THE BELMONT-MORGAN SYNDICATE AS AN OPTIMAL INVESTMENT BANKING CONTRACT

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ABSTRACT

This paper represents an application of theories of speculative attacks on fixed exchange rate regimes and of optimal investment banking contracts to the Belmont-Morgan syndicate of 1895. This syndicate contracted to supply gold to the U.S. Treasury and to bear the risk of maintaining a fixed exchange rate for six months. Our purpose is to determine the extend to which such simple theories can elucidate both the events of that period and the features of the Belmont-Morgan contract.

RESUMEN

Este trabajo es una aplicación de las teorías sobre ataques especulativos en contra de un régimen de tasas de cambio fijas y de las teorías sobre contratos óptimos en la banca de inversión (investment banking) al sindicato Belmont-Morgan de 1895. Este consorcio firmó un contrato en el que se comprometía a entregar cierta cantidad de oro al Tesoro Americano y a intervenir en el mercado de cambios fijando la tasa de cambio durante seis meses. Nuestro propósito es investigar en qué medida las teorías mencionadas pueden aclarar los sucesos de la época así como las características específicas del contrato Belmont-Morgan.

1. Introduction

The Belmont–Morgan Syndicate provided the temporary institutional arrangement to preserve U.S. adherence to the gold standard in 1895. From February to September, 1895, the syndicate underwrote a large issue of U.S. bonds, delivered the proceeds in gold coin to the Treasury, part of which was imported from Europe, and guaranteed the Treasury against gold withdrawals by massive intervention in the exchange markets.

The deal between the syndicate and the Treasury has been treated as a curious episode in the long transition to a complete U.S. commitment to a permanent gold standard. However, the Belmont–Morgan contract presents the researcher with a rich blend of several concepts, each of which represents an important line of current research.

First, the episode occurred in an environment of imminent collapse of the U.S. gold standard; the triggering mechanism for the contract was the massive speculative attack on U.S. gold stocks in January, 1895. Since the attacks themselves were generated by the monetization of silver under the Sherman Silver Purchase Act of 1890, the analysis of the timing of the attacks fits naturally into current models which study the timing of speculative attacks against fixed exchange rate systems and of monetary regime switches.

Second, since the government bonds were payable either in gold or in silver coin, a collapse of the gold standard, which would entail further payments in silver rather than in gold coin, would have represented a partial repudiation of the foreign (and domestic) debt. Much recent literature has considered the problem of contractual constraints on the debt instruments of

a government which may default on its debt.[1] The Belmont-Morgan contract, whose provisions were aimed at preventing such a default, provides an explicit example of the optimal contracting considerations that may arise in the presence of possible default.

Third, recent finance literature on the behavior of investment bankers underwriting risky securities issues has derived implications for the institutional features required of an optimal underwriting contract.[2] However, application of these results has been hampered because of the difficulties in specifying the stochastic environments facing particular issuers of securities and because the source of the objective functions of the risk averse firms and investment bankers is not transparent. The Belmont-Morgan contract provides an example in which the provisions of the contract, the objectives of at least one contracting party, and the stochastic environment are observable.

This paper represents an application of theories of speculative attacks on fixed exchange rate regimes and of optimal investment banking contracts to this piece of history. Our purpose is to determine the extent to which such simple theories can elucidate both the events of that period and the features of the Belmont-Morgan contract. We will provide a uniform explanation consistent with current theories.

In the paper, we outline the laws restricting the behavior of the Treasury and defining its objectives and the historical context of the Belmont-Morgan Syndicate; and we describe the provisions of the contract. We provide a theory of government and syndicate behavior which implies that the

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[1] See Sachs & Cohen (1982), Eaton & Gershovitz (1984).

[2] See Mandelker & Raviv (1977) , Baron (1979), Baron & Holmstrom (1980)

qualitative features of the contract were optimal given the constraints on the Treasury and the stochastic environment. We show how to derive the magnitude of spread, size of issue, the fixed price guaranteed the government for the bond issue, and the gold imports which the nature of the environment requires in an optimal contract. In so doing, we have to answer questions like: "Why will an international syndicate of banks underwrite a bond issue of a potentially defaulting government?"; "How will expectations about regime switching, i.e. the collapse of the gold standard, affect the terms of the contract?; "What are the costs and the benefits for a syndicate and a government in entering a loan contract?"; "Why does the syndicate offer the government an option on the nature of the bonds to issue?"; "Why establish a free line of credit to the government?".

2. Legal Constraints on Treasury Finance Operations

In attempting to finance the maintenance of the gold standard, the Secretary of the Treasury was restricted by a set of laws which had been established in several different economic environments. In this section we will review the content of the laws relevant to our discussion. Page references indicate where the text of the laws can be found in Dunbar (1893).

By acts of March 3, 1853, Section 9 (p, 149) and March 3, 1881 (p. 219), the Treasurer could expend excess government funds by discretionary bond redemption and purchases at market prices. In particular, this act provided the authority to reduce the government debt when the budget was in surplus and allowed the recirculation of legal tender money paid in as revenue.

Under the Public Credit Act of March 18, 1869 (p. 202), the Treasury was committed to pay interest and principal of all U.S. debt in coin of the current standard metallic content. Since "coin" meant either legal tender gold or silver coin, U.S. bonds contained a government option to pay in either metal at the discretion of the Treasury. Such bonds were referred to as "coin" bonds; and by the 1870's all outstanding bonds were coin bonds. The U.S. government never circulated bonds payable only in gold in the 19th century.

The laws regulating the convertibility of U.S. paper money began with the Resumption Act of January 14, 1875, (pp. 214-215). The law prescribed that the Treasury would redeem the legal tender paper money called U.S. Notes (greenbacks) in coin after January 1, 1879. At the time, "coin" meant standard U.S. gold coins, since the standard silver dollar was removed from the list of coins with unlimited legal tender by the Act of February 12, 1873, Section 15 (p. 242). By 1878, the Bland-Allison Act had restored the coinage and the unlimited legal tender status of the standard silver dollar. Since "coin" then meant either gold or silver coins at the time of the resumption of convertibility, the Treasury had the legal option to redeem U.S. Notes either in gold or in silver.

To guarantee coin convertibility, the Treasury was empowered by the Resumption Act to use surplus government funds for note redemption or to issue at not less than par in coin "to the extent necessary for the provision of the act" any of the classes of bonds authorized in the Refunding Act of July 14, 1870, (pp. 205-208). The principal and interest of all of these bonds were payable in coin "at the present (1870) standard". The bonds

prescribed in the 1870 act were a 10 year, 5% coupon bond, a 15 year, 4.5% coupon bond, and a 30 year, 4% coupon bond, all with interest payable semi-annually. Payments on these bonds were exempt from all taxes.

In an Act of May 31, 1878, the Treasury was forbidden from cancelling or retiring any of the U.S. Notes (greenbacks) then outstanding. The notes, after receipt, had to be reissued and maintained in circulation. Since the reissuing of the notes could occur only through normal expenditures, in times of budget surplus, the Treasury might legally accumulate a stock of U.S.-Notes if it did not redeem outstanding bonds or deposit the notes in banks. By this law the stock of U.S. Notes, including the part held by the Treasury, was frozen at $346.7 million for the remainder of the century.

In addition to restoring the unlimited legal tender status and coining of the silver dollar, the Bland-Allison Act of February 28, 1878 (pp. 246-8) provided for the circulation of silver certificates backed by silver coin deposits. Though the coin deposits were themselves legal tender, the certificates were not, though they were receivable at face value for customs and taxes. In addition, the Bland-Allison Act forced the Treasury to purchase each month from $2 million to $4 million in silver at market prices to be coined into silver dollars.

In an Act of July 12, 1882, Section 12 (p. 223), the Treasury was authorized to issue gold deposits in return for gold certificates. All the deposited coin was to be retained as full backing for the certificates and paid on demand to the certificate holders. Though not legal tender, the certificates were receivable in payment of customs and taxes and associations of national banks were required to receive them in the clearing of clearinghouse balances.

By this act, the Treasury was required to suspend the issue of new gold certificates whenever the coin and bullion reserve available for the redemption of U.S. Notes fell below $100 million. This is the only legal prescription of a minimum gold reserve to back U.S. Notes. Though it legally triggered only a suspension of gold certificate issue, subsequent Secretaries of the Treasury interpreted it as a reserve limit below which some action must be taken to restore the gold backing of U.S. Notes.[3]

The Sherman Silver Purchase Act of July 14, 1890 (pp. 250-52) created yet another paper currency, the Treasury Notes of 1890, to be used in the required purchase at market prices of 4.5 million ounces per month of silver. Such purchases and money creation were to continue as long as the market price of pure silver remained less than $1 for 371.25 grains, the content of the standard silver dollar. The notes were legal tender and redeemable on demand in coin; the Secretary of the Treasury had the option to redeem the notes in gold or silver coin. The face value of the notes outstanding had to equal the cost of the silver bullion in the Treasury purchased by the notes plus the standard silver dollars in the Treasury minted from bullion bought with the notes. Such minted silver dollars were to be produced only to redeem the notes. Finally, though the silver purchase provisions of the Bland-Allison Act were repealed, the Treasury was required

[3]The judiciary committee of the House of Rapresentatives, in the report ubmitted July 6,1892, conludes as follows: "... That it was intention of the Congress to fix the minimum amount of of this reserve fund at $100,000,000 gold and gold bullion, and that it should be maintained at that sum, seems clear from the language of the act [the act of 1882]" Congressional Record, July 6,1892.

to purchase silver and to coin 2 million silver dollars per month until July, 1891.

Now there were two legal tender paper currencies partly backed by gold, the U.S. Notes and the Treasury Notes of 1890. The U.S. Notes were strictly limited in quantity, and the Treasury Notes were scheduled to grow at monthly rates which depended on the market price of silver. The Treasury had no option to cancel previously issued Treasury notes which it received in payments; it could hold them as part of its surplus funds, but it had to recirculate them in periods of budgetary deficit.

By an act of November 1, 1893, the purchase clause of the Sherman Silver Purchase Act was repealed, thereby terminating the government silver acquisition and the circulation of additional quantities of Treasury Notes of 1890. However, the outstanding notes were to remain in circulation as a legal tender paper currency convertible into gold or silver.

Finally, the law which granted the Treasury the power to contract the complicated investment banking services of the Belmont-Morgan syndicate without Congressional approval was the Act to Authorize the Purchase of Coin of March 17, 1862 (p. 166), also contained in Section 3700 of the Revised Statutes. To purchase coin, the Secretary of the Treasury was authorized to exchange any of the previously authorized bonds of the United States, at rates and terms that he deemed most advantageous to the public interest. Such issues were considered purchases of coin and not sales of bonds, and the Secretary had the power to require whatever additional services he wanted of the seller of the coin without Congressional approval.

3.An Outline of the Politics and Economics Behind the Belmont-Morgan Contract

The Belmont-Morgan contract was the outcome of a set of restrictions and requirements on the Secretary of the Treasury. It reflected a deadlocked Congress which imposed a continuing deficit. The nexus of previous laws restricting the actions of the Treasurer transformed the deficit into expansions of the fiat component of the money stock, thereby threatening the continuation of the gold standard. Since the Secretary of the Treasury also was charged with maintaining specie payments on national debt and currency conversions, the end of the gold standard implied an ultimate shift to a silver standard and a partial "default" on the national debt. These results were the goal of the silver faction which controlled a powerful block of senators and continually sought to corner the Treasury into abandoning the gold standard.

These are familiar elements in international and public finance. Priority is given to a set of domestic policies which imply a deficit which must be financed through domestic credit creation. The creation of domestic credit threatens the continued existence of a fixed exchange rate regime; and the priority of financing the expenditure and revenue policies of the government perhaps threatens the allocation of resources to finance previously incurred debt.

In this section we will present a brief history of the political and economic events of this episode. Readers seeking more details can consult Noyes (1907), Friedman and Schwartz (1963), Laughlin (1968), or Simons (1968).

