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THE GOLD STANDARD AS A RULE

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ABSTRACT

In this paper, we show that the monetary rule followed by a number of key countries, especially England and to a lesser extent the U.S., before 1914 represented a commitment technology preventing the monetary authorities from changing planned future policy. The experiences of these major countries suggest that the gold standard was intended as a contingent rule. By that, we mean, that the authorities could temporarily abandon the fixed price of gold during a wartime emergency on the understanding that convertibility at the original price of gold would be restored when the emergency passed. The experiences of other countries, however, suggest that the gold standard rule was often viewed more as a desirable goal than an operational constraint.

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I. Introduction

The gold standard has been a subject of perennial interest to both economists and economic historians. Attention has focused on three aspects of the gold standard's performance: as an international exchange-rate arrangement; as providing macro stability; and as a constraint on government policy actions.

The balance-of-payments adjustment mechanism or the links between the money supplies, price levels, and real outputs of different countries under fixed exchange rates has long been studied as the key aspect of the international exchange-rate arrangement of the gold standard.[1] The durability of fixed exchange rates, the absence of exchange-market crises and the smooth adjustment to the massive transfers of capital in the decades before 1914 have been features stressed in proposals for monetary reform ever since.

The gold standard has often been viewed as ensuring long-run, though not necessarily short-run, price stability via the operation of the classical commodity theory of money. However, recent comparisons between the classical gold standard and subsequent managed fiduciary monetary regimes suggest the record is mixed both with respect to price-level and real-output performance.[2]

Finally, the gold standard has been viewed also as a form of constraint over monetary policy actions -- as a form of monetary rule. The Currency School in England in the early nineteenth century made the case for the Bank of England's fiduciary note issue to vary automatically with the level of the Bank's gold reserve ["the currency principle"]. Following such a rule was viewed as preferable (for providing price-level stability) to allowing the note issue to be altered at the discretion of the well-meaning and possibly well-informed directors of the Bank (the position taken by the opposing Banking School).[3]

In this paper, we focus on the third aspect of the gold standard's performance -- on the gold standard as a rule. However, our meaning of the concept of a rule differs radically from the traditional one. In our view, a rule can be regarded as a way of binding policy actions over time. This view of policy rules, in contrast to the earlier tradition which stressed both impersonality and automaticity, stems from the recent literature on the time inconsistency of optimal government policy. Discretion, in this approach, is defined as setting policies to satisfy more immediate objectives without taking into consideration the future consequences of such action. This literature has demonstrated that, in almost all intertemporal policy situations, the government would benefit from having access to a commitment technology preventing it from changing planned future policy. Examples have shown that these benefits can be substantial. In this paper we use that literature as a framework for understanding the historical operation of the gold standard.

For the period from 1880 to 1914, the gold standard is often viewed as a monolithic regime where all countries religiously followed the dictates of the rule of a fixed price of gold. Before 1880, most countries were on a form of specie standard: either bimetallism or silver or gold monometallism. As we point out below, however, from our perspective the bimetallic standards that many countries followed were a variant of the gold standard rule. This is contrasted to the period since 1914 when central banks and governments to a great extent have geared their policies to satisfy more immediate objectives without considering the intertemporal consequences of their action in terms of lack of commitment to a long-run rule governing policy. In this paper, we show that the rule followed by a number of key countries, especially England and to a lesser extent the U.S., before 1914 was consistent with such a commitment. The experiences of these major countries suggest that the gold standard was intended as a contingent rule. By that we mean that the authorities could temporarily

abandon the fixed price of gold during a wartime emergency on the understanding that convertibility at the original price of gold would be restored when the emergency passed. The experiences of other countries, however, suggest that the gold standard rule was often viewed more as a desirable goal than an operational constraint.

Section II discusses the benefits of being able to commit to future government policy and presents the meaning we assign to the terms "rules" and "discretion." Section III interprets the institutions of the gold-standard era in terms of variants of the concepts developed in Section II. Section IV surveys the historical record on the adherence to the gold standard rule by England, the U.S., and other major countries. Finally, Section V discusses the lessons from history.

II. The Value of Commitment

A long-standing question in public finance is how to finance varying quantities of government expenditures in such a way as to minimize dead-weight loss to society. In the last decade, this question, which dates back to the pioneering work by Ramsey (1927), more and more has shifted from a static to a dynamic context. This intertemporal perspective has generated a considerable literature. We shall argue that this literature represents the appropriate framework for evaluating the operation of the gold standard.

The focus of this literature initially centered around the incentives, in the absence of a commitment mechanism to prevent the government from changing its policy rule in the future, for excessive taxation of capital income.[4] It became clear, however, that similar arguments can be made with respect to the taxation of (or default on) government debt. We first discuss the source of time inconsistency of optimal policy as it arises in the context of capital taxation. This discussion will highlight the source of the problem, and will

also describe the nature of the situation facing a government unable to issue debt. Then we shift our focus to government debt policy which, we argue, is at the heart of why the gold standard was adhered to in some countries for long periods of time.

Consider the following prototype model of optimal taxation used in Kydland and Prescott (1980a). The economy is inhabited by a large number of identical consumers who own competitive firms and supply labor input. Each consumer maximizes infinite-horizon discounted utility, $E\Sigma_{t=0}^{\infty}\beta^t u(c_t, n_t, g_t, \sigma_t)$, where c_t is consumption, n_t hours of work, g_t government purchases, and β is the subjective discount factor. The parameter σ_t is stochastic and may indicate, for instance, how the value of defense expenditures varies over time depending upon the political situation. There is little loss of generality, however, in simply assuming that the g_t process itself is exogenous and stochastic. Thus, the typical consumer is assumed to maximize

$$E \sum_{t=0}^{\infty} \beta^t u(c_t, n_t, g_t)$$

subject to

$$k_{t+1} + c_t \leq k_t + (1-\theta_t) r_t k_t + (1-\tau_t) w_t n_t$$

and nonnegativity constraints. Here, k_t is the capital stock at the beginning of period t, r_t the rental income from owning capital, w_t the real wage rate, and θ_t and τ_t are the tax rates for capital and labor income, respectively. The firms simply maximize $f(k_t, n_t) - r_t k_t - w_t r_t$, where $f(k_t, n_t)$ is a constant-returns-to-scale production function.

In this economy, consumers choose sequences of c_t, n_t, and k_{t+1}, while the government's decision variables are sequences of θ_t and τ_t. Interpreting aggregates as measured in per-capita terms, a natural formulation of the optimal taxation problem is to choose a sequence $\pi_o = \{\theta_t, \tau_t\}_{t=0}^{\infty}$ so as to maximize

$$E \Sigma_{t=0}^{\infty} \beta^t u(c_t, n_t, g_t)$$

subject to

$$g_t \leq \theta_t r_t k_t + \tau_t w_t n_t$$

and the constraints implied by equilibrium aggregate behavior of the atomistic private agents. These constraints can be written as sequences $x_o(\pi_o) = \{c_t(\pi_o), n_t(\pi_o), k_{t+1}(\pi_o)\}_{t=0}^{\infty}$; in other words, the equilibrium aggregate private decisions at time t depend on the entire sequence of policy decisions. The solution, π_o^*, to this optimal taxation problem, together with the associated equilibrium, $x_o(\pi_o^*)$, is sometimes referred to as a Ramsey allocation.

The heart of the time-consistency issue is as follows. Suppose π_o^* is the plan that solves the optimal taxation problem as of time zero. Imagine now that the same problem is contemplated as of time $s > 0$. The optimal taxation problem then has a solution π_s^* which turns out to be different from the part of π_o^* that specifies the plan for periods $t = s, s+1, \ldots$. In other words, the original plan, π_o^*, is inconsistent with the passage of time. This time inconsistency clearly is unrelated to the presence of uncertainty. One could specify a deterministic time path for g_t and the resulting plan would still be time inconsistent.

The nature of this prototype model highlights the following two points. One is that time inconsistency has nothing to do with conflict between interest groups or between the objectives of the government on the one hand and those of private individuals on the other. Also, it is clear from the objective function that time inconsistency arises in spite of unchanging tastes over time. Instead, the key factors are the strategic dominance of the government relative to the atomistic members of the private economy, combined with decisions being made sequentially over time.

In the optimal plan, when an increase in g_t occurs, the incentive effects on work effort of raising τ_t have been weighed against the effects on savings behavior from changing θ_t. Once the capital stock is in place, however, the

optimal plan from then on, taking history up to that point as given, is to tax capital more heavily, as it will be inelastically supplied, and then to reduce future capital taxation. Of course, this change of action by the government is likely to create beliefs among the public that a similar change of plans will take place again sometime in the future. This point was made in Kydland and Prescott (1980a) and also illustrated by a revealing numerical example in Fischer (1980) using a simplified two-period version of that model.

