and not via the former only as predicted by classical economic theory.

V. Conclusion

The empirical evidence presented in this study suggests the following conclusions. First, the price adjustment mechanism (the price specie flow mechanism) on its own was inadequate to maintain payments equilibria under the gold standard:

the role of the income adjustment mechanism was complementary. This finding should not be interpreted to imply that the role of interest rates and other factors was unimportant. Second, there was no such thing as a common price level under the gold standard as price levels in Britain and the U. S. were found not to be cointegrated. Finally, there was conspicuous asymmetry in the system reflecting the important role played by Britain under the gold standard. One conclusion that can be derived from the results and safely stated is that the gold standard does not provide a magical formula to solve the world's current monetary and economic problems, particularly in periods of extreme intranquilities. After all, the miracle of the gold standard was a myth.

Notes

- 1 An interesting account of the gold standard restoration debate of the 1920s is presented by Barkai (1993).
- 2 In the 1980s a combination of factors attracted renewed interest in the gold standard. In addition to the general dissatisfaction with exchange rate volatility, other factors include greater acceptance of the monetarist theories of inflation, "back-to-basics" political attitudes that supported the discipline imposed by market forces, and the election of President Reagan who supported the return to the gold standard. In 1981, the Reagan administration appointed the Gold Commission to evaluate the option of returning to gold.
- 3 Strictly speaking, the U. S. was not on the gold standard before the Civil War. The adopted system was a bimetallic standard, but with gold being undervalued the U. S. was *de facto* on gold.
- 4 Grubel (1977, p. 433) emphasises this role by stating that Britain "dominated world trade and finance as no other country has since". Asymmetry is also notable with respect to the interest rate elasticity of private capital flows (Neuburger and Stokes, 1979).
- 5 In the jargon of modern econometrics, price levels of individual countries should be cointegrated.
- 6 Another factor is the national supply of credit money. This factor, according to Grubel, (1977, p. 431) lessened the one-to-one link between changes in the gold stock and the money supply.
- 7 The exact definitions of the variables are as follows. B_b is Britain's current account in million pounds; B_u is the U. S. current account in million dollars; P_b is Britain's producer prices (1980=100, the index covers materials and fuel purchased by manufacturing industry and output of manufactured products); P_u is U. S. producer prices (1980=100, the index covers all commodities); C_b is Britain's consumer prices (1980=100, the index covers all items); C_u is U.S. consumer prices (1980=100, the index covers all items); Y_b is Britain's gross domestic product at market prices in billion pounds at 1985 prices; and Y_u is U. S. gross national product at market prices in billion dollars at 1982 prices.
- 8 See, for example, Goldstein and Khan (1976).
- 9 For example, an autonomous change that causes a deficit in the balance of payments will result in gold outflow and consequently monetary contraction and deflation which will be reflected on the balance of payments. Similarly, an autonomous increase in exports will have an expansionary effect on the domestic economy, leading to an increase in imports and that will be reflected on the balance of payments. Thus, there is bidirectional causality between the balance of payments on the one hand and prices and

income on the other. In any case, trial with a model specification that does not allow for contemporaneous causality did not produce qualitatively different results.

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