The U.S. monetary instability of 1890-96 began with attempts to end the large government budget surpluses of 1886-90. Table 1 contains a time series of the U.S. surpluses and deficits for this period. Because of the nature of the monetary system, these surpluses led to the destruction of much of the fiat component of the money stock and to an increase in the gold basis of money. In particular, in managing its surplus funds, the Treasury could either absorb legal tender in its vaults, thereby directly reducing the stock of circulating paper money, or recall or purchase at market prices the outstanding stock of U.S. debt.

Table 2 contains series on the stock of interest bearing U.S. government debt, Treasury holdings of legal tender currency, and Treasury gold holdings by category for this period. Table 3 contains series of the various forms of money circulating outside the Treasury. The Treasury resorted to large scale bond redemptions. Since these were simultaneous with a contraction in the stock of bank notes, the contraction of the bank notes was associated with the surplus and it was thought that the continuation of the surpluses would soon generate monetary disturbances (see Noyes, pp. 123-26).[4]

While the government also increased its bank deposits, banks were somewhat reluctant to accept them. They were required to hold government

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[4] It is not clear why the debt reduction caused the banknote reduction. While national banks were required to deposit Treasury bonds to back their note circulation, the magnitude of the bonds outstanding never served as a binding constraint on note circulation. (see Champ, 1984) A rise in the price of the bonds associated with the purchases would make note circulation less profitable and thereby cause banks to contract the note supply. However, in an international market with freely mobile capital, it is not clear how these purchases themselves would raise prices. Alternatively, the surpluses themselves, regardless of how they were managed would signal a lower probability of a termination of gold payments, thereby raising bond prices. Thus, ending the surplus would make the Treasury bonds riskier in gold, thereby lowering their prices and ending the banknote contraction.

bonds with a face value of 1.1 times the amount of the deposit at a time when the bonds sold a high prices. Since the deposits were subject to sudden withdrawals, the returns from this transaction did not generate sufficient revenues for the risk.[5]

Political pressures in several forms arose to end the surpluses. First, there was the fear, whether valid or not, of the monetary contraction. Second, there was a coalition pressing for a protectionist tariff. Third, the silver interests wanted to maintain a large percentage of fiat in the money stock. While the Democrats sought to end the surplus simply through tariff and revenue reduction, the Republicans, who controlled the Congress and the Presidency, passed a program to end the surplus by raising a prohibitive tariff and increasing expenditure on the military, on Civil War pensions, and on public works in 1890. However, recognizing its strategic importance in the Senate, the silver block extracted the Sherman Silver Purchase Act as its price for supporting the Republican fiscal plan.

This combination of policies immediately converted the surplus to a continuing deficit, as indicated in Table 1. The coalition did not collapse until the Silver Purchase Act was repealed in the midst of the Panic of 1893. An attempt was made to end the deficit in the Tariff of 1894, but protectionist interests remained powerful enough to thwart serious tariff reductions. In the environment of depressed trade of 1894-5, the tariff still yielded insufficient revenue to end the deficit. The expenditure programs, particularly the pension increases, of course remained sacrosanct.

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[5] See Noyes, pp. 124-5, Annual Treasury Report, 1887, p. xviii, 1888, p. 19, 453, 457.

While the gold exports that one would expect with the domestic credit creation implied by the issuing of Treasury Notes were temporarily reversed by the unusual U.S. agricultural market successes in 1890 and 1891, continual gold exports began in 1892 along with a decline in Treasury gold holdings, as indicated in Tables 2b and 2c . In 1893, there were large demands on Treasury gold in exchange for legal tender notes, driving the stock backing the U.S. Notes below $100 million and forcing a suspension of the issue of new gold certificates. Effectively, the Treasury, prevented by the Congressional deadlock from financing the deficit by new bond issues, was financing the deficits by running down its cumulated stocks of legal tender and finally gold.

While the repeal of the Silver Purchase Act terminated the steady increase in legal tender paper money, it did not reduce the outstanding stock. The sum of Treasury Notes of 1890 and U.S. Notes remaining was of a sufficient magnitude such that small changes in the variables affecting money demand threatened the Treasury with a run on its remaining gold stock. For instance, the depression following the Panic of 1893 reduced money demand and led to a continued gold outflow from the Treasury in exchange for legal tenders. See Table 2 for the changes in the gold stock and legal tender holdings of the Treasury at this time. Since the Treasury deficits continued, these legal tenders had to be recirculated to finance the deficit, further threatening the gold standard.

In December, 1893, the Treasury Secretary proposed that he be authorized to issue bonds to finance the continuing deficits. Alternatively, he proposed that he be authorized to issue Treasury bills to finance the deficit on a short term basis. The deadlock in the Congress blocked the enactment

of either of these measures. Faced with the requirement that he finance the continuing deficit, the Treasury Secretary could only draw down the remaining surplus funds, including gold, in the Treasury.

The steady decline of Treasury gold holdings and occasional runs on its stock led the Secretary to invoke the provisions of the Resumption Act and offer a $50 million issue of 10 year, 5% bonds intended to restore the Treasury gold stocks in January, 1894. The issue was offered for public subscription with payment in gold coin at a price of 117.223, equivalent to a 3% bond at par. Since small quantities of these bonds were taken up, the Treasury pressured the New York banks to form a syndicate to buy the issue. However, though they paid for the bonds directly in gold, the banks quickly turned in legal tenders to the Treasury for coin. Thus, the loan, intended to expand the gold reserve, actually succeeded in removing legal tenders temporarily from circulation. As the Treasury deficits continued, the legal tenders from the bond issue were recirculated to finance them, thereby eventually threatening the gold standard once more. Thus, the bond sale provisions of the Resumption Act, intended for accumulating gold reserves to back a paper money, were used as the only means allowed to the Treasury to finance the deficit. Also, they served as a means of temporally relaxing pressure on the gold standard by briefly removing legal tenders from circulation.

By November, 1894, the Treasury's gold stock and legal tender holdings had reached levels comparable to those of February, 1894, forcing it to invoke the Resumption Act once more by offering an issue of $50 million in 10 year, 5% bonds for public subscription. Again, the gold payments for the bonds were quickly exchanged for legal tenders, so the loan simply reduced

the circulation of legal tenders temporarily. Almost immediatly, a run on the remaining gold reserve began, and in January, 1895, $45 million in gold was withdrawn from the Treasury in exchange for legal tenders.

Realizing that the finance methods authorized in the Resumption Act were not sufficient to preserve the gold standard against sudden attacks of this magnitude, the Secretary of the Treasury invoked Section 3700 of the Revised Statutes and contracted with the Belmont-Morgan Syndicate to market the next issue of bonds aimed at preserving the gold standard.

4. The Belmont-Morgan Contract and the Syndicate Operations

Through use of the Belmont-Morgan Syndicate, the Secretary of the Treasury attempted to fulfill his responsibility of preserving coin convertibility and the parity of the gold and silver dollar while satisfying all the legal constraints that hampered his actions.[6] In effect, the Treasury agreed to a large spread for the syndicate in marketing a bond issue in return for a six month line of short term, interest-free gold credit to guarantee the maintenance of its gold reserve. The Treasury was not legally authorized directly to issue short term credit instruments. However, to circumvent this restriction, it used its power under Section 3700 of the Revised Statutes to contract the purchase of coin with bonds under general terms.

We include the text of the contract, negotiated in late January and early February, 1895. Rather than a sale of bonds for gold as in the earlier

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[6] The syndicate consisted at least of Drexel, Morgan & Co., A. Belmont & Co., J. S. Morgan & Co. of London, and N.M. Rothschild & Sons of London. The identity of other members, if any, remained secret.

CONTRACT.

This agreement entered into this eighth day of February, 1895, between the Secretary of the Treasury of the United States, of the first part, and Messrs. August Belmont and Company, of New York, on behalf of Messrs. N. M. Rothschild and Sons, of London, England, and themselves, and Messrs. J. P. Morgan and Company, of New York, on behalf of Messrs. J. S. Morgan and Company, of London, and themselves, parties of the second part,

Witnesseth: Whereas it is provided by the Revised Statutes of the United States (section 3700) that the Secretary of the Treasury may purchase coin with any of the bonds or notes of the United States authorized by law, at such rates and upon such terms as he may deem most advantageous to the public interests; and the Secretary of the Treasury now deems that an emergency exists in which the public interests require that, as hereinafter provided, coin shall be purchased with the bonds of the United States, of the description hereinafter mentioned, authorized to be issued under the act entitled "An act to provide for the resumption of specie payments," approved January 14, 1875, being bonds of the United States described in an act of Congress approved July 14, 1870, entitled "An act to authorize the refunding of the national debt."

Now, therefore, the said parties of the second part hereby agree to sell and deliver to the United States three million five hundred thousand ounces of standard gold coin of the United States, at the rate of $17.80441 per ounce, payable in United States four per cent thirty-year coupon or registered bonds, said bonds to be dated February 1, 1895, and payable at the pleasure of the United States after thirty years from date, issued under the acts of Congress of July 14, 1870, January 20, 1871, and January 14, 1875, bearing interest at the rate of four per cent per annum, payable quarterly.

First.—Such purchase and sale of gold coin being made on the following conditions:

(1) At least one-half of all coin deliverable hereunder shall be obtained in and shipped from Europe, but the shipments shall not be required to exceed three hundred thousand ounces per month, unless the parties of the second part shall consent thereto.

(2) All deliveries shall be made at any of the subtreasuries or at any other legal depository of the United States.

(3) All gold coins delivered shall be received on the basis of twenty-five and eight-tenths grains of standard gold per dollar, if within limit of tolerance.

(4) Bonds delivered under this contract are to be delivered free of accrued interest, which is to be assumed and paid by the parties of the second part at the time of their delivery to them.

Second.—Should the Secretary of the Treasury desire to offer or sell any bonds of the United States on or before the first day of October, 1895, he shall first offer the same to the parties of the second part; but thereafter he shall be free from every such obligation to the parties of the second part.

Third.—The Secretary of the Treasury hereby reserves the right, within ten days from the date hereof, in case he shall receive authority from Congress therefor, to substitute any bonds of the United States, bearing three per cent interest, of which the principal and interest shall be specifically payable in United States gold coin of the present weight and fineness for the bonds herein alluded to; such three per cent bonds to be accepted by the parties of the second part at par, i. e.: at $18.60465 per ounce of standard gold.

Fourth.—No bonds shall be delivered to the parties of the second part, or either of them, except in payment for coin from time to time received hereunder; whereupon the Secretary of the Treasury of the United States shall and will deliver the bonds as herein provided, at such places as shall be designated by the parties of the second part. Any expense of delivery out of the United States shall be assumed and paid by the parties of the second part.

Fifth.—In consideration of the purchase of such coin, the parties of the second part, and their associates hereunder, assume and will bear all the expense and inevitable loss of bringing gold from Europe hereunder; and, as far as lies in their power, will exert all financial influence and will make all legitimate efforts to protect the Treasury of the United States against the withdrawals of gold pending the complete performance of this contract.

In witness whereof the parties hereto have hereunto set their hands in five parts this 8th day of February, 1895.

<div align="right">

J. G. CARLISLE,
Secretary of the Treasury.

AUGUST BELMONT & CO.,
On behalf of Messrs. N. M. Rothschild & Sons, London, and themselves.

J. P. MORGAN & CO.,
On behalf of Messrs. J. S. Morgan & Co., London, and themselves.

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Attest:
W. E. CURTIS,
FRANCIS LYNDE STETSON.

two issues, the contract was written in terms of a purchase of gold coin in
exchange for bonds to conform with Section 3700.

The bonds were the 30 year, 4% bonds authorized by the Resumption Act.
The purchase price established for the coin implied a price of $104.5 in gold
paid for the issue by the syndicate for $100 par value bonds. The yield on
these bonds was 3.75%. The par value of the bonds to be delivered for the
gold was $62.3 million, so the government was to receive $65.1 million in
coin. Alternatively, the syndicate agreed to receive 3% gold bonds at par at
the Treasury's option if Congress passed an authorization to issue such
bonds. Since Congress refused, the option was not exercized. The difference
in yields provides a measure, however, of the anticipated depreciation of the
dollar relative to gold.