The model above assumes that the government balances its budget in every period. If the changes in government expenditures can be very large at times, such as during wars, the required changes in tax rates would reduce severely the incentives for economic activity at a time when the need for maintaining such activity is the greatest. In this situation, government debt provides an opportunity for the government to smooth tax rates over time. Arguments that tax smoothing generally is beneficial, not just during wars, but also under normal circumstances, can be found in Barro (1979) and in Kydland and Prescott (1980b).

When we introduce debt into the model, consumers' objectives, and therefore those of the government as well, are unaffected. The key difference is in the budget constraints. For the government, consider the following constraint:

$$g_t + (1-\delta_t)q_t \cdot b_t \leq a_t + q_t \cdot b_{t+1}.$$

Here, a_t stands for tax revenue (the sum of revenue from capital and labor taxation and other sources, such as customs duties), δ_t is the rate of default on the government debt (say, because of inflation), and b_t represents government debt of different maturities, treated as discount bonds, with prices given by q_t. We treat high-powered money (e.g., greenbacks during the Civil War) as a form of debt and include it in b. The notation here is as follows. Let ${}_s b_t$ be the amount of outstanding debt maturing in period s as of the beginning of period t, and ${}_s q_t$ its corresponding price. Define the notation $q_t \cdot b_t =$

$\Sigma_{s=t+1}^{\infty} {}_{s}q_{t} \, {}_{s}b_{t}$. In practice, the quantities ${}_{s}b_{t}$ usually will equal zero for s large enough. In the case of a one-period bond, for example, the price ${}_{t+1}q_{t}$ of new debt issue is determined by

$$ {}_{t+1}q_{t} = (1-\delta_{t+1})/(1+r_{t}), $$

where r_{t} is the one-period interest rate between period t and t+1, and δ_{t+1} is the default rate expected to prevail in period t+1.

Prescott (1977) uses an example in which the government finances a given stream of expenditures either through taxes on labor income (abstracting from capital) or by selling debt. For that model, he finds that if the government has no commitment mechanism for future actions, the government will always default on outstanding debt to avoid levying distorting taxes. As a consequence, the equilibrium implies that the value of government debt is zero and the government always runs a balanced budget. This policy and the implied allocation are, of course, inferior to the Ramsey allocation for that model.

Lucas and Stokey (1983) characterize optimal government policy with debt, also in an environment without capital. They find that if one *assumes* that the government will not default on its debt, then a debt-maturity structure can be found such that the other elements of government policy, including tax rates over time, are time consistent.

Several recent papers describe circumstances under which Ramsey policies are sustainable in the sense of being an equilibrium arising endogenously within the environment considered. Chari and Kehoe (1989a, 1989b) have studied this issue in contexts in which time-consistency problems can arise either because of capital taxation or because of the presence of government debt. A well-written overview is in Chari (1988). The typical finding is that a Ramsey allocation is problematic to implement when the horizon is finite. When the horizon is infinite, on the other hand, the Ramsey allocation may be one among a large, usually infinite, number of equilibriums. The conditions that have been used to achieve

this result restrict the applicability severely. What supports Ramsey policies as equilibriums in those cases is the belief by consumers that as long as the government has chosen Ramsey policies in the past, it will continue to do so.[5]

To overcome the shortcomings associated with a lack of an endogenous commitment mechanism, society in some cases has instituted commitment in the form of laws. Such is the case with patent protection. The law ensures sufficient incentives for inventive activity through the exclusive use of new inventions for a period of time without fear that the government will remove the patent right and allow the price of the resulting product to be driven toward the competitive price. Our thesis is that, although the gold standard is easier to change than for example the patent law, this institutional arrangement has the potential for working as an explicit, transparent, well-understood rule. But before going into details of how the gold standard rule worked, it is necessary to clarify what we mean by operating according to a rule rather than discretion in the light of the time-inconsistency literature.

In the discussion above, we emphasized that, in an uncertain world, the Ramsey plan will generally be a contingent plan or rule. Strictly speaking, the Ramsey plan will usually include many contingencies. In the patent case, for example, one can imagine that an optimal patent arrangement occasionally, under special circumstances, would permit nonexclusive use. The danger of too many contingencies, however, is lack of transparency and creating uncertainty as to the will to stick to the original plan. Thus, the rule may very well include only the contingency that is considered most important and abstract from the minor ones. In this sense, it will not quite reach the maximum of the social welfare function, but will score high. Discretion is any purposeful deviation, under whatever guise, from such a rule. Deviations are tempting because of their short-run benefits (perhaps accompanied by promises not to repeat the breach of the rule). Because of the effect on future beliefs, however, these

benefits are outweighed by the long-run implications of having given up on the original, nearly optimal, rule.

A variant of the gold standard rule that we believe is particularly pertinent applies to the case of a war. Assume for the time being that a country finds the gold standard rule to have good operating characteristics if it maintains the gold standard under all circumstances except for a war. Let z_t equal one if the country is on the gold standard at time t and zero otherwise. Let h_i represent the start of war i and e_i its end. A reasonable rule could be to choose $z_t = 0$ if $t \in [h_i, e_i+d]$ for all i and $z_t = 1$ otherwise; in other words, it is understood that in order to finance the war, the gold standard will be suspended for the duration of the war plus an additional delay period d which is the same in every war. Such a policy, if implemented as planned, is consistent with a gold standard rule. It is clear that when people foresee a war in the near future, this rule will result in different prices q_t for the issue of new debt than under the unconditional $z_t = 1$ rule. These effects would be regarded as negative, although if the rule is optimal, presumably outweighed by the benefits of being able better to finance the war.

This description is consistent with the results of Lucas and Stokey (1983) in which they use financing of wars as an example of a contingency rule. In their example, where the occurrence and duration of the war is permitted to be uncertain, the optimal plan is for the debt not to be serviced during a war. Under this policy, people realize when they purchase the debt that effectively it will be defaulted on in the event the war continues. In our setup, we think of this outcome as taking place in the form of inflation during the suspension of the gold standard.

In this situation, an example of discretion is, after war i has ended, say, to decide at time e_i+d to delay further the resumption of the gold standard, perhaps as a result of the perceived current situation in terms of the fraction

of the war that has been paid for and the undesirable effects of alternative means of financing, e.g., by raising taxes. This change is all the more tempting if the public had accepted the debt at reasonably high prices q in the expectation that the gold standard would be resumed as scheduled. If the government breaks the rule by effectively choosing a high default rate δ in the future, it is obvious that, should there be another war within memory of the previous one, then people's behavior would be quite different from the previous war, even if the situation is otherwise similar and the government claims to subscribe to the same fixed-delay rule.

There are some aspects of the operation of a gold standard that are not so clear-cut. In designing its details, for example the gold-silver ratio under bimetallism -- a variant of the gold standard -- it can be difficult to anticipate exactly what the optimal ratio is. New knowledge may be gained over time which would have been helpful when the standard was designed. When the new information is revealed, a potentially difficult question is what happens if the government goes ahead and makes the technical adjustment in the standard. If most people accept the claim that new information is the reason for the change, then the associated private behavior should be approximately as if this had been the standard from the very beginning. On the other hand, the greater the suspicion among the public that the change is partly a form of discretion, for which the government certainly has a strong incentive, the greater will be the change in private behavior reflecting the adjustment in their beliefs about likely future discretionary actions by the government. The same argument can be made regarding the choice of a different price when the gold standard is resumed after a temporary abandonment.

The question of the role of the gold standard in contributing to policy commitment has an international dimension as well. This brings up some interesting issues. In the above framework, we can think of the countries as being

interrelated through the constraints as well as having different objectives. One dimension of commitment relates to the interaction among the countries' policy makers, all of whom have strategic power to various degrees. But any cooperative arrangement also needs a commitment mechanism for the group of countries as a whole vis a vis the private agents in the various countries. Rogoff (1985), and more recently Kehoe (1989) within a framework closer to ours, have shown that in the absence of the latter form of commitment, cooperation among countries in general may be undesirable. That is, in the presence of the time-consistency problem in the countries' joint dealings with their private economies, the outcome of a cooperative arrangement among countries could very well be inferior to a noncooperative one. Thus, enforcing the cooperative version of Ramsey policies for a group of countries could be an especially important and challenging task.

In the case of the gold standard, the enforcement seems to have taken a particular form that was conducive to making it credible. A key factor may have been the role of England -- the leading financial and commercial center of the gold-standard era. The financial institutions of London provided the world with a well-defined and universally accepted means, based on gold, of executing bilateral trades and obtaining credit. As we shall argue later, the gold standard provided the benefits needed for it to be in England's interest to enforce it and for many other countries to follow England's lead. This arrangement also may have contributed to making the commitment mechanism a transparent one, a condition that we think is important for its likely success.

III. The Institution of the Gold Standard Rule

The essence of the gold standard rule is that each country would define the price of gold in terms of its currency and keep the price fixed. This involved defining a gold coin as a fixed weight of gold called, for example, one dollar.