The conditions of the contract specified that one half of the coin
delivered would be shipped from Europe at a rate not exceeding 300,000 ounces
per month. Therefore, the syndicate had six months to complete the contract.
The syndicate was given the right of first refusal of any additional govern-
ment bond issues until October, 1895.

Most importantly, the syndicate agreed that " so far as it lies within
their power, will exert all financial influence and will make all legitimate
efforts to protect the Treasury of the United States against withdrawals of
gold, pending the complete performance of this contract." By this clause,
the syndicate eventually undertook several operations to protect the govern-
ment gold reserve.

First, when anyone delivered legal tender in return for gold to the
government, the syndicate replaced the lost gold, assuming possession of the
legal tender. Since the legal tenders paid no interest, the syndicate would

suffer an interest loss on this operation. Ultimately, under this clause the syndicate delivered an additional $25 million in gold to the Treasury in exchange for legal tenders.

Second, the syndicate protected the Treasury against direct withdrawals by borrowing exchange on London and selling it in New York, effectively controlling the exchange market. To the extent that individuals sold legal tenders to obtain exchange, the syndicate again had to absorb the legal tenders and suffer an interest loss. For the details of this and other syndicate operations in fulfilling the contract, see Simons (1968).

If the credit line had been unlimited, there would have been no risk of capital loss from this asset position. However, the credit line was limited to "so far as it lies within their power", so some maximum extent of these additional interventions implicitly existed. Indeed, the requirement to import gold from Europe must have been a device imposed by the Treasury to guarantee the extent of the credit line immediately available for use. Presumably, the Treasury, already protected by the bond sale and the credit line, would not otherwise have worried about the source of the coin it received.

Since the credit line was limited, there was still some risk that the gold standard could collapse before the completion of the contract. Having taken an asset position in paper dollars and a liability position in gold, the syndicate then took a risk of capital loss in the event that the operation failed and the Treasury was forced to devalue the dollar.

The syndicate immediately marketed the bonds received from the Treasury at 110.46 for a total of $68.8 million. The response to the offer was large, and the syndicate distributed them to all players in the foreign exchange

market to enlist them as participants in the effort to protect the government against gold withdrawals. Since the market prices of these bonds quickly rose to 124, it seems that the syndicate distributed part of the overall spread to line up other institutions in providing the credit line to the government.

5. Modelling a Specualtive Attack on a Gold Standard

We will interpret the problem of defending the gold standard as that of defending a fixed exchange rate between dollars and pounds. The fixed parity is the ratio of the gold content of each of the two currencies. We can thus employ the theories of speculative attacks on fixed exchange rate systems to describe how the probability of the viability of the gold standard evolved during the first half of the 1890's and to explain the timing of the runs on the gold reserves of the Treasury.

Underlying the analysis is the following monetary model of the exchange rate for a small economy:[6]

(1) $m_t - p_t = \beta + \gamma y_t - \alpha i_t + w_t$

(2) $i_t - i_t^* = E_t e_{t+1} - e_t$

(3) $p_t - p_t^* = e_t$

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[6] This model has been widely used in the speculative attack literature. See Flood and Garber (1984), Blanco and Garber (1983), Obstfeld (1984a,b), and Grilli(1985).

m, p, e, and y are the logarithms of the money stock, price level, exchange rate in dollars per pound, and real income, respectively. i is the nominal interest rate, and w is a stochastic disturbance. The parameters β, α, γ are all positive and E_t is the expectation operator conditional on time t information. British variables are marked with asterisks, and all variables are assumed exogenous to the exchange rate.

The model can be solved to produce the following first order difference equation in the exchange rate:

(4) $(1+\alpha)e_t - \alpha E_t e_{t+1} = h_t$

where

(5) $h_t = m_t - \beta - \gamma y_t + \alpha i_t{}^* - w_t - p_t{}^*$

In a freely floating exchange rate regime, the equilibrium exchange rate will be given by

(6) $e_t = (1/1+\alpha) \sum_{j=0}^{\infty} (\alpha/1+\alpha)^j E_t h_{t+j}$

On the other hand, in a viable fixed exchange rate system, we have $E_t e_{t+1} = e_t = e$ so that the difference equation reduces to :

(7) $e = h_t = m_t - \beta - \gamma y_t + \alpha i_t{}^* - w_t - p_t{}^*$

In a fixed exchange rate regime, the total money supply becomes endogenous and must move to compensate the fluctuations in the other exogenous variables. The fixed parity will be viable until it becomes profitable to attack it, which will happen as soon as the post-attack exchange rate is expected to exceed the given parity. It is thus crucial to calculate the shadow exchange rate, defined as the hypothetical level of the exchange rate that would prevail at time t given that a speculative attack strikes at that time. To compute this variable, it is necessary to assume the nature of the regime which will prevail after the attack. We will assume that a paper money convertible to silver is expected to be introduced after the collapse of the gold standard, though there will not be free coinage of silver. Our next step is to analyze the behavior of the money supply before and after the attack.

6. The Probability of a Speculative Attack

a. The Money Stock in the U.S. Gold Standard and After Its Collape

During the operation of the gold standard, the circulating money stock consisted of gold coins, silver coins, gold and silver certificates, bank notes, and legal tender which were composed of U.S. Notes and Treasury Notes of the 1890. We define G_t^P as the total of gold coins and gold certificates in circulation at time t and G_t^T as the gold in the Treasury not backing gold certificates. Then the money stock M_t equaled a "domestic credit" component DC_t plus a gold component, i.e. $M_t = DC_t + G_t^P + G_t^T$. Though DC_t was that part of the money stock unbacked by gold, it did have some silver backing so

it was not pure fiat. In particular, DC_t contained the legal tenders and was driven primarly by changes in those notes.[7]

We assume that the Treasury will defend the gold standard until its net gold reserves reach a predetermined minumum level, G^m, which may be negative. If an attack occurs at time t driving the Treasury to its minimum reserve level of gold, the post attack money supply backed by silver will then be $M_t = DC_t + G^m$.[8] Since the Treasury no longer undertakes open market operation in the gold market after the gold standard's collapse, the money stock at time t+j, j>0, will be $M_{t+j} = DC_{t+j} + G^m$. In a silver standard, gold is no longer part of the money supply, so $G_t{}^P$ disappears. Moreover, G^m represents that portion of bank notes and legal tender backed by gold which could not be redeemed in the collapse of the system at time t.

b. The Probability of Attack

We define

(8) $h_t{}^A = \log(DC_t + G^m) - \beta - \gamma y_t + \alpha i_t{}^* - w_t - p_t{}^*$

as the time t realization of the exogenous stochastic process driving the post attack exchange rate for the pre-1893 period under the Sherman Act. If

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[7] The gold certificates were backed 100% by gold coin deposits at the Treasury; the silver certificates were backed 100% by silver dollar deposits, thou the silver content of the silver dollar was worth less than $1. The bank notes were backed by U.S. bond and 5% legal tender deposit at the Treasury

[8] This assumes that gold money goes out of circulation at the time of the collapse. For some cases where this does not hold, see Rolnick and Weber (1984).

an attack occurs at time (t+1), the post attack exchange rate will be given by:[9]

$$(9) \quad e_{t+1}{}^A = (1/1+\alpha) \sum_{j=c}^{\infty} (\alpha/1+\alpha)^j \; E_t h_{t+j}{}^A$$

The necessary and sufficient condition for an attack to occur at time (t+1) is[10]

$$(10) \quad e_{t+1}{}^A \geq e$$

Then the probability of an attack next period is given by:

$$(11) \quad Pr(e_{t+1}{}^A \geq e) = Pr[(1/1+\alpha) \sum_{j=0}^{\infty} (\alpha/1+\alpha)^j \; E_t h_{t+j} \geq e]$$

c. The Attack of 1893

After 1890, the Sherman Act required the purchase of 4.5 million ounces per month of silver with Treasury Notes of 1890, generating a rapid growth in

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[9] The process generating the silver backed money may not be expected to be viable forever. In the case of the Treasury Notes of 1890 there was a trigger mechanism to terminate the production of additional notes when the market price of silver first reached $1 per 371.25 grains, the silver content of the standard silver dollar. Thus, the system contained an endogenously timed stochastic regime switch triggered by a first passage through a prearranged price. To see the extent of the complexities generated by an equivalent problem, see Flood and Garber (1983).

[10] We assume that there are not restrictions on the credit market, or that speculators are able to organize themselves when confronted with a profit opportunity, so that the above condition is always sufficient, independently of the process driving the overall state variable. For a discussion, see Grilli (1985).

the domestic credit component of the money supply. This increment consisted of the sum of the nominal value of the constant silver purchases under the Sherman Act and the nominal deficit. Recall that the government could not directly issue bonds to finance the deficit because of the Congressional impasse. The nominal deficit represented an increase in legal tender because of the drawing down of surplus government funds. This growth in domestic credit implied an upward trend in $h_t{}^\wedge$, thus making inevitable an eventual collapse of the system, unless the other variables in $h_t{}^\wedge$ moved in an offsetting direction or the policy changed.[11]

The probability of an attack on the gold standard, if agents anticipated no possibility that the Sherman Act would be repealed, is

$$(13) \quad \Pr\{e_{t+1}{}^\wedge \geq e\} = \Pr\{(1/1+\alpha) \sum_{j=0}^{\infty} (\alpha/1+\alpha)^j [E_t \log(DC_{t+j}+G^m) - E_t x_{t+j}] \geq e\}$$

where $x_t = \beta + \gamma y_t - \alpha i^*{}_t + p^*{}_t + w_t$.

Since we expect a high probability of attack when runs actually occur, the shadow exchange rate should approach the fixed rate at the time of an attack, such as in the spring of 1893 when the first major run occurred. These runs were halted by the repeal of the Sherman act. This entailed a change in the process generating h_t, i.e. a downward revision of the expected value of future h_{t+j} and therefore a decrease in $e_t{}^\wedge$.

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[11] This would have implied an increase in domestic output or inflation in Great Britain. However, as Friedman and Schwartz (1963, p. 104) point out, there was a deflation in Great Britain at this time.

d. From June, 1893 to February, 1895

With the repeal of the Sherman Act on November 1, 1893, the speculative buying attack temporarily halted. However, further deficit finance implied further increases in domestic credit due to the recirculation of legal tenders and a decrease in gold reserves once the legal tender paper money holdings of the Treasury had been exhausted.

The repeal of the Sherman Act, by changing the process generating the money supply, implied a change in the expectation formation about the h_t variable through the m_t term. Therefore, the probability distribution function of the shadow exchange rate and the probability of an attack on the gold standard also must have shifted. However, once we account for the switch in expectation formation, we can represent the probability of an attack for the period after 1893 exactly as in the previous section, i.e. as $\Pr\{e_{t+1}{}^B \geq e\}$ where $e_{t+1}{}^B$ is the new shadow exchange rate implied by the revised expectations about the money supply process. As in the previous case, we can reproduce the evolution of the probability of an attack and track the runs on Treasury reserves which occurred in January and December, 1894 and January and November, 1895.

7. The Bond Issue as a Signal

Starting with the attack on January, 1894, the Treasury regularly used a strategy of issuing bonds to maintain the gold standard. We will inquire why a bond issue should decrease the probability of an attack or, equivalently, increase the probability of the viability of the system.

Recall that the probability of the gold standard's survival into the next period is given by $[1 - Pr\{e_{t+1}{}^B \geq e\}]$. Since $e_{t+1}{}^B$ is increasing in $E_t h_{t+j}{}^B$, the system's survival is a decreasing function of $E_t h_{t+j}{}^B$. To reduce the probability of an attack, it is sufficient to reduce $E_t h_{t+j}{}^B = E_t \{\log(DC_{t+j} + G^m) - x_{t+j}\}$ for all j. For a given pattern of x_t, this implies a reduction in $E_t \log(DC_{t+j} + G^m)$ for all j. This can be achieved by an unexpected reduction in either DC_t or G^m.[12]

The Treasurer could reduce these variables only through bond issues. If a bond issue were subscribed in legal tenders, it would reduce DC_t and thereby the probability of an attack. We interpret subscriptions in gold as a signal of a lower G^m. Suppose that the public initially believes that the defence of the gold standard will continue until the exhaustion of the Treasury's gross gold reserves, i.e. until $G_t{}^T = 0$.[13] Then before any bond issue occurs, $G^m = 0$. A bond issue of G dollars subscribed in gold reduces G^m to $G^m = -G$. From this perspective, bond issues subscribed either in gold or in legal tenders have identical impacts on the probability of attack.