The dollar in 1792 was defined as 24.75 grains of gold with 480 grains to the ounce. This was equivalent to $19.39 per ounce. The monetary authority was then committed to keep the mint price of gold fixed. This was done by being willing to buy and sell gold in unlimited amounts. The monetary authority was willing to convert into coin gold bullion brought to it by the public, charge a certain fee for the service -- called brassage -- and also sell coins freely to the public in any amount and allow the public to convert it into bullion or export it.[6]

This rule applies to a pure gold coin standard. In actual fact, the standard that prevailed in the nineteenth century was a mixed standard containing both fiduciary money and gold coins. Under the mixed standard, the gold standard rule required that fiduciary money (issued either by private banks or by the government) be freely convertible into gold at the fixed price.

Most countries, until the third quarter of the nineteenth century, maintained bimetallic systems using both gold and silver at a fixed ratio. Defining the weight of both gold and silver coins, freely buying and selling them, and maintaining the ratio fixed can be viewed as a variant of the basic gold standard rule, since it is a fixed value of the unit of account that is the essence of the rule.[7]

The Gold Standard as a Contingent Rule

As discussed in Section II, the gold standard rule as it operated in many countries should be interpreted as a contingent rule. Under the rule, the sovereign maintains the standard -- keeps the price of its currency in terms of gold fixed -- except in the event of a major war, in which circumstance it can suspend specie payments and issue paper money to finance its expenditures, and it can sell debt issues in terms of the nominal value of its currency on the understanding that the debt will eventually be paid off in gold. The rule is

contingent in the sense that the public understands that the suspension will last only for the duration of the wartime emergency plus some period of adjustment; it assumes that afterward the government will follow the deflationary policies necessary to resume payments.

Contingency also had some importance during financial crises. Restrictions on convertibility of bank liabilities for gold were often used to reduce the extent of a banking panic. Such restrictions of payments, however, should be carefully distinguished from suspension of external convertibility.

An International Rule

The gold standard rule also has an international dimension. Under the rule, there would be no restriction on the nationality of individuals presenting bullion to the mint to be coined, or exporting coin or bullion to foreign countries. Moreover, because every country following the rule would fix the price of its currency in gold, this created a system of fixed exchange rates linking together all countries on the same standard. Hence the gold standard rule represented a commitment mechanism between countries as well as within countries.

Commitment Mechanisms

How was the gold standard rule enforced? One possible explanation is to focus on reputational considerations within each country. Long-run adherence to the rule was based on the historical evolution itself of the gold standard. Gold was accepted as money because of its intrinsic value and desirable properties such as durability, storability, divisibility, portability and uniformity. Paper claims, developed to economize on the scarce resources tied up in a commodity money, only became acceptable because they were convertible into gold.[8]

In turn, the reputation of the gold standard would constrain the monetary authorities from breaching convertibility, except under well-understood contingencies. Thus, when an emergency occurred, the abandonment of the standard would be viewed by all to be a temporary event since, from their experience, only gold or gold-backed claims truly served as money.

As an international rule, the gold standard would also be enforced by reputation. Exchange in both goods and capital were facilitated if countries adhered to a standard based on a rule anchored by the same commitment mechanism.

Discretion Under the Gold Standard

Discretion under the gold standard manifested itself in a number of ways: first, through changes in the price of gold (or silver) under monometallism, second, through changes in the bimetallic price ratio under bimetallism, third, through outright suspension of convertibility, and fourth, through violations of "the rules of the game."[9]

To the extent that the first two policies can be viewed as merely technical adjustments, they may not lead to expectations by the public of further breaches of the rule. But the question arises as to how the public is to learn whether such a change is to be repeated in the future.

With respect to outright suspension of convertibility, it is difficult to distinguish between a suspension as part of the operation of a contingent rule as mentioned above, or as evidence of a change in regime. As we discuss below, statements by the monetary authorities, debates in Parliament, frequency of suspension, and changes in expectations as reflected in people's decisions can all be used to distinguish between the two.

Finally, an aspect of the international gold standard given considerable attention is the operation of the "rules of the game." According to the traditional story, central banks or the monetary authorities were supposed to use

their monetary policy to speed up the adjustment mechanism to a change in external balance. To the extent the "rules" would be followed, this presumably would strengthen the commitment to convertibility. Thus, when a country was running a balance of payments deficit and there was a gold outflow, the monetary authority, observing a decline in its gold reserves, was supposed to raise its discount rate in order to reduce domestic credit. The resultant fall in the money supply would reduce the price level. The adjustment process would be aided by higher short-term domestic interest rates, attracting capital from abroad.

IV. History of the Gold Standard as a Rule

In this section, we discuss the history of the gold standard, viewed first as a domestic rule binding the monetary authorities. In this context, we survey in some detail the operation of the gold standard as a rule in England and the U.S. -- two key nations under the standard; in the two remaining "core" countries of the classical gold standard -- France and Germany; and in a number of peripheral countries. Then we survey the record of the gold standard as an international rule governing the interrelationships between nations.

Our survey extends primarily from the early nineteenth century to 1933. Although the U.S. continued to maintain gold backing for the dollar until 1971 and the Bretton Woods system 1945 to 1971 was in part based on gold, we view the period after World War II as far enough removed from the gold standard rule to be omitted from this survey.[10]

1. The Gold Standard as a Domestic Rule

England 1717 to 1931

England can be viewed as the most important country to follow the gold standard rule. The gold standard in England as in other Western European countries evolved from the use of a commodity as money. Standardization of coins of

specific weight evolved by the early eighteenth century from a rudimentary bimetallic specie standard where coins frequently circulated by weight, not tale (face value).[11] England adopted a de facto gold standard in 1717, but before that date it had been on a de facto silver standard at least back to the thirteenth century. Over the five-hundred-year period on silver, the price of silver and the bimetallic ratio were rarely changed -- the principal exception was the Great Debasement of the sixteenth century. According to Glassman and Redish (1988), this episode represented an attempt to gain seigniorage -- follow discretionary policy -- rather than a technical adjustment in the coinage.[12]

The early standard was plagued by the problems of deterioration in quality and counterfeiting. This was especially serious for small-denomination silver coins and may explain periodic recoinage and occasional debasement in the early modern era. [Glassman and Redish 1988]. The emergence of the standard in its modern guise likely reflects the development of milling and other techniques of producing high-quality coin. The gold standard emerged in England de facto by the unintended overvaluation of gold at the mint from 1717 by the Master of the Mint, Sir Isaac Newton. It became de jure in 1816.[13]

The gold standard prevailed, with the price of gold fixed at £4.44 per ounce, from 1717 to 1931, with two major departures: 1797-1821 and 1914-1925. The first departure, referred to as the "Suspension Period" or the "Paper Pound" during the Napoleonic wars, is generally viewed as an example of the operation of a contingent rule [Barro 1987]. The suspension of payments on February 26, 1797, whereby the Bank of England received permission from the government not to have to redeem its notes in terms of gold, followed a run on the country banks and the depletion of the Bank of England's gold reserve with the threat of a French invasion.[14] Figure 1 portrays monthly movements in the price of the pound in terms of the Hamburg Schillingen Banco, the only exchange-rate series continuously available over the entire period. (The par of exchange before suspension

was approximately 35.)[15]

The suspension was universally viewed as a temporary event, initially expected to last for a period of months.[16] As the French wars dragged on, however, and the Bank of England freely discounted government securities financing military expenditures, the pound depreciated on the foreign exchange market. Consequently, the Bank repeatedly requested an extension of the suspension. Concern over the depreciation of the paper pound led to the Bullion Report of 1810, which attributed the depreciation to the Bank of England's note issue.

The Bullion Report recommended that immediate steps be taken to resume payments in two years from the date of the report at the pre-suspension parity.[17] The debate which ensued in Parliament and in the press, revolved over the themes of the extent, if any, of depreciation, and responsibility for the depreciation -- the Bank of England blaming it on external real factors.[18] There was little discussion over the possibility of not resuming payments or of resuming at a depreciated level of the pound in the ensuing ten years. Several attempts were made to pick a date for resumption [1816, 1818], but as each occasion approached, the Bank requested a postponement on the grounds that the exchanges were unfavorable. It is important to note that this occurred after the wartime emergency ended in 1815.[19] Finally, Parliament agreed on July 2, 1819 (Peel's Act) on resumption in stages from February 1, 1820, to full redemption on demand on May 1, 1823,[20] and it was agreed that the government would retire its outstanding securities held by the Bank and the Bank would reduce its note issue to achieve the aim. During the year preceding Resumption, considerable opposition to the plan emerged in Parliament by interests (especially agriculture and the Birmingham industrial area) hurt by deflation. They advocated return to parity at a depreciated pound. This opposition was not sufficient, however, to prevent resumption from being achieved. [Feavearyear, 1963, pp. 224-225; Fetter, 1965, pp. 73-76; Laidler, 1987].

We interpret the repeated requests for postponement, especially after the end of hostilities in 1815, as the use of discretionary policy. Moreover, each postponement gave a negative signal to the public of the government's intention of ever resuming. Nevertheless, the fact that resumption was achieved suggests that observing the rule was paramount.

The Bank Charter Act of 1844 and the separation of the Bank of England into the Issue department to regulate the currency and the Banking department to follow sound commercial banking principles, further demonstrated England's commitment to the gold standard rule. The Issue department, by varying directly its fiduciary issue (over and above a statutory limit of £14 million) with the level of gold reserves ("the currency principle") was designed to make the long-run maintenance of the (mixed) gold standard more credible.[21] A second contingency aspect of the rule developed with experience. The Bank was authorized to expand its unbacked note issue in the face of a depletion of its reserves without suspending convertibility of its notes into gold.

From 1821 to 1914, the gold standard rule was continuously honored. However, on three occasions -- the crises of 1847, 1857 and 1866 -- the second contingent aspect of the rule came into play. The policy was successful in alleviating the pressure and the Bank retired the excess issue shortly thereafter.[22]

The Overend Gurney crisis of 1866 was the last real financial crisis (i.e., banking panic) in British financial history [Schwartz, 1986]. After that point the Bank of England learned to follow Bagehot's rule -- in the face of both an external and an internal drain "to lend freely but at a penalty rate." Although Bagehot intended for the Bank to use its discretion (in the traditional sense) to avert a financial crisis, it can be argued that the successful performance of the Bank as lender of last resort actually served to strengthen the credibility of the Bank's commitment to the gold standard rule since a key threat to the

maintenance of convertibility was removed. Evidence of the credibility of England's commitment to the gold standard rule is provided by private short-term capital inflows during the incipient crises of 1890 and 1907 [Eichengreen, 1989b].

The 1914-1925 episode was similar in many respects to the earlier Suspension period, although the extent of the inflation and the depreciation of the pound were considerably greater. Indeed it appears that the successful resumption of 1821 may have been a factor enabling the British to finance an even larger share of the World War I expenditures by debt finance and the issue of fiat money (See Table 1).[23] Figure 2 shows monthly movements in the dollar-sterling exchange rate. Note that from the beginning of hostilities in August 1914 until March 1919 the country was still formally on the gold standard but the monetary authorities prevented conversion and pegged the pound close to the old parity. [Crabbe, 1988].

After hostilities ended, the official view in the *Cunliffe Report* (1918) and other documents was for an immediate resumption at the old parity of $4.867. In consequence, the Bank of England began following a deflationary policy in early 1920. The exchange rate was close to parity by December 1922 but resumption was delayed because of unfavorable events on the continent (the Germans' refusal to pay reparations and the Belgian-French occupation of the Ruhr in 1923). By the end of 1924 the pound was again close to parity and resumption was announced by Winston Churchill in the Budget Speech of April 28, 1925.

Though the official view from 1920 to 1925 was in favor of resumption, and a key argument made was the maintenance of credibility by returning to gold at the old par, vociferous opposition to it was voiced by J. M. Keynes (1925) and other academics, by labor (not the official Labor party), and by industry groups. Most of the opposition, however, with the principal exception of Keynes, was opposed not to resumption at the old parity per se but the defla-

tionary policies used to attain it.[24] The successful resumption in 1925 and the painful deflation that accompanied it can be viewed as evidence for the British commitment to the rule of the gold standard.[25]

The United States 1792-1933

The U.S. Constitution (Section 8) gave Congress power over the currency -- "to coin money and regulate the value thereof." The Coinage Act of 1792 defined U.S. coinage as both gold and silver. Thus the original monetary standard was a bimetallic standard. One dollar was defined as 371.25 grains of silver or 24.75 grains of gold. This yields a bimetallic ratio of the value of gold to silver of 15:1. Soon after instituting the 15:1 ratio, the market ratio increased to $15\frac{1}{2}$:1. Consequently, silver became overvalued at the mint, gold undervalued, and, via the operation of Gresham's Law, the U.S. after a few years was on a de facto silver standard.

The situation was altered by a new Coinage Act in 1834 and another in 1837, which changed the bimetallic ratio to 16:1, presumably in an attempt to restore bimetallism. As it turned out, gold became overvalued at the mint, silver undervalued, and the U.S. switched to a de facto gold standard. If we interpret periodic adjustment of the bimetallic mint ratio to the market ratio as an example of a contingent rule and the public expects such adjustments, then the question arises whether the switch from 15:1 to 16:1 rather than to $15\frac{1}{2}$:1 was a mistake or a deliberate use of discretionary policy. Indeed, O'Leary (1937) viewed this episode as a deliberate attempt by the Jacksonians to discredit the Second Bank of the United States. The resultant flood of gold coins would obviate the necessity for its notes. The Act of 1834 was also passed at the urging of the gold-producing states of South Carolina, North Carolina, and Georgia. [Friedman, 1989].

The fixed price of $20.67 per ounce prevailed from 1837 to 1933 with one significant departure -- the Greenback episode 1862-78. Figure 3 plots the greenback price of gold over that period.

The Greenback episode, at least at the outset, can be interpreted as the operation of a contingent rule. The Federal government originally intended to finance its expenditures by borrowing and taxation, but within a year resorted to the issue of paper notes. Under the Legal Tender Acts, these notes were issued on the presumption that they would be convertible, but the date and provisions for convertibility were not specified.

Shortly after the war, the government made its intentions clear to resume payments at the prewar parity in the Contraction Act of April 12, 1866, which provided for the limited withdrawal of U.S. notes. Declining prices from 1866 to 1868 led to a public outcry and repeal of the Act in February 1868. Over the next seven years a fierce debate raged between the hard-money forces -- advocates of rapid resumption -- and the soft-money forces, some of whom were opposed to restoring the gold standard, others who wanted to restore at a devalued parity, and yet others who just wanted to prevent any undue deflation and allow the economy to grow up to its money supply. [Sharkey, 1969, Unger, 1964]. Alternating victories by the conflicting forces were manifest in legislation, alternately contracting and expanding the issue of greenbacks (the Public Credit Act of 1869 contracting it, the reissue of $26 million of retired greenbacks in 1873 expanding it) and, in Supreme Court decisions, initially declaring the Legal Tender Acts unconstitutional (Hepburn vs. Griswold, February 1870, and then reversing the decision -- Knox vs. Lee, May 1871). Finally, the decision to resume payments on January 1, 1879, was made in the *Resumption Act* of 1875 which was passed by a majority of one by the lame-duck Republican Congress. Despite the announcement of Resumption, however, and of steps taken by the Treasury to accumulate a gold reserve and to retire greenbacks, the bitter

election of 1876 was fought between Cooper the Greenback candidate -- opposed to Resumption, Tilden, a soft-money Democrat, and Hayes, a hard-money Republican. Hayes won by one electoral vote.

Though the ferocity of the debate and the reversals in policy suggest to us that many features of the period after the Civil War can be interpreted as incorporating elements of a discretionary regime, other evidence argues in favor of the contingent gold standard rule. As Calomiris (1988) points out, credibility in the restoration of the gold standard rule was likely established by the actual redemption of bond principal in gold in 1869 by the Act of March 18, 1869, guaranteeing payment in gold, and the Supreme Court decision in Venzie Bank vs. Fenno which supported the constitutionality of gold clauses. (Calomiris, 1988, p. 208fn)[26]

Moreover, both Roll (1972) and Calomiris (1988) present evidence of expected appreciation of the greenback dollar based on a negative interest differential between bonds that were paid in greenbacks and those paid in gold. Calomiris (see Table 2) calculated the appreciation forecast error on a semi-annual basis from January 1869 to December 1878 defined as the difference between his calculation of expected appreciation and actual appreciation. The errors are close to zero for most of the periods, with two exceptions: January to June 1869 when it is 1.53 and January to June 1876 when it is -1.46. The former positive exchange-rate surprise reflects the credibility of the government's commitment to the redemption of bond principal in gold; the latter negative surprise reflects the temporary threat to Resumption by the election of 1876.

In the ensuing 17 years, though the U.S. was back on a gold basis, the battle between hard and soft-money forces continued over the issue of free coinage of silver. Silver advocates can be classified into several groups. There were those who believed that, had silver not been demonetized by the

"Crime of 73" (the Coinage Act of February 1873), then bimetallism at 16:1 would have yielded less deflation than actually occurred from 1873 to 1896, as relatively more abundant silver was substituted for increasingly scarce gold. Such a position is consistent with maintenance of a rule. Other silver advocates (the Populist party), however, viewed the issue of silver certificates as a potential engine of inflation to stimulate the economy, as well as to reverse the redistribution of income from debtors to creditors. In this sense the pressure in favor of discretion did not disappear.