That the Treasury insisted on subscription in gold coin stemmed from the legal restrictions imposed on its power to issue bonds. In particular, the Treasury was allowed to issue bonds only to "provide for redemption" of legal tenders. Thus, it would issue bonds only to replenish gold reserves once they fell below $100 million.

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[12] We are assuming that these unexpected reductions do not alter the process driving the state variables. There is no process switching in the domestic credit creation, or, equivalently, no change in the deficit financing policy. Then the reduction in DC_t or $G_t{}^m$ implies an equal reduction an all future post-attack money supplies.

[13] $G_t{}^T = 0$ is not crucial. Any other constant would work as well. $G_t{}^T = 0$ is assumed for expositional convenience.

This bond issue strategy was used repeatedly by the Treasury from 1894 to 1896. Each new issue generated an instantaneous drop in the probability of an attack due to a reduction in DC_t or G_m. Deficit financing, however, implied an eventual rise in the probability of an attack back to the original value (ignoring movements in x_t). The probability rose by the same magnitude if deficits were paid wither by recirculating legal tenders or by expanding gold reserves. Use of legal tenders to finance the deficit increased domestic credit; use of gold reserves increased the minimum level of net reserves G^m, since G^m would have remained unchanged only if the Treasury had employed gold exclusively for the redemption of legal tenders.

8. The Belmont-Morgan Contract

Whenever the probability of an attack reached high levels, the Treasury decided to issue bonds, thus signalling either a reduction of G^m or a decrease in DC_t. This happened in January, 1894, November, 1894, February, 1895, and January, 1896. Because it was formally underwritten by an investment banking syndicate and because the Treasury contracted the defence of its gold reserve to the syndicate, the issue of February, 1895 was unique among these bond issues. In the remainder of the paper we will examine the meaning of this clause, proposing a theory which interprets the contract as the result of Treasury optimizing behavior.

As is usual in the investment banking literature, we will formalize the Principal's (Treasury) objective function and the agent's (syndicate) profit function. In this setup, we will ignore possible problems of incentive

incompatibility in the contract, assuming a Treasury ability to monitor the agent's activity and to retaliate in case of deviation from the contract.

a. The Treasury's Objective Function

We assume that the Treasury aims to minimize the probability of an attack or, equivalently, to maximize the probability that the gold standard remains viable, ie. $\max \Pr\{e_{t+1}{}^B < e\}$. From the discussion of the previous sections, this maximum is attained by choosing DC_t and G^m to minimize $\log(DC_t + G^m)$. Because of the requirements of Section 3700 of the Revised Statutes, the bond could have been subscribed only in gold, so we express this minimization problem only in terms of the net reserve minimum or

$$\min G^m$$

subject to the bond's being sold above some minimum acceptable price and to the Treasury's gross reserves' exceeding \$100 million.

It is useful to express the optimization problem in terms of the bond issue size G plus other short term debt G^c the government is willing to incur instead of in terms of G^m. The relationship between them is

$$G^m = -G - G^c$$

where we assume that the minimum level of gold reserves before the bond issue was zero. This assumption is reasonable since the previous two issues had been subsribed in legal tenders and since any gold added to reserves by these issues had been expended in deficit finance. G is the amount in dollars of the subscription, and G^c is the extent of the government's potential short

term borrowing.   While the Congress blocked the use of short term credit, the financial breakthrough made in invoking Section 3700 involved the Treasury's sudden ability to tap the syndicate's line of credit in gold. The contract then signalled Treasury access to more gold than that directly generated by the bond sale. That the Treasury, in case of necessity, would use this line of credit to defend the parity reduced the perceived G^m to the extent of the line of credit.

We interpret the clause concerning the defence of the Treasury reserves as a syndicate commitment to open a line of credit to the Treasury for the duration of the contract. It is important to note that the effect of this type of operation would only temporarily reduce G^m, since the credit line would vanish with the expiration of the contract. However, this withdrawal of credit would not adversely affect the gold standard if adverse movement in the state variables generating the demand for money had been expected to be important only for the duration of the contract, so that an unusually low G^m would be needed only for a limited amount of time.[14]

That the syndicate turned over $25 million in gold in exchange for legal tenders in excess of the amount specifically contracted indicates the existence of the line of credit. Moreover, the syndicate's direct intervention in the exchange market can be interpreted as indirect short term lending of international reserves to the Treasury to the extent that the syndicate absorbed legal tenders in this operation. Finally, after the conclusion of the contract, the Treasury was forced to another issue of bonds, revealing

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[14] Recall that during this period there were adverse seasonal conditions in the balance of payments which were expected to disappear in the harvest season.

the increase in the probability of an attack due to the expiration of the line of credit.

These two different methods of affecting G^m, long term borrowing or short term lines of credit, can be represented in Figure 1. G^c is the maximum amount in dollars of the line of credit. The lines FI1, FI2, FI3 are iso-probability loci where FI3>FI2>FI1. The iso-probability loci have slopes of -1, indicating that G and G^c have the same effect on the probability that the system remains viable.

b. The Behavior of the Syndicate

We can study the behavior of the syndicate through the following profit function:

$$(14) \quad \pi = [P(G) - P]G - I(G^c) \geq K$$

where P is the price which the syndicate pays to the government for the issue, P(G) is the expected price at which it will sell the issue to the public with P'(G)<0, and $I(G^c)$ is the expected cost connected with the provision of a line of credit with a maximum G^c with I'(G^c)>0.[15] The

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[15] We assume that the syndicate exchanges gold in return for legal tender through the credit line but that it holds the legal tenders in its vaults until completion of the contract. If it did not withdraw the money from circulation, the loan would be useless since the recirculated legal tenders would immediately be presented to the Treasury for gold. I(G^c) represents the expected opportunity cost deriving from the commitment to lend to the Treasury; it includes expected interest costs, expected capital losses from possible devaluations, and possible profits from dealing in the exchange markets.

The above expected price and cost functions are not formally derived from the behavior of markets consistent with the assumed speculative attack

G

F11 F12 F13

G^c

FIG.1

G

r_3

r_2

G_1^*

r_1

G^c
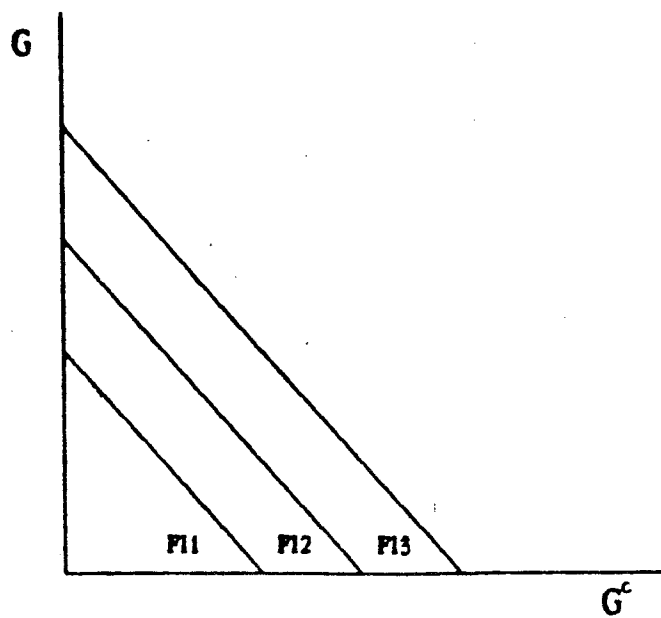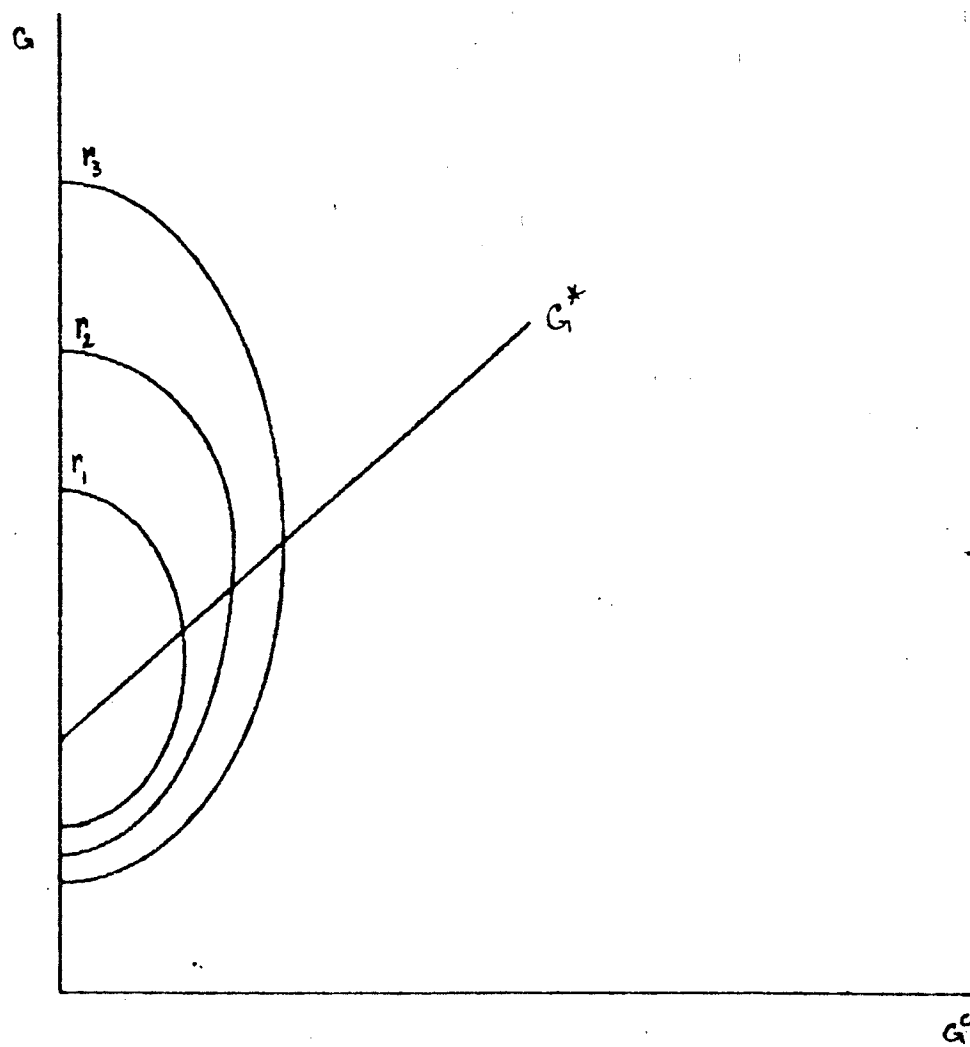
FIG.2

constant K represents the minimum level of profit that the syndicate will find acceptable for the operation, determined exogenously to the model. From (14) we can determine the price of the issue P as a function of G and G^c:

$$P = P(G) - [I(G^c) + K]/G$$

so that we can write

$$P = F(G,G^c)$$

$$\partial P/\partial G = P'(G) + [I(G^c) + K]/G^2 \; ? \; 0$$

$$\partial P/\partial G^c = - I(G^c)/G < 0$$

The derivative of P with respect to G is ambiguous due to the opposite effects of an increase in G on the total revenue of the syndicate. An increase in G, given P, will increase total revenue. However, an increase in G will also decrease P(G), thus tending to decrease total revenue. We can expect a revenue maximum, so that the increase in G will increase total revenue until a critical value G^* and decrease total revenue for $G > G^*$. However, we are also concerned with the costs arising from the line of credit. P must respond to changes in G to keep profits constant. Thus, the effect of change in G on P will depend also on the level of G^c and K. The higher is G^c, the higher will be the critical point at which the derivative changes sign. On the other hand, the derivative of P with respect to G^c is

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model. In the Appendix, we provide specifications of the price and cost functions consistent with the rational expectations assumption. However, such functions are too complicated to be fruitfully used in the anaylsis. We therefore opted for simpler, though ad hoc, functions which are reasonably consistent with the environment we specify.

always negative since an increase in G^c increases cost, so that P must decrease to maintain constant profits.