The free-silver forces succeeded in passing two pieces of legislation that increased the outstanding stock of silver coins: the Bland Allison Act of 1878 and the Sherman Silver Purchase Act of 1890. The latter increased the stock of high-powered money sufficiently to threaten convertibility into gold. [Friedman and Schwartz, 1963]. As Grilli (1989, Figure 3) shows, however, the probability of a speculative attack on the gold dollar at the height of the agitation over silver in 1893 (before the repeal of the Sherman Silver Purchase Act) was not much greater than 6%.[27]

A second departure from the gold standard, an embargo during World War I (1917-19) on gold exports, did not affect internal convertibility of gold. Hence, we believe, it should just be viewed as a temporary adjustment in the standard.[28]

Financial crises characterized by banking panics were a frequent occurrence in U.S. monetary history until the establishment of the Federal Reserve System. Before 1914, pressure on the banking system's reserves was often relieved by a restriction on convertibility of bank notes and deposits into high-powered money. The restrictions in 1837-38, 1839 and 1857 did involve suspensions of convertibility into gold. It could be argued, however, that such temporary departures were viewed as a contingent aspect of the rule. The restrictions of 1873, 1893, and 1907-08 did not involve suspension of convertibility into gold

and hence cannot be viewed as breaking the gold standard rule.

The decision by FDR to devalue the dollar in 1933 represents a clear departure from the gold standard rule and a clear case of discretion. The decision was undertaken for the purpose of raising the price level. Though the price of gold was again fixed, at $35.00 per ounce, gold ownership by U.S. residents was prohibited and the standard which re-emerged has been described as "a discretionary fiduciary standard" with gold just a commodity whose price was fixed by an official support program. [Friedman and Schwartz, 1963].

Other "Core" Countries

France

France followed a bimetallic standard from the middle ages until 1878. From the thirteenth to the fifteenth century, the rule was honored in the breach more than the observance, with frequent debasements, devaluations, and revaluations. This reflects internal political instability, frequent wars, and the lack of an adequate tax base [Bordo 1986]. By the sixteenth century, France had developed a stable bimetallic system, although the ancient regime was punctuated by several devaluations and revaluations [Murphy, 1987], and the infamous system of John Law -- a paper-money-induced inflation -- from 1716-1720 [Bordo, 1987a].

The French revolution spawned the assignats hyperinflation from 1789 to 1795 -- the aftermath of which led to the establishment of official bimetallism with the fixing of the ratio of silver to gold at $15\frac{1}{2}$:1 in 1803 -- a rule which was successful for 75 years. Until the late 1840's, abundant supplies of silver threatened to displace gold, but with gold discoveries in California and Australia the process was reversed until the 1860's when again major silver discoveries threatened the bimetallic standard. In 1865, France formed the Latin Monetary Union with Belgium, Switzerland, and Italy (later joined by the Papal States, Greece and Romania). By agreeing to mint silver coins of the same

fineness, these countries expanded the size of the bimetallic currency area. The Latin Monetary Union continued the free coinage of silver until, swamped by massive supplies of new silver from discoveries in the Americas and the abandonment of the silver standard by Germany and other European countries emulating the gold standard example of Britain, the leading commercial power [Friedman, 1990], it limited silver coinage in 1874 and fully demonetized silver in 1878. [Bordo, 1987b].

France followed the gold standard rule (albeit in its bimetallic form until 1878) until World War I. Like other belligerents she switched to fiat-money issue to finance the war, with the intention to resume payments after hostilities ended. Unlike the British case, the aftermath of the war was a period of rapid inflation and depreciation of the franc. The forces of discretion carried the day even with the ultimate return of the franc to gold convertibility at a vastly depreciated level in 1928. France stayed on the gold standard until 1936.

Germany

The German states, like all of Europe, followed a bimetallic standard throughout the first two-thirds of the nineteenth century. With unification in 1871, Germany switched to a gold standard. Until World War I, convertibility was always maintained, although the "rules of the game" were not strictly observed [McGouldrick, 1984]. The story of inflation and hyperinflation during and after World War I is well known. The inflation tax was used to finance reparations and to redistribute income [Cukierman, 1988].

Thus the experience of France and Germany, the other two "core" countries of the classical gold standard, was similar to that of England and the U.S. -- the rule was upheld at least until World War I. This contrasts with the behavior of a number of peripheral countries where the record was less favorable.

Peripheral Countries

Austria-Hungary

The Austro-Hungarian empire was on a de facto silver standard until 1879, punctuated in the 1860's by an episode of inconvertible paper. From 1879, the Empire was on an inconvertible paper standard until it joined the gold standard in 1892. According to Yeager (1976), the price level was as stable under paper as it was in other countries on the gold standard. Austria opted for the gold standard, presumably to get access at more favorable terms to the London capital market, to develop a war chest -- in both the sense of accumulating a gold reserve and in the sense of providing greater inflation tax revenue in the event of hostilities, and for ideological considerations -- gold was viewed as the standard for "modern" nations. [Gallarotti, 1989]. The experience of Austria-Hungary in World War I and its aftermath is similar to that of Germany.

Russia

Russian experience, according to Yeager (1976), was similar to that of Austria. After abandoning silver in the 1860's and following a paper standard, she opted for a gold standard in 1879, presumably to gain access to foreign capital and as insurance against wartime emergencies.

Sweden

Sweden, like other European countries, followed a silver standard until 1875 when she switched to a gold standard. In 1873, Sweden joined with the other Scandinavian countries to form the Scandinavian Monetary Union -- a currency union based on fixed gold parities that lasted until 1914. The Swedish experience until World War I under the gold standard was to follow the rule. During World War I the Krona remained very close to its prewar parity and in

1922 Sweden was the first country in Europe to return de facto to gold at the prewar parity which became de jure in 1924. Sweden left the gold standard with Great Britain in 1931. [Jonung, 1984].

Italy

Italy was a country that departed from the gold standard rule more than it followed it. The newly unified Italian state adopted a gold standard in 1865 but abandoned it in 1866 and did not return to convertibility until 1884. According to Fratianni and Spinelli (1984), inconvertibility was a consequence of financing the war against Austria in 1866 and the government's subsequent liberal fiscal policy. A return to sound fiscal policy permitted restoration of gold payments from 1884 to 1894, after which the Italian currency remained inconvertible until World War I. According to Fratianni and Spinelli, "Politicians had no difficulties in throwing off the strait jacket of the gold standard when it stood in the way of large budget deficits."

Spain

Like other continental countries, Spain followed bimetallism and de facto silver till the third quarter of the nineteenth century. Spain shifted from silver to gold in 1876 and managed to maintain convertibility until 1883. Thereafter, until World War I, Spain was on an inconvertible paper standard. According to Acena (1987) she had the worst of all possible worlds -- not having access to the capital markets of the gold standard world while at the same time accumulating large gold reserves.

Developing Countries

A considerable number of developing countries adopted the gold standard or a variant of it in the nineteenth century. The British Dominions -- Canada,

Australia, New Zealand and South Africa -- were tied to gold through their connection to the pound. Other major countries' colonies were tied to the metropolitan currencies through variants of the gold exchange standard and through currency boards [Keynes 1913]. These countries generally remained on the gold standard except during severe financial crises [Presnell 1982].[29]

One important example of a country that did not systematically follow the rule was Argentina. Argentina was a country closely tied to England as its principal source of long-term capital and hence a country to whom being on the gold standard was of considerable importance. Ford (1962) describes how Argentina alternately abandoned and then followed gold convertibility during periods of falling prices 1880-1900 and rising prices 1900-1913. Other Latin American countries had a similar experience with monetary and fiscal profligacy. [Fishlow 1987].

2. The Gold Standard as an International Rule

The classical gold standard emerged as a true international standard by 1880 following the switch by the majority of countries from bimetallism, silver monometallism, and paper to gold as the basis of their currencies.[30] As an international standard, the key rule was maintenance of gold convertibility at the established par. Maintenance of a fixed price of gold by its adherents in turn ensured fixed exchange rates. Recent evidence suggests that indeed throughout the 1880-1914 period exchange rates were characterized by a high degree of fixity in the principal countries. Although exchange rates frequently deviated from par, violations of the gold points were rare [Officer, 1986] as were devaluations [Eichengreen, 1985].

The fixed exchange rate ensured the close linkage of national price levels either by the operation of the price specie flow mechanism (aided by capital flows), or by commodity arbitrage. The same fixed exchange rate also ensured

that both monetary and nonmonetary shocks would be transmitted via gold and capital flows between countries.

The question arises as to what would prevent the monetary authorities from suspending convertibility in the face of a balance of payments deficit and gold outflow (caused for example by a real shock such as a domestic harvest failure), as the ensuing contraction in the domestic money supply reduced aggregate demand. The answer may well be the reputation of the gold standard as discussed in Section III. However, another mechanism may have been the operation of the "rules of the game."

According to the traditional story, the monetary authorities were supposed to alter the discount rate to speed up the adjustment to a change in external balance. Thus, for example, in the case of a gold outflow, the monetary authority, observing a decline in its gold reserves, was supposed to raise its discount rate in order to reduce domestic credit. The resultant fall in the money supply would reduce the price level. The adjustment process would be aided by higher short-term domestic interest rates attracting capital from abroad. As mentioned in Section III above, to the extent the "rules of the game" were followed, this would strengthen the commitment to convertibility.

There is considerable evidence that, with the exception of England, the rules were frequently violated in the sense that discount rates were not always changed in the required direction (or by sufficient amount) and in the sense that changes in domestic credit were often negatively correlated with changes in gold reserves. [Bloomfield 1959].[31] According to Goodfriend (1988), central banks under the gold standard engaged in such practices because they had "interest rate smoothing" as an important objective and used "gold stockpiling" as a way of achieving it. Such a practice, in our approach, can be viewed as a form of discretion because following such practices can lead the public to believe that ultimately convertibility will be abandoned. A similar problem arises with

the use of gold devices -- practices many countries engaged in to prevent gold from leaving.[32]

For the major countries, at least before 1914, such policies were not used extensively enough to threaten the convertibility into gold -- evidence for commitment to the rule [Schwartz, 1984]. Moreover, as McKinnon (1989) argues, to the extent monetary authorities followed Bagehot's rule and prevented a financial crisis while seemingly violating the "rules of the game," the commitment to the gold standard in the long run may have been strengthened. In the case of a number of minor countries, however, because transactions in gold were so restricted, the record suggests that their adherence to the rule was in name only. In the interwar period, sterilization by the U.S. and gold hoarding by the Bank of France were key factors in the breakdown of the Gold Exchange Standard.

In addition to the reputation of the gold standard and observance of the "rules of the game," an additional enforcement mechanism was the hegemonic power of England, the most important gold standard country [Eichengreen, 1988a]. Thus, a persistent theme in the literature on the international gold standard is that the classical gold standard 1880-1914 was a British managed standard [Bordo, 1984]. Because London was the center for the world's principal gold, commodities, and capital markets, because of the extensive outstanding sterling-denominated assets, and because sterling was used as an international reserve currency (as a substitute for gold) by many countries, it is argued that the Bank of England, by manipulating its bank rate, could attract whatever gold it needed and, furthermore, that other central banks would adjust their discount rate to hers. Thus, the Bank of England could exert powerful influences on the money supplies and price levels of other gold standard countries.

The evidence suggests that the Bank did have some influence, although limited, on other European central banks [Lindert, 1969]. Eichengreen (1987)

views the Bank of England as engaged in a leadership role in a Stackelberg strategic game with other central banks as followers. The other central banks accepted a passive role because of the benefits to them of using sterling as a reserve asset. According to this interpretation, the gold standard rule may have been enforced by the Bank of England.[33] Thus, the monetary authorities of many countries may have been constrained from following independent discretionary policies which would have threatened the adherence to the gold standard rule.[34]

Finally, an additional way in which England passively may have helped enforce the rule stems from the fact that many developing countries joined the gold standard in order to have access to the London capital market. Once on the standard, such countries feared the consequences of departure.[35] The benefits to England as leader of the gold standard -- from seigniorage earned on foreign-held sterling balances and from returns to activities generated by England's central position in the gold standard -- were substantial enough to make the costs of not following the rule extremely high.

V. The Lessons from History

The history of the gold standard suggests that the gold standard as a rule was followed continuously by only a few key countries -- the best example being England from 1821 to 1914. No other major country was so successful. Most major countries, however, did follow the rule during the heyday of the classical gold standard 1880-1914. Peripheral countries and several fairly important nations -- Italy and Argentina -- followed the rule in name only.

The gold standard rule also proved to be successful as a commitment mechanism for England and the U.S. in preventing default on debt and ensuring that paper-money issues were not permanent. It may have been successful as a commitment device because it had the virtues of being simple and transparent.

Our survey does not definitively explain why the gold standard was so durable in some countries and not in others. However, we will attempt some conjectures.

Our first conjecture is the importance of political stability. This has two aspects, external and internal. Countries faced with external instability -- threatening wars -- abandoned gold convertibility to finance military expenditures with paper-money. As we argue above, as long as convertibility was restored after the war, abandoning convertibility was consistent with the rule.[36]

Countries plagued with unstable internal politics also found it difficult to maintain convertibility. As discussed above, a key element of the commitment to the gold standard rule was the reputation of the gold standard itself. It is no accident that the gold standard emerged in the stable political environment of England after the seventeenth century where the rule of law sanctified private contracts.[37] Gold emerged early as a way of certifying contracts. This certifying characteristic of gold carried forward to the relationship between the private and public sectors. Abandoning gold convertibility was viewed as a serious breach of contract. Only a few countries had comparable stability. Countries fraught with unstable internal politics found it difficult to refrain from running budget deficits, ultimately financed by paper-money issue (e.g., Italy and Argentina), although the benefits of convertibility likely placed some constraints on their behavior.[38]

The second conjecture is the importance of England. The advantages accruing to England as the center of the gold standard world -- the use of sterling as a reserve asset and the location in London of the world's key asset and commodity markets -- made the costs of not following the gold standard rule (except in wartime emergency) extremely high. Furthermore, because England was the most important country in the gold standard era and access to the London capital market was considered to be of great benefit to developing countries, it

is likely that many countries adhered to the gold standard who otherwise would not have, given the high resource costs of maintaining gold reserves. Also, because of the Bank of England's leadership role, other central banks may have been prevented from using discretionary policies threatening adherence to the rule.

Finally, the fact that England, the most successful country of the nineteenth century, as well as other "progressive" countries were on the gold standard was likely a powerful argument for joining. [Gallarotti, 1989; Friedman, 1990].

A comparison of the pre-1914 period with the subsequent period is of great interest. While the gold standard rule was widely upheld before 1914, it has not been since. Today we would characterize most nations as following a discretionary standard, although rhetoric over the importance of rules abounds. This may seem surprising since the benefits of having a commitment mechanism seems more relevant today than a hundred years ago. The time inconsistency literature has taught us that the widespread taxation of physical and human capital has broadened the scope for policy makers to use discretionary policies with apparent short-term benefits at the expense of substantial long-term costs. The gold standard rule was simple, transparent and, for at least 35 years, successful. Though, from the perspective of macroeconomic performance, it was characterized by some major defects, a better commitment mechanism has not been adopted. Despite its appeal, many of the conditions that made the gold standard so successful vanished in 1914 and the importance that nation states attach to immediate objectives casts doubt on its eventual restoration.

Table 1

The Financing of Wartime Expenditures in the French Wars and World War I

	A. French Wars 1793-1815 (G.B.)	B. World War I 1914-1918 (U.K.)[a]
Fraction of total wartime expenditures financed by:	(%)	
(1) Taxes	58	31.8
(2) Bonds	40.5	64.4
(3) High powered money	1.5	3.8

Sources by row: (1) 1793-1815 O'Brien (1969) Table 4. 1914-1918. Mitchell and Deane (1962) pp. 392-395, 396-398.

(2) 1793-1815 O'Brien (1969) Table 4. 1914-1918. Mitchell and Deane (1962) ibid.

(3) 1793-1815 Mitchell and Deane (1962) pp. 441-443; 1914-1918 Capie and Webber (1985) Table 1.(1)

[a]Wartime expenditures calculated as total government expenditures less 1903-1913 annual average of total government expenditures.

Table 2*

	(1) Average Differential Between Gold and Greenbacks Yield†	(2) Expected Appreciation (Current Differential Less Differential for July-December 1878)	(3) Average Actual Rate of Greenbacks Appreciation to 1881‡	(4) Appreciation Forecast Error (2)-(3)
January-June 1869	1.33	3.53	2.00	1.53
July-December 1869	0.49	2.69	1.85	0.84
January-June 1870	-0.52	1.68	0.93	0.75
July-December 1870	-0.42	1.78	0.93	0.85
January-June 1871	-1.01	1.19	1.09	0.10
July-December 1871	-0.95	1.25	1.10	0.15
January-June 1872	-0.02	2.18	1.26	0.92
July-December 1872	0.01	2.21	1.40	0.81
January-June 1873	-0.09	2.11	1.90	0.21
July-December 1873	-0.26	1.94	1.39	0.55
January-June 1874	-0.65	1.55	1.60	-0.05
July-December 1874	-0.45	1.75	1.50	0.25
January-June 1875	0.07	2.27	2.36	-0.09
July-December 1875	0.09	2.29	2.30	-0.01
January-June 1876	-1.19	1.01	2.50	-1.49
July-December 1876	-1.07	1.13	1.76	-0.63
January-June 1877	-1.22	0.98	1.36	-0.38
July-December 1877	-1.21	0.99	0.84	0.15
January-June 1878	-1.32	0.88	0.40	0.48
July-December 1878	-2.20	0.00	0.10	0.10

† $\frac{1}{6}\sum_{j=1}^{6}[1_{ap}(j)-1_{gr}(j)] = d.$

‡ The average of monthly exchange rate closings for the period was used to measure the current gold price of greenbacks. The 6s of 1881 were redeemable June 1, 1881.