We can represent the price schedule for payments to the government as

$$P = F(G,G^c)$$

$$F_1 \gtrless 0 \quad \text{if} \quad G \lessgtr G^*(G^c)$$

$$F_2 < 0$$

This schedule is given by the syndicate to the Treasury, which chooses the combination of G and G^c to maximize the probability of the gold standard's survival, given the legal constraints.

It is more appealing to transform the price schedule into a yield cost schedule. Once we take as given the kind of bond to be issued, a 30 year, 4% bond, there is a one-to-one relationship between P and r, the yield to maturity indicated by $r=r(P)$, $r'(P)<0$.[16] Finally, we can write r as a function of G and G^c:

$$r = r(G,G^c)$$

$$r_1 \lessgtr 0 \quad \text{if} \quad G \lessgtr G^*(G^c)$$

$$r_2 > 0$$

---

[16] $P = [\sum_{j=1}^{6c} (2/1+r^*)^j] + 100/(1+r^*)^{60}$

where r^* is the six month implicit interest rate. (Recall that the coupons were paid twice a year.) There exists an inverse relationship between P and r as in the text where $r = 2r^*+r^{*2}$, the annual yield.

The schedule r(G, G^c) represents the cost, in terms of yield to maturity, of various combinations of G and G^c.

c. The Feasible Contracts Curve

In Figure 2, we depict in (G^c, G) space the yield cost function to the government as a mapping of iso-yield cost curves. A given curve represents all (G^c, G) combinations which imply a given yield for the bond issue. Here $r_1 < r_2 < r_3$.[17]

In Figure 3, we combine the iso-probability loci in Figure 1 with the iso-yield cost loci in Figure 2. The curve C represents the curve of feasible contracts, the combinations of G and G^c that achieve a given FI at the minimum yield cost.

d. The Optimal Contract

To find the optimal contract on the curve C, we must introduce the constraints faced by the Treasury, a maximum yield constraint and a minimum gross reserves constraint. The yield cost constraint assumes the simple form, $r < \hat{r} < 4\%$, since the bonds could not be sold under par.[18] In Figure 4, the shaded area represents the points that satisfy this constraint. Point A

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[17] The vertical intercept of an isocost curve must be positive since it is necessary that $G > 0$ for the syndicate to earn any profit.

[18] The size of $\hat{r}$ is given by political constraints imposed on the Secretary of the Treasury. In any case it cannot surpass the legal limit of 4%.
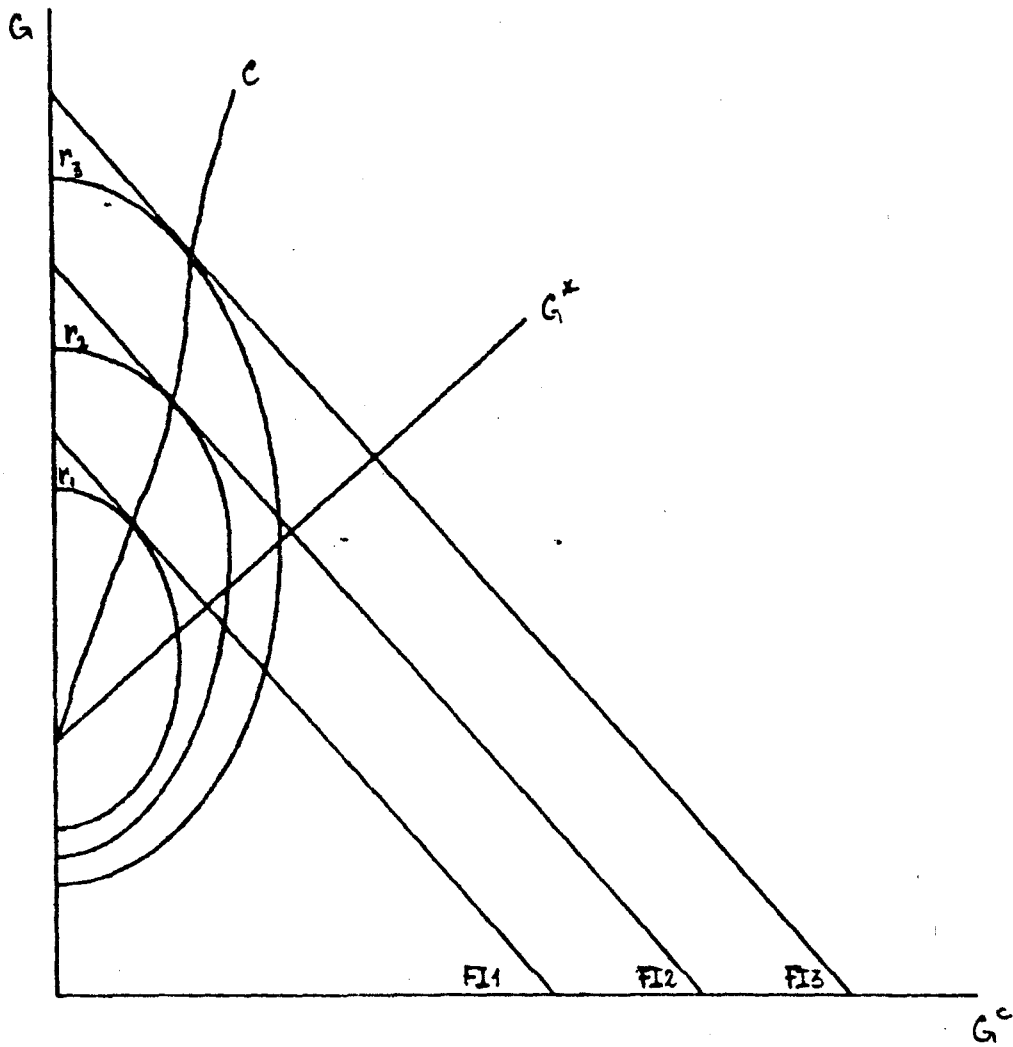
FIG.3

would be the optimal combination $(G_A, G_A{}^c)$ chosen by the Treasury, barring other restrictions. However, at a minimum, \$100 million of gross gold reserves was required of the Treasury, or $G_t{}^T > $ \$100 million. Expressed in terms of the magnitude of the bond issue, $G > [$100 \text{ million} - G_t{}^T] = G_{min}$. If $G_{min} > G_A$, we will have a corner solution, as depicted in Figure 5. The amount of the issue will be G_{min}, the line of credit maximum $G_B{}^c$, and the probability of survival FI_B. Note that the minimum gross reserve constraint, imposed to sustain the viability of the gold standard, has the effect, when binding, of reducing the probability of viability from FI_A to FI_B. That the Treasury actually chose a level $G = G_{min}$ suggests that the legal constraint was binding.

e. Other Features of the Contract

In the previous section, we provided an explanation of how the optimal size of the issue, the price at which the syndicate was willing to undertake the issue, and the optimal size of the line of credit can be determined. However, we have not explained the other features of the contract. We can summarize them as:

1. The alternative underwriting by the syndicate of 3%, 30-year gold bonds at par at the option of the government and the choice among the coin bonds of the 4%, 30-year bond instead of the 5%, 10-year bond or the 4.5%, 15 year bond. We can imagine that the syndicate computed the different price functions, $P(G)$, associated with the different characteristics of the potential bonds, following an analysis identical to that for the 4%, 30-year bond. The syndicate then offered to the Treasury these four different price
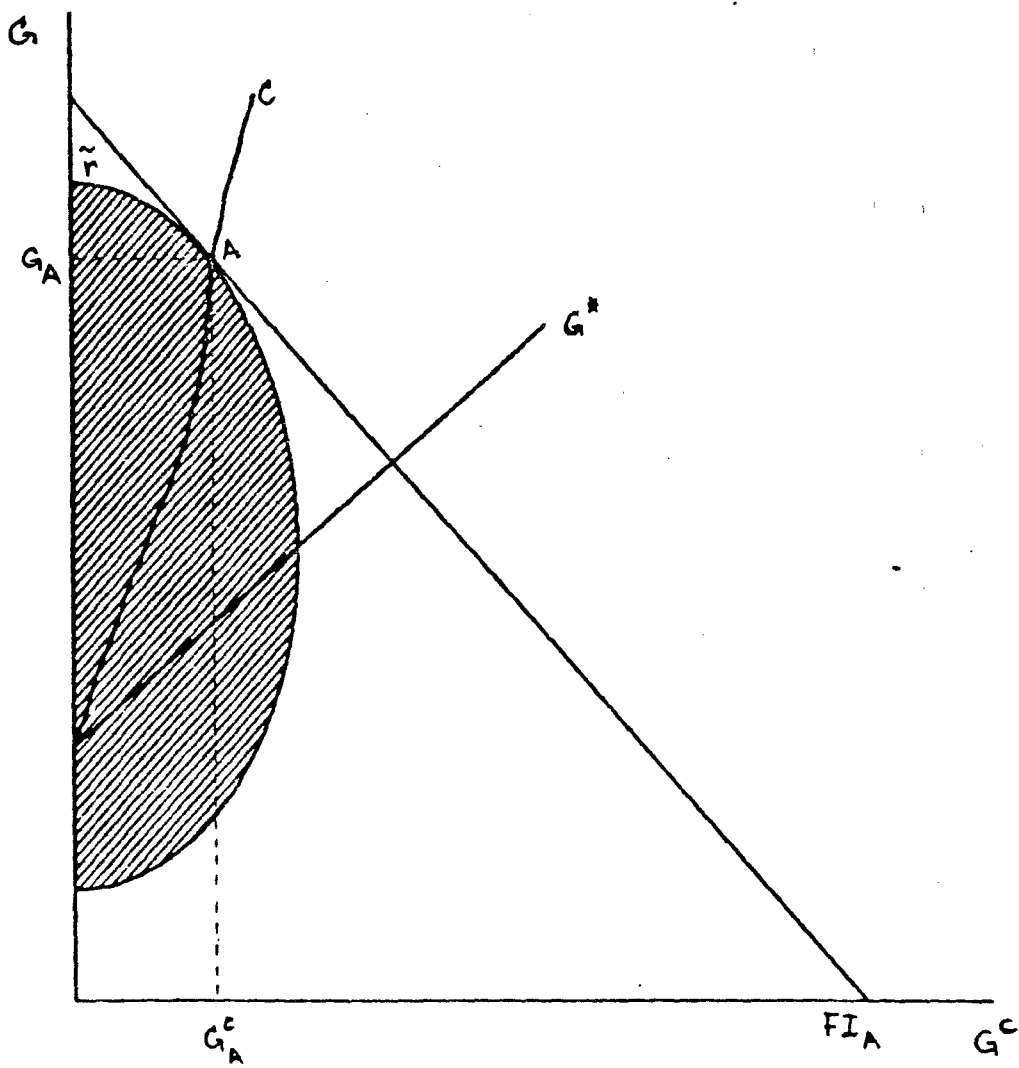
FIG.4
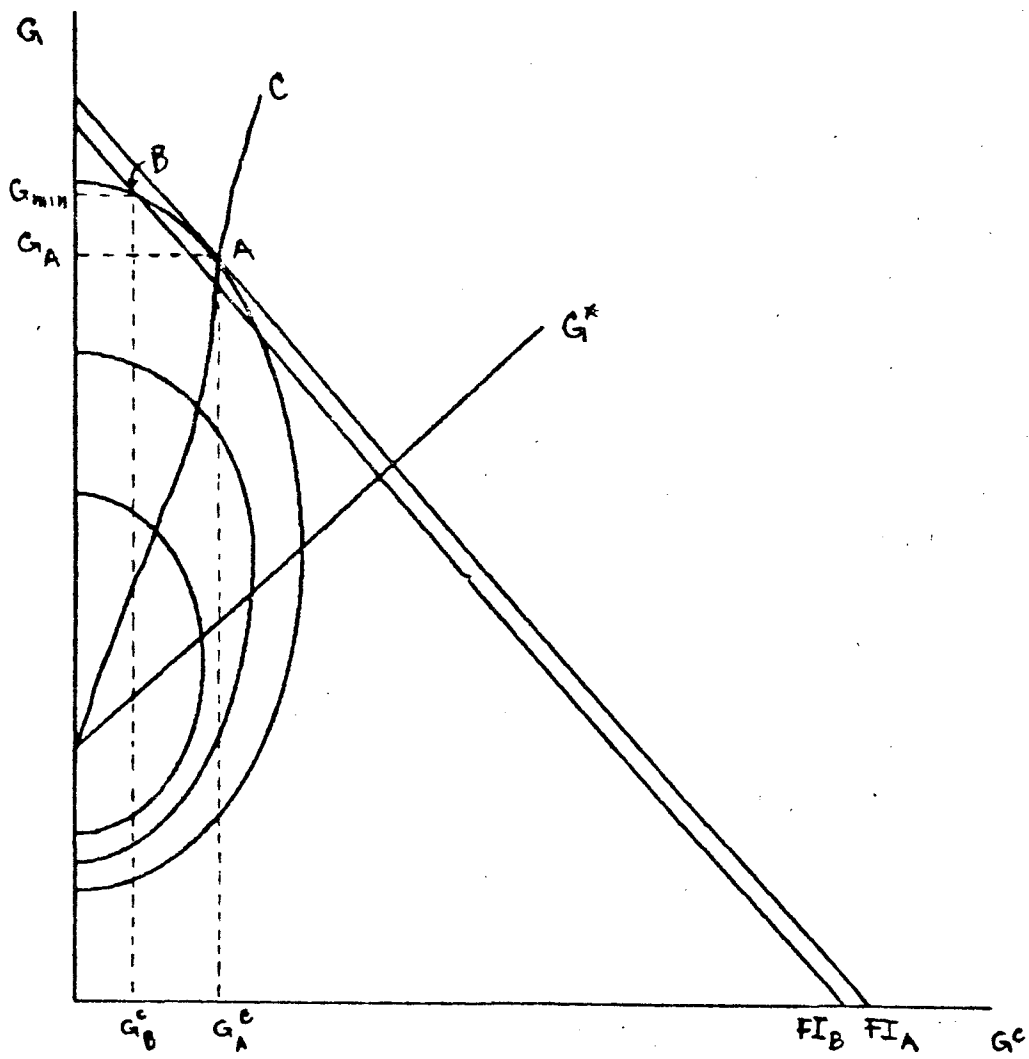
FIG.5