Source: Calomiris (1985).

*This is Table 5 from Calomiris (1988).

FIG. 1: London Exchange Rate on Hamburg

Monthly, 1797-1821

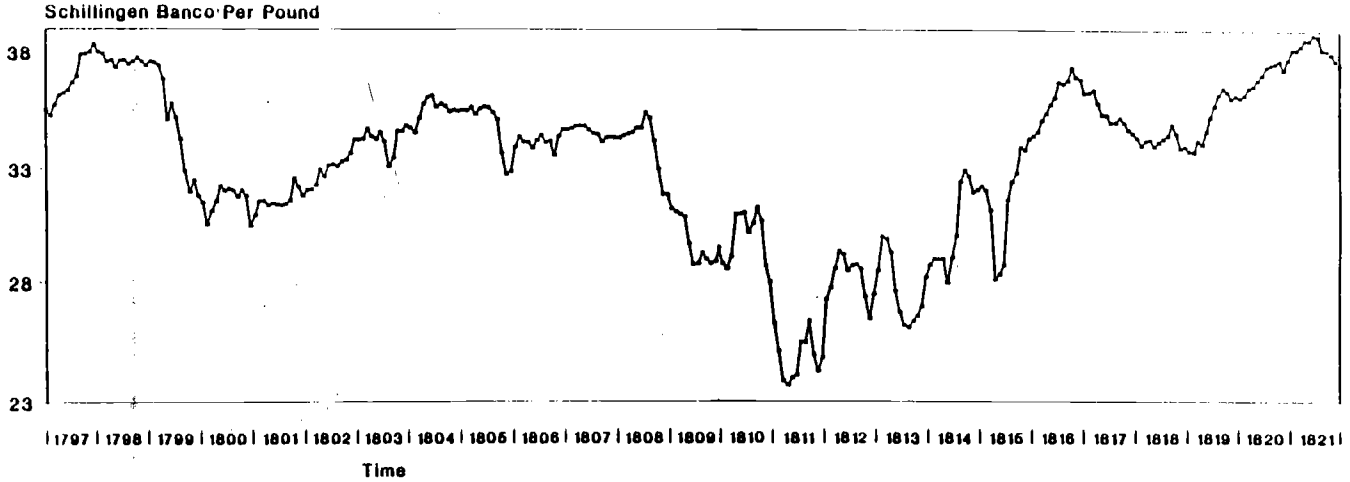


FIG. 2: Dollar/Sterling Exchange Rate

Monthly, 1914-1925

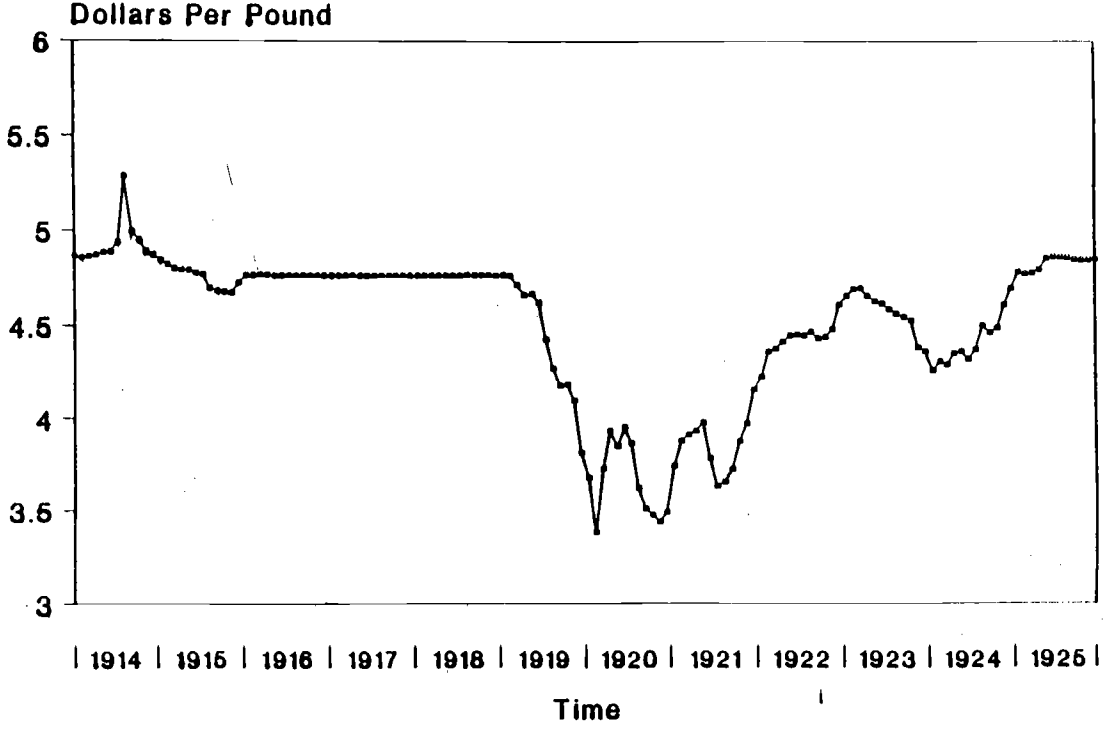
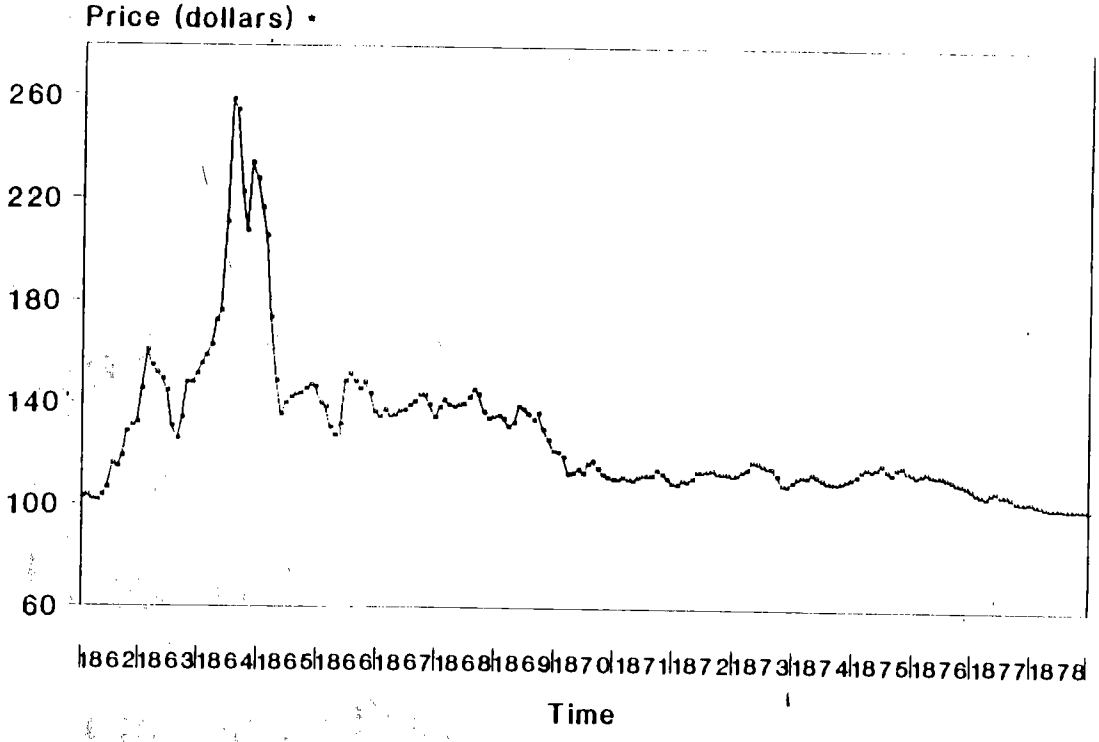


FIG. 3: Price of Gold in Greenbacks

Monthly, 1862-1878



• Price of $100 in gold in greenbacks.

Data Sources

Figure 1. Gayer, Rostow and Schwartz (1953).

Figure 2. Federal Reserve Board, *Banking and Monetary Statistics* (1944).

Figure 3. Friedman and Schwartz (1963).

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ENDNOTES

[1]For surveys of this literature see Bordo (1984) and Eichengreen (1985, 1989).

[2]See Bordo (1981), Cooper (1984), Meltzer and Robinson (1989).

[3]For a discussion of the Currency Banking School debate see Viner (1937), Fetter (1965), and Schwartz (1987).

[4]In the main example of Kydland and Prescott (1977), time inconsistency arises in an environment in which tax policy affects the incentives for capital accumulation.

[5]The idea that reputation may support optimal policy has been studied in a different context by Barro and Gordon (1983).