functions; and the Treasury, faced with four different iso-yield cost maps, solved its optimization problem by selecting the bond characteristics that maximized the probability of the gold standard's viability given the legal constraints. The optimal solution was presumably the 3%, 30-year gold bond, while the 3.75%, 30-year coin bond was a second best solution forced by the lack of Congressional approval of the gold bond.

2. Half of the gold for the subscription had to originate in Europe. As we said before, the requirement to import gold from Europe must have been a device imposed by the Treasury to guarantee the extent of the credit line immediately available for use. Presumably, the Treasury, already protected by the bond sale and the credit line, would not otherwise have worried about the source of the coin it received.

3. The duration of the contract was six months. We have explained the duration of the contract by suggesting that the adverse conditions in the balance of payments were considered temporary, with an improvement expected with the harvest season. Six months of the additional line of credit until September would have been optimal if the balance of payment perturbations had actually stopped. Presumably, the syndicate would have extracted a higher spread for a commitment of longer duration, and the six months balanced these two considerations.

4. There was an agreement that the syndicate would have first refusal of any additional bond issue by the Treasury before October 1, 1895. This feature is an option to underwrite or not obtained by the syndicate. As do all options,

it had a value which presumably could be priced. It was included in the contract because the wording of Section 3700 gave the Secretary of the Treasury the opportunity to create such a security, an act which normally would require Congressional approval. By this means, the Secretary could reduce the spread demanded by the syndicate for this particular bond issue, possibly at the price of increasing the spreads associated with future issues.

9. Summary and Conclusions

In this paper we wanted to show how theories of speculative attacks to fixed exchange rate systems and of optimal investment banking contract, could be used to produce a coherent explanation of the contract of 1895 between the U.S. Treasury and the Belmont-Morgan Syndicate. We think that the experiment is interesting because it allows us to combine economic theory and legal structure into an uniform and consitent story.

We showed how the economic environment of the early 1890's can be sensibly synthesized by using speculative attack models. This, in turn, allowed us to specify objective functions for both the U.S. Treasury and the Syndicate.

The final step has been to show how the features of the contract could be reproduced by solving a Principal-Agent optimization problem, subject to the legal and political constraints faced by the parts involved in the transaction.

APPENDIX: THE SYNDICATE PROFIT FUNCTION

In the paper, we assumed that $P(\ )$, the price of the bond issue to the public, was a function only of the size of the issue G and that $I(\ )$, the cost of the credit line, was a function only of the size of the line of credit G^c. In a rational expectations environment, however, $P(\ )$ and $I(\ )$ should depend on both G and G^c. Both the price at which the public will absorb the issue and the cost of the line of credit depend on whether and when the gold standard will collapse; and the probability and magnitude of a collapse will depend on the sizes of the issue and of the line of credit. In this appendix we will produce the price and cost function $P(\ )$ and $I(\ )$ consistent with the speculative attack environment.

1. The Price Function

In general, the price at which the public will subscribe the issue is given by

$$(A1) \quad P(G,G^c) = [1 - PV_1(G,G^c)]P(G,G^c|C_1) + PV_1(G,G^c)P(G,G^c|V_1)$$

where PV_1 is the probability that the system will be viable in period 1, $P(\ |C_1)$ is the price that investors would pay for the issue, given that the system collapses in period one, and $P(\ |V_1)$ is the price that individuals would pay if the system is viable in period one. C_i indicates the event of a collapse at time i; V_i indicates the event of a viable gold standard at time i. However, $P(G,G^c|V_1)$ will itself be a convex combination of the price that the public would pay if the system is viable in period two, and

the price it would pay if the system collapses in period 2, conditional on its viability in period one:

(A2) $P(G,G^c|V_1) = [1-PV_2(G,G^c|V_1)]P(G,G^c|C_2 \cap V_1) + PV_2(G,G^c|V_1)P(G,G^c|V_2 \cap V_1)$

where $\cap$ is the intersection operator. By repeating the same reasoning for $P(G,G^c|V_1 \cap V_2)$, $P(G,G^c|V_1 \cap V_2 \cap V_3)$, etc., until the last period of the loan, and by substituting back into (A1), we find the formula for the bond price

(A3) $P(G,G^c) = \{ \sum_{i=1}^{360} [\prod_{j=0}^{j-1} PV_j(G,G^c|\bigcap_{k=1}^{i-1} V_k)][1-PV_i(G,G^c|\bigcap_{k=1}^{i-1} V_k)]P(G,G^c|C_i \cap (\bigcap_{k=1}^{i-1} V_k))\}$

$+ \{ \prod_{j=1}^{360} PV_j(G,G^c|\bigcap_{k=1}^{j-1} V_k)P(G,G^c|\bigcap_{k=1}^{360} V_k)\}$

where 360 is the number of periods (months) in the 30 year duration of the contract.

2. The Cost Function

The cost of the credit line is composed of two parts, an interest cost and a capital loss. We assume here that the syndicate always has on hand at the insistence of the Treasury the total amount of the line of credit, so that the interest cost is computed on the maximum G^c either for the duration of the contract or until the collapse of the system if it occurs before the expiration of the contract. Thus the interest cost component will depend on the size of the line of credit, the probability of an attack, and the timing of an attack.

The capital loss is incurred only in the case of a collapse. All the

credit line G^c will be used in this event, and the attack itself will produce an instantaneous jump in the price of gold. Since the syndicate holds legal tenders as assets and gold liabilities, the capital loss will be given by the jump in the price of gold, multiplied by the amount of the credit line. The expected capital loss is then a function of the probability and timing of an attack and of the size of the devaluation produced by the attack itself.

We can write the expected cost function as

$$(A4) \quad I_1(G,G^c) = (1/1+r_1)\{[1-PV_1(G,G^c)][G^c p_g [\exp[E_t(e_{t+1}|C_1)-e]-1]+r_1 G^c] +$$

$$+ PV_1(G,G^c)[r_1 G^c + I_2(G,G^c)]\}$$

We can apply the same reasoning to $I_2(G,G^c)$:

$$(A5) \quad I_2(G,G^c) = (1/1+r_2)\{[1-PV_2(G,G^c|V_1)][G^c p_g [\exp[E_t(e_{t+2}|C_2 \cap V_1)-e]-1]+r_2 G^c]$$

$$+ PV_2(G,G^c|V_1)[r_2 G^c + I_3(G,G^c)]$$

solving for I_3, I_4, I_5, and I_6, and substituting back into (A4), we find

$$(A6) \quad I_1(G,G^c) = \sum_{i=1}^{6} \rho_i \ \{[\ \prod_{j=0}^{i-1} PV_j(G,G^c|\bigcap_{k=1}^{j-1} V_k)][1-PV_i(G,G^c|\bigcap_{k=1}^{i-1} V_k)]$$

$$[G^c p_g [\exp[E_t(e_{t+i}|C_i \cap (\bigcap_{k=1}^{i-1} V_k))-e]-1]\}$$

$$+ \sum_{i=1}^{6} \rho_i r_i G^c [\ \prod_{j=1}^{i-1} PV_j(G,G^c|\bigcap_{k=1}^{j-1} V_k)]$$

Both the price function $P(G,G^c)$ and the cost function (G,G^c) are complicated, and the derivation of an explicit solution would require a large effort, out of proportion to the benefit we expect from it. We decided to assume an "ad hoc" specification for both price and cost function, which are sensible and simple enough to generate interesting answers from the model. Though it permits a consistent, simple specification of the Treasury's side of the contract, the rational expectations, speculative attack modelling approach produces an intractable specification for the syndicate's side. Nevertheless, we consider our result as an improvement over the existing literature on investment bank contracts, where both the Principal's and the Agent's objective functions are usually "ad hoc" specifications.

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GOVERNMENT REVENUE AND EXPENDITURES (thousand $)

YEAR	MONTH	REVENUE	EXPENDITURE	SURPLUS DEFICIT (-)
1885	JANUARY	26670		
	FEBRUARY	24093		
	MARCH	26311		
	APRIL	26064		
	MAY	29609		
	JUNE	27157		
	JULY	26767		
	AUGUST	28064		
	SEPTEMBER	29971		
	OCTOBER	30834		
	NOVEMBER	25381		
	DECEMBER	25758		
1886	JANUARY	24952		
	FEBRUARY	25972		
	MARCH	31312		
	APRIL	26871		
	MAY	28047		
	JUNE	32511		
	JULY	29637	29403	234
	AUGUST	33622	28909	4713
	SEPTEMBER	31687	20583	11104
	OCTOBER	29538	19461	10077
	NOVEMBER	28086	25658	2428
	DECEMBER	28623	18484	10139
1887	JANUARY	28396	23385	5011
	FEBRUARY	29774	25485	4289
	MARCH	33358	19551	13807
	APRIL	31755	20230	11525
	MAY	33856	21823	12033
	JUNE	33071	14960	18111
	JULY	30815	35137	-4322
	AUGUST	37653	26398	11255
	SEPTEMBER	38860	18790	20070
	OCTOBER	31803	20333	11470
	NOVEMBER	29129	28254	875
	DECEMBER	29182	12770	16412
1888	JANUARY	30773	21867	8906
	FEBRUARY	31152	19898	11254
	MARCH	28868	15517	13351
	APRIL	30686	24861	5825
	MAY	32854	27457	5397
	JUNE	32491	16643	15848
	JULY	31205	36141	-4936
	AUGUST	34623	22196	12427
	SEPTEMBER	31698	19530	12168
	OCTOBER	34403	32610	1793
	NOVEMBER	28590	36397	-7807
	DECEMBER	30160	15220	14940
1889	JANUARY	34398	26554	7844
	FEBRUARY	30133	33787	-3654
	MARCH	31014	16972	14042

	APRIL	33637	22458	11179
	MAY	34431	23674	10757
	JUNE	32758	13750	19008
	JULY	31886	41999	-10113
	AUGUST	36234	36385	-151
	SEPTEMBER	31416	17411	14005
	OCTOBER	33050	28599	4451
	NOVEMBER	30717	25335	5382
	DECEMBER	29595	25821	3774
1890	JANUARY	36691	27858	8833
	FEBRUARY	30866	25060	5806
	MARCH	34778	17512	17266
	APRIL	33861	29908	3953
	MAY	36440	27287	9153
	JUNE	37547	14863	22684
	JULY	38303	39052	-749
	AUGUST	36607	36204	403
	SEPTEMBER	39804	33339	6465
	OCTOBER	40216	38036	2180
	NOVEMBER	28986	42570	-13584
	DECEMBER	34730	21596	13134
1891	JANUARY	37891	23981	13910
	FEBRUARY	29611	31725	-2114
	MARCH	29418	31491	-2073
	APRIL	27130	25331	1799
	MAY	27558	30099	-2541
	JUNE	31722	35903	-4181
	JULY	34300	39799	-5499
	AUGUST	28885	20738	8147
	SEPTEMBER	28001	23935	4066
	OCTOBER	28560	31872	-3312
	NOVEMBER	26917	27911	-994
	DECEMBER	29083	31809	-2726
1892	JANUARY	31590	35663	-4073
	FEBRUARY	30756	27482	3274
	MARCH	30049	29425	624
	APRIL	29074	31098	-2024
	MAY	29482	32662	-3180
	JUNE	31219	28941	2278
	JULY	34571	37249	-2678
	AUGUST	34033	32081	1952
	SEPTEMBER	31841	28917	2924
	OCTOBER	31836	31881	-45
	NOVEMBER	28795	30749	-1954
	DECEMBER	34778	34426	352
1893	JANUARY	35688	39253	-3565
	FEBRUARY	30010	31678	-1668
	MARCH	34438	32372	2066
	APRIL	29801	33771	-3970
	MAY	31983	30873	1110
	JUNE	30984	29266	1718
	JULY	31026	40094	-9068
	AUGUST	24057	33596	-9539
	SEPTEMBER	25290	25698	-408

GOVERNMENT REVENUE AND EXPENDITURES (thousand $)

	OCTOBER	25618	30085	-4467	
	NOVEMBER	25019	32684	-7665	
	DECEMBER	26834	30995	-4161	
1894	JANUARY	27036	32488	-5452	
	FEBRUARY [a]	24759	27823	-3064	
	MARCH	25928	32877	-6949	
	APRIL	26568	33289	-6721	
	MAY	24580	32099	-7519	
	JUNE	27645	26726	919	
	JULY	35697	37590	-1893	
	AUGUST	41050	32374	8676	
	SEPTEMBER	24217	31093	-6876	
	OCTOBER	22104	33439	-11335	
	NOVEMBER [a]	21892	29634	-7742	
	DECEMBER	23098	28247	-5149	
1895	JANUARY	29698	35937	-6239	
	FEBRUARY [a]	23101	27055	-3954	
	MARCH	25985	27007	-1022	
	APRIL	26842	34080	-7238	
	MAY	25686	29837	-4151	
	JUNE	25998	22912	3086	
	JULY	29251	39522	-10271	
	AUGUST	29309	33235	-3936	
	SEPTEMBER	28026	25225	2801	
	OCTOBER	30208	35092	-4884	
	NOVEMBER	26596	28298	-1702	
	DECEMBER	26651	26733	-82	

Year	Public debt less cash in Treasury July 1.a		Interest-bearing debt.		Annual interest charge	Interest per capita.
	Total b	Per capita	Total b	Per capita		
1800	$82,976,294 35	$15 63	$82,976,294	$15 63	$3,602,801	$0 64
1810	53,173,217 52	7 34	53,173,218	7 34	3,163,671	.44
1820	91,015,866 15	9 44	91,015,866	9 44	5,151,004	.53
1830	48,565,406 80	3 77	48,565,406	3 77	3,912,878	.15
1840	3,573,343 82	.21	3,573,344	.21	174,598	.01
1850	63,452,773 55	2 74	63,452,774	2 74	3,782,393	.16
1851	68,304,796 02	2 85	68,304,796	2 85	3,696,761	.15
1852	66,199,341 71	2 67	66,199,342	2 67	4,000,298	.16
1853	59,803,117 70	2 33	59,803,118	2 33	3,665,833	.14
1854	42,242,222 42	1 60	42,242,222	1 60	3,070,927	.12
1855	35,586,956 56	1 31	35,586,957	1 31	2,314,065	.08
1856	31,965,853 01	1 14	31,762,762	1 13	1,869,646	.07
1857	28,996,621 76	.99	28,400,959	.96	1,672,768	.06
1858	44,900,391 72	1 51	44,700,835	1 50	2,446,670	.08
1859	58,605,234 19	1 91	56,290,738	1 90	3,126,166	.10
1860	59,964,402 01	1 91	64,640,838	2 06	3,443,687	.11
1861	87,718,660 80	2 74	90,380,574	2 82	5,092,630	.16
1862	505,312,752 17	15 45	365,304,827	11 17	22,048,510	.67
1863	1,111,350,737 41	33 31	707,531,634	21 21	41,854,148	1 25
1864	1,709,452,277 04	50 21	1,359,930,764	39 94	78,853,487	2 32
1865	2,674,815,856 76	76 98	2,221,311,918	63 93	137,742,617	3 96
1866	2,630,030,163 84	74 32	2,332,331,206	65 76	146,068,196	4 12
1867	2,508,151,211 69	69 26	2,248,067,388	62 06	138,892,451	3 84
1868	2,480,853,413 23	67 10	2,202,088,728	59 60	128,459,598	3 48
1869	2,432,771,873 04	64 43	2,162,060,522	57 26	125,523,996	3 32
1870	2,331,169,956 21	60 46	2,046,455,722	53 07	118,784,960	3 06
1871	2,246,994,068 67	56 81	1,934,696,750	48 91	111,949,331	2 83
1872	2,149,780,530 25	52 96	1,814,794,100	44 70	103,988,463	2 56
1873	2,105,462,060 75	50 82	1,710,683,950	41 04	98,049,804	2 35
1874	2,104,149,153 69	49 17	1,738,930,750	40 63	98,796,005	2 31
1875	2,090,041,170 13	47 53	1,722,676,800	39 20	96,855,691	2 20
1876	2,060,925,340 45	45 86	1,710,685,450	37 90	96,104,269	2 11
1877	2,019,275,431 37	43 56	1,711,888,500	36 93	93,160,644	2 01
1878	1,999,382,280 45	42 01	1,794,735,650	37 71	94,654,473	1 99
1879	1,996,414,905 03	40 85	1,797,643,700	36 79	83,773,779	1 71
1880	1,919,326,747 75	38 27	1,723,993,100	34 37	79,633,981	1 58
1881	1,819,650,154 23	35 06	1,639,567,750	31 95	75,018,696	1 46
1882	1,675,023,474 25	31 91	1,463,810,400	27 88	57,360,111	1 09
1883	1,538,781,825 15	28 86	1,338,229,150	24 92	51,436,710	.96
1884	1,438,542,995 39	26 20	1,226,563,850	22 34	47,926,433	.87
1885	1,375,352,443 91	24 50	1,196,150,950	26 65	47,014,133	.84
1886	1,282,145,840 44	22 34	1,146,014,100	19 96	45,510,098	.79
1887	1,175,168,675 42	20 03	1,021,692,350	17 41	41,780,530	.71
1888	1,063,004,894 73	17 72	950,522,500	15 83	38,991,935	.65
1889	975,939,750 22	15 92	829,853,990	13 54	33,752,355	.53
1890	890,784,370 53	14 22	725,313,110	11 56	29,417,603	.47
1891	851,912,751 78	13 34	610,529,120	9 59	23,615,736	.37
1892	841,526,463 60	12 93	585,029,330	8 99	22,893,883	.35
1893	838,969,475 75	12 64	585,037,100	8 82	22,894,194	.35
1894	899,313,380 55	11 80	635,041,890	9 39	25,394,396	.38
1895	901,672,966 74	13 06	716,202,060	10 39	29,140,792	.42
1896	955,297,253 70	13 60	847,363,890	12 06	34,387,255	.49
1897	986,656,086 14	13 78	847,365,130	11 84	34,387,315	.48
1898	1,027,085,490 14	14 06	847,367,470	11 62	34,387,409	.47
1899	1,155,320,235 19	15 55	1,046,048,750	14 06	40,347,873	.54
1900	1,107,711,257 83	14 52	1,023,478,860	13 41	33,545,130	.44
1901	1,044,739,119 97	13 45	987,141,040	12 71	29,789,153	.38
1902	969,457,241 04	12 27	931,070,340	11 79	27,542,945	.35
1903	925,011,637 31	11 51	914,541,410	11 38	25,541,573	.32
1904	967,231,773 75	11 83	895,157,440	10 95	24,176,742	.30
1905	989,869,772 00	11 91	895,155,340	10 77	24,176,781	.29
1906	964,435,686 79	11 43	895,159,140	10 63	23,249,064	.28
1907	878,596,755 03	10 24	894,834,280	10 43	21,626,914	.25
1908	936,132,409 38	10 76	897,503,990	10 29	21,101,197	.24
1909	1,023,861,530 79	11 51	913,317,490	10 27	21,275,602	.24

a 1800 to 1849, outstanding principal of the public debt January 1; 1850 to date, outstanding principal of the public debt July 1.
b Figures for the years 1800 to 1842 include the total public debt.

GOLD IN THE TREASURY

YEAR	MONTH	AGAINST CERTIFICATE	NET	TOTAL		
1885	JANUARY	111980380	125187595	237167975		
	FEBRUARY	112683290	127346553	240029843		
	MARCH	115647540	125793257	241440797		
	APRIL	125234800	117927395	243162195		
	MAY	128553010	115810533	244363543		
	JUNE	126729730	120298895	247028625		
	JULY	123289000	126078596	249367596		
	AUGUST	123885490	126371928	250257418		
	SEPTEMBER	118137790	133113324	251251114		
	OCTOBER	109020760	142338589	251359349		
	NOVEMBER	105554092	146391486	251945578		
	DECEMBER	105359601	147991809	253351410		
1886	JANUARY	115284951	136086610	251371561		
	FEBRUARY	105637050	144164038	249801088		
	MARCH	90775643	151379525	242155168		
	APRIL	84715225	155865308	240580533		
	MAY	80120025	156304709	236424734		
	JUNE	76044375	156793749	232838124		
	JULY	74718517	158933005	233651522		
	AUGUST	77698347	157732289	235430636		
	SEPTEMBER	84691807	157917211	242609018		
	OCTOBER	88294969	158537179	246832148		
	NOVEMBER	90520633	163930220	254450853		
	DECEMBER	97215605	170912414	268128019		
1887	JANUARY	105665107	168475361	274140468		
	FEBRUARY	99958365	175130262	275088627		
	MARCH	94046015	181939848	275985863		
	APRIL	94434485	180902431	275336916		
	MAY	90960977	186667774	277628751		
	JUNE	91225437	186875669	278101106		
	JULY	94990087	186306330	281296417		
	AUGUST	88765340	193274194	282039534		
	SEPTEMBER	97984683	192717947	290702630		
	OCTOBER	99684773	202859832	302544605		
	NOVEMBER	90780753	211880526	302661279		
	DECEMBER	96734057	208608130	305342187		
1888	JANUARY	104853971	202955184	307809155		
	FEBRUARY	96697913	212869914	309567827		
	MARCH	91953949	218818253	310772202		
	APRIL	99561293	213239994	312801287		
	MAY	109581730	200301129	309882859		
	JUNE	119887370	193866247	313753617		
	JULY	131959112	194592280	326551392		
	AUGUST	124750394	206383036	331133430		
	SEPTEMBER	134838190	197713116	332551306		
	OCTOBER	140613658	191074575	331688233		
	NOVEMBER	129264228	199339134	328603362		
	DECEMBER	120888448	203885219	324773667		
1889	JANUARY	130986592	194655264	325641856		
	FEBRUARY	130210717	196245980	326456697		
	MARCH	128826517	197874422	326700939		