[6]Strictly speaking, the government need only define a gold coin in terms of the unit of account. Private mints could then supply the demand for coin. Indeed, this was the case shortly after the California gold discoveries. [Bancroft 1890, p. 165]. In most countries, however, the mint was under government authority.

[7]Viewed, however, as a rule in the traditional sense -- as an automatic mechanism to ensure price stability -- bimetallism may have had greater scope for automaticity than the gold standard because of the additional cushion of a switch from one metal to the other. See Friedman (1990). Garber (1986) regards bimetallism as a gold standard with an option.

[8]Goodfriend (1989) describes how the evolution of contractual arrangements in the financial system in eighteenth and nineteenth century England had to overcome the problem of fraud. Private markets developed an elaborate system of monitoring financial arrangements, but ultimately convertibility into gold lay behind them.

[9]An additional source of discretion was government policies to regulate gold production, such as taxation, the enforcement and relaxation of environmental regulations, and subsidies to encourage gold production in periods of depression. For examples of the use of such policies, see Rockoff (1984, pp. 632-639).

[10]McKinnon (1989, Chapter 3), however, views the Bretton Woods system as a dollar standard which incorporated many of the features of the classical gold standard.

[11]Even under the pre-1914 gold standard, however, weight mattered for sovereigns. Bankers had tiny scales for weighing sovereigns, which might be credited at less than twenty shillings. Loss on light gold was clearly a consideration for George Rae, himself a leading banker at the time, in *The Country Banker*, 1885, Letter XIX. (Our thanks to Leslie Presnell for bringing this to our attention).

[12]By contrast to England, in medieval France and Burgundy, monetary authorities often would change arbitrarily the face value of silver coins to raise revenue -- a discretionary breach of the rule -- a policy which would succeed until the public caught on, raising prices in proportion to the change in unit of account.

[13]One interpretation of England's early abandonment of bimetallism is continuous difficulties encountered in providing a fractional silver coinage. [Redish, 1990]. Alternatively, Lord Liverpool's decision to adopt gold may have been strongly influenced by Ricardo's (1819) belief that technical change in silver mining would lead to a massive increase in its supply. See Friedman (1990).

[14]Though the Bank of England was a private institution until 1946, we treat its policies as not independent of the wishes of the government. The government had two powerful checks over the Bank: periodic renewal of its charter, and its role as the government's banker. For a contrary view, see Gallarotti (1989).

[15]In interpreting this exchange rate, adjustments have to be made to allow for the Hamburg currency being on silver and sterling effectively on gold, as well as the interest charge implicit in the prices of bills of exchange used to derive the series. As Ricardo pointed out, when account is taken of these factors, the Hamburg exchange rate understated the depreciation of the Bank of England note in terms of gold (Fetter, 1965, p. 28).

[16]The Order in Council of February 26, suspending the specie convertibility of Bank of England notes, recommended resumption by June 24, 1797.

[17]The report's exact words were:

> "...Your Committee would suggest, that the restriction on cash payments cannot safely be removed at an earlier period than two years from the present time; but your Committee is of the opinion, that early provision ought to be made by parliament for terminating, by the end of the period, the operation of the several statutes which have imposed and continued that restriction." [1978] [1810, cclxi]

It went on to stress that, even if peace came in less than two years, two years should be allowed for resumption because of the increase likely, with increased mercantile activity on the coming of peace, in demands on the Bank for discount. But, "even if the war should be prolonged, cash payments should be resumed by the end of that period" [of two years from the date of the Report]. [ibid]

[18]The debate referred to as "the Bullionist debate" pitted the Bullionists, who blamed the depreciation of the pound on the excessive issue of Bank of England notes, against the anti-bullionists, who attributed the depreciation to extraordinary wartime foreign remittances and other real factors. See Laidler (1987) and Viner (1937).

[19]According to Neal (1989), the Bank was opposed to resumption after hostilities ceased because it feared the loss of its gold reserves as capital was repatriated to the continent.

[20]Initially, resumption would be at £4, 15s, 0d on gold bars. The price would then be reduced in stages and the terms extended finally to include coin at mint par of £3, 17s, $10\frac{1}{2}$d. (Clapham, 1944, p. 71).

[21]The Bank Charter Act was criticized on two grounds: (1) the currency principle ignored the role of deposits as an increasingly important component of the money stock; and (2) the Banking Department in operating on a sound commercial banking basis could not act responsibly as a central bank. The latter criticism was at the heart of the traditional case for "discretion." This criticism culminated in the 1860's with the formulation by Walter Bagehot, the influential editor of the *Economist*, of the "responsibility doctrine" and the establishment of guidelines for a central bank under a gold standard. [Bordo, 1984, pp. 45-46].

[22]On all three occasions, the Treasury issued a letter allowing the Bank to expand its fiduciary issue but only in 1857 did it actually do so. On the other two occasions, just the announcement was sufficient to allay the panic. [Clapham, 1944, Vol. II, pp. 208-209.]

[23]The contribution of high-powered money to the finance of wartime expenditure is a lower-bound estimate of the contribution of money to wartime finance since in both episodes the banking system participated in the operation.

[24]See Pollard (1970) editor's introduction and especially the articles by Brown (1929), Sayers (1960) and Hume (1963).

[25]Smith and Smith (1988) view resumption in 1925 as an example of a stochastic-process switch. Their numerical estimates suggest that, contrary to some contemporary views, the appreciation of sterling prior to April 1925 appears to have been due to fundamentals, such as restrictive monetary policy, rather than to the expectation of a change in regime.

[26]According to Calomiris (1988), following Mitchell (1903) and Roll (1972), the pace and timing of resumption depended solely on fiscal news -- legislation and policy announcements affecting the government's budget. Rolnick and Wallace (1984) also view interpretation of this episode as dependent only on overall government fiscal expectations.

[27]Garber and Grilli (1986) present estimates of silver risk in the yields of dollar-denominated assets in this period. Also see Garber (1986) for estimates of the value of the silver option on bimetallic bonds.

[28]The U.S., unlike the British example comparing World War I to the French Wars, financed a smaller fraction of its expenditures in World War I by debt and fiat money issue than in the Civil War. The fractions are:

	A. Civil War 1861-1865	B. World War I 1917-1918
	%	
Fraction of wartime expenditure financed by:		
(1) Taxes	21	43
(2) Bonds	61	51
(3) High-Powered Money	18	4

Sources: 1861-1865 Friedman (1952)
1917-1918 Walton and Rockoff (1989), p. 443

[29]According to Pope (1989), private bankers in Australia strictly enforced the gold standard rule in the absence of a central bank. For Canada's similar experience, see Rich (1989).

[30]See Eichengreen (1985, p. 5) for a chronology of countries adopting gold.

[31]For a counterview, see Giovannini (1986).

[32]Alternatively the gold devices could be interpreted as an effort to strain every nerve to *avoid* abandoning convertibility.

[33]According to Eichengreen (1989b) the Bank of England's ability to ensure convertibility was aided by cooperation with other central banks. In addition, as mentioned above, belief based on past performance that England attached highest priority to convertibility encouraged stabilizing private capital movements in times of threat to convertibility such as in 1890 and 1907.

[34]According to Giovannini's (1988) regressions, the French and German central banks adapted their domestic policies to external conditions whereas the British did not. This can be interpreted as evidence for British management.

[35]See Eichengreen (1989b, p. 17) and Fishlow (1987, 1989).

[36]Grossman's (1990) interpretation of the historical record, though emphasizing different factors, is in accordance with this view. Thus, according to him, the ratio of government debt to gross national product increased during major wartime episodes in Britain and the U.S. from the mid-eighteenth century until after World War I, reflecting intertemporal substitution. Such borrowing represented a temporary effort to shift resources from the future to the present. Following each war, the ratio of debt to income would then be reduced by contractionary fiscal policy accompanied by deflationary monetary policies that maintained the real rate of return on outstanding bonds. According to Grossman, such a policy was an investment in the credibility capital of the sovereign borrower -- a reputation for responsible repayment of the principal and for preservation of the real value of interest payments that enhanced the probability of being able to borrow heavily again at favorable rates in the event of a future war.

[37]According to North and Weingast (1989) this process was complete by the Glorious Revolution of 1688. After that date capital markets developed in an environment free of the risk of sovereign appropriation of capital.

[38]An alternative and complementary explanation to that offered in this paper relates to political economy considerations and the distribution of income. The configuration of political interest groups in the nineteenth century was favorable to the hard-money pro gold standard rule position. This may have been related to the more limited development of democracy and less than universal suffrage. Thus a comparison of the debates over resumption in England 1797-1821 and the U.S. 1865-1878 suggests that the more limited suffrage in England in the early period served as a brake on the soft-money forces favoring permanent depreciation. In the U.S. case, the soft-money forces favoring redistribution of income to debtors and other groups (e.g., Midwestern manufacturers) almost carried the day.