GOLD IN THE TREASURY

	APRIL	136614789	191589112	328203901
	MAY	129044662	192252715	321297377
	JUNE	116792759	186711560	303504319
	JULY	118541409	182218164	300759573
	AUGUST	123393519	180654670	304048189
	SEPTEMBER	116675349	189196423	305871772
	OCTOBER	120937229	187572386	308509615
	NOVEMBER	123483119	187496672	310979791
	DECEMBER	122985889	190833052	313818941
1890	JANUARY	138657169	177386285	316043454
	FEBRUARY	130604804	187988948	318593752
	MARCH	134938079	185287715	320225794
	APRIL	134642839	186235572	320878411
	MAY	130788399	190544854	321333253
	JUNE	131380019	190232405	321612424
	JULY	132444749	184092074	316536823
	AUGUST	124382539	185837581	310220120
	SEPTEMBER	158104739	147981732	306086471
	OCTOBER	138173979	156315624	294489603
	NOVEMBER	131316499	162439381	293755880
	DECEMBER	144047279	148972935	293020214
1891	JANUARY	155839449	141728097	297567546
	FEBRUARY	147119129	149712824	296831953
	MARCH	144317069	148118150	292435219
	APRIL	138890799	141742241	280633040
	MAY	122124339	133207164	255331503
	JUNE	120850399	117667723	238518122
	JULY	115715389	121113024	236828413
	AUGUST	108273079	132471409	240744488
	SEPTEMBER	112451569	132523222	244974791
	OCTOBER	136100319	127674422	263774741
	NOVEMBER	142649969	129193224	271843193
	DECEMBER	148106119	130740631	278846750
1892	JANUARY	163178959	119574905	282753864
	FEBRUARY	160001279	122122113	282123392
	MARCH	154329229	125815040	280144269
	APRIL	153713699	119909757	273623456
	MAY	157295209	114231883	271527092
	JUNE	141235339	114342367	255577706
	JULY	136861829	110444391	247306220
	AUGUST	128387379	114156316	242543695
	SEPTEMBER	121210399	119395509	240605908
	OCTOBER	120255349	124006120	244261469
	NOVEMBER	123188809	124409657	247598466
	DECEMBER	117093139	121266663	238359802
1893	JANUARY	120645819	108181713	228827532
	FEBRUARY	114388729	103284219	217672948
	MARCH	111486009	106892224	218378233
	APRIL	105272029	97011330	202283359
	MAY	101469969	95048641	196518610
	JUNE	92970019	95485414	188455433
	JULY	87611029	99202933	186813962
	AUGUST	80414049	96009123	176423172
	SEPTEMBER	79627599	93582172	173209771

	OCTOBER	78889309	84384863	163274172
	NOVEMBER	78163079	82959049	161122128
	DECEMBER	77412179	80891600	158303779
1894	JANUARY	77015419	65650175	142665594
	FEBRUARY*	70935729	106527068	177462797
	MARCH	70306909	106149136	176456045
	APRIL	69990449	100202009	170192458
	MAY	69374549	78693267	148067816
	JUNE	66344409	64873025	131217434
	JULY	65947229	54975607	120922836
	AUGUST	65668969	55216900	120885869
	SEPTEMBER	64790439	58875317	123665756
	OCTOBER	64252069	61361827	125613896
	NOVEMBER*	58925899	105424569	164350468
	DECEMBER	53361909	86244445	139606354
1895	JANUARY	52647809	44705967	97353776
	FEBRUARY*	51507769	87085511	138593280
	MARCH	48843189	90643307	139486496
	APRIL	48751009	91247145	139998154
	MAY	48539569	99151409	147690978
	JUNE	48381569	107512363	155893932
	JULY	48117579	107236487	155354066
	AUGUST	49081089	100329837	149410926
	SEPTEMBER	50645539	92911974	143557513
	OCTOBER	50417659	92943180	143360839
	NOVEMBER	50233979	79333966	129567945
	DECEMBER	49936439	63262268	113198707

NOTES IN THE TREASURY

YEAR	MONTH	U.S. NOTES	TREASURY NOTES	NATIONAL BANK NOTES	TOTAL
1885	JANUARY	43958469		13880648	57839117
	FEBRUARY	48926822		9774141	58700963
	MARCH	46683288		7312940	53996228
	APRIL	46865690		8120660	54986350
	MAY	50417109		9806087	60223196
	JUNE	45047379		9945711	54993090
	JULY	48418997		8081130	56500127
	AUGUST	55658656		7556108	63214764
	SEPTEMBER	51129332		6196408	57325740
	OCTOBER	45695341		5438241	51133582
	NOVEMBER	43290643		5775356	49065999
	DECEMBER	41731200		5347767	47078967
1886	JANUARY	47890389		9951057	57841446
	FEBRUARY	47197292		7961334	55158626
	MARCH	42214485		3392203	45606688
	APRIL	37603774		3831002	41434776
	MAY	40244098		4962150	45206248
	JUNE	41118317		4034416	45152733
	JULY	41044142		3792409	44836551
	AUGUST	46774647		2878520	49653167
	SEPTEMBER	44224081		2104764	46328845
	OCTOBER	38107305		3192746	41300051
	NOVEMBER	36573188		2522033	39095221
	DECEMBER	29679326		3012335	32691661
1887	JANUARY	33003682		4606322	37610004
	FEBRUARY	33869202		3072561	36941763
	MARCH	28294938		2558485	30853423
	APRIL	28575474		3480653	32056127
	MAY	30757376		3927245	34684621
	JUNE	28783797		2362585	31146382
	JULY	28093740		3142105	31235845
	AUGUST	28287539		3354726	31642265
	SEPTEMBER	24145212		2938593	27083805
	OCTOBER	22476067		4157980	26634047
	NOVEMBER	23153220		3131864	26285084
	DECEMBER	22409425		4919434	27328859
1888	JANUARY	28660469		7782203	36442672
	FEBRUARY	33482087		6355477	39837564
	MARCH	33085623		5323787	38409410
	APRIL	39046614		5942194	44988808
	MAY	46158200		6702811	52861011
	JUNE	52398204		7054221	59452425
	JULY	55030740		8218834	63249574
	AUGUST	56225393		7880157	64105550
	SEPTEMBER	53358963		6023307	59382270
	OCTOBER	48393320		4167954	52561274
	NOVEMBER	46562956		3381456	49944412
	DECEMBER	41125860		4068046	45193906
1889	JANUARY	43361498		5439229	48800727
	FEBRUARY	45220511		3433572	48654083
	MARCH	39501231		3054267	42555498

	APRIL	38350137		3686890	42037027
	MAY	43940387		4703087	48643474
	JUNE	46336085		4158341	50494426
	JULY	47939366		3632535	51571901
	AUGUST	48870935		4590661	53461596
	SEPTEMBER	36445258		3883721	40328979
	OCTOBER	29813501		5211415	35024916
	NOVEMBER	24959022		4251973	29210995
	DECEMBER	15673925		4500355	20174280
1890	JANUARY	19236224		6172760	25408984
	FEBRUARY	19823865		4339314	24163179
	MARCH	14579657		3937196	18516853
	APRIL	16004411		3942536	19946947
	MAY	19747799		4289295	24037094
	JUNE	23634190		4351767	27985957
	JULY	23983412		4766359	28749771
	AUGUST	19393710	2233100	5063228	26690038
	SEPTEMBER	12765290	962500	4620511	18348301
	OCTOBER	12263263	2481649	3662638	18407550
	NOVEMBER	11105720	2039144	3416944	16561808
	DECEMBER	10005631	2193717	3349587	15548935
1891	JANUARY	18355508	3702294	6320151	28377953
	FEBRUARY	18676165	4279421	4970638	27926224
	MARCH	12650818	3171227	3415237	19237282
	APRIL	14496398	4710946	4055760	23263104
	MAY	19362270	7565067	5189490	32116827
	JUNE	22966744	9765252	5655174	38387170
	JULY	26788452	11309957	5924947	44023356
	AUGUST	28984580	13937685	6822252	49744517
	SEPTEMBER	19949815	7045902	5695080	32690797
	OCTOBER	14127027	2251786	5738795	22117608
	NOVEMBER	13316707	1976366	4841754	20134827
	DECEMBER	12913665	2031045	4651152	19595862
1892	JANUARY	16583703	5514681	6028889	28127273
	FEBRUARY	24549328	9517659	4792427	38859414
	MARCH	22776054	11996788	3884496	38657338
	APRIL	21895155	11726920	4409486	38031561
	MAY	28227714	10323314	5071384	43622412
	JUNE	34866176	3660414	5376893	43903483
	JULY	34828738	3809869	5931778	44570385
	AUGUST	29132596	5268551	6623311	41024458
	SEPTEMBER	24077858	5482485	7701652	37261995
	OCTOBER	14600782	2043810	7208009	23852601
	NOVEMBER	12908139	1919154	5828486	20655779
	DECEMBER	15747476	2705967	6043059	24496502
1893	JANUARY	26986878	4019143	7768170	38774191
	FEBRUARY	32506274	5420240	5578128	43504642
	MARCH	29887702	6533367	3827111	40248180
	APRIL	26873899	10290675	5085299	42249873
	MAY	27658693	10684691	5243455	43586839
	JUNE	25805333	6528533	3982733	36316599
	JULY	22286612	4512210	3620150	30418972
	AUGUST	15012956	4461749	3157587	22632292
	SEPTEMBER	14452110	2494841	7815481	24762432

	OCTOBER	24788988	19?506	11566766	38272360
	NOVEMBER	35412344	2?3225	12808547	50904114
	DECEMBER	44139202	1194884	12357628	57691714
1894	JANUARY	47302190	2315506	14526887	64144583
	FEBRUARY*	53070488	11962418	12640479	77673385
	MARCH	56089660	11583462	10758809	78431931
	APRIL	62237328	11786958	8750439	82774725
	MAY	76090927	12605052	7520998	96216977
	JUNE	77908645	17722408	6598893	102229946
	JULY	82116791	22528599	4895465	109540855
	AUGUST	82905913	27598929	5567162	116072004
	SEPTEMBER	79397535	30113893	5017748	114529176
	OCTOBER	66206311	28425172	4970188	99601671
	NOVEMBER *	69770527	26404164	4169283	100343974
	DECEMBER	81919158	28369950	4759972	115049080
1895	JANUARY	89681673	33571316	6333175	129586164
	FEBRUARY*	84692758	36455457	5154293	126302508
	MARCH	89745257	28872489	4449893	123067639
	APRIL	79287111	27743971	4959625	111990707
	MAY	79742984	30089473	4899226	114731683
	JUNE	81571560	30109692	4643489	116324741
	JULY	75331689	31485899	5642488	112460076
	AUGUST	99144263	35058618	7600591	141803472
	SEPTEMBER	106316600	36630854	6018775	148966229
	OCTOBER				
	NOVEMBER				
	DECEMBER				

NATIONAL MONETARY COMMISSION.

—AMOUNT OF EACH KIND OF MONEY IN CIRCULATION ON THE FIRST DAY OF EACH MONTH,

Month.	Gold coin.	Gold certificates.	Silver dollars.	Silver certificates.	Subsidiary silver coin.	Treasury notes *	United States notes	Currency certificates.	National bank notes	Total.
1885—Jan......	$341,142,648	$93,287,420	$43,059,129	$114,865,911	$45,900,318	....	$310,181,441	$24,760,000	$318,828,029	$1,252,031,496
Feb	341,600,992	111,980,390	41,315,040	113,858,811	45,172,760	....	302,721,547	32,085,000	313,031,910	1,299,827,440
Mar	341,133,130	112,683,290	40,686,187	111,467,951	44,802,220	....	297,754,194	30,200,000	314,886,770	1,293,613,742
Apr......	342,727,561	115,647,540	39,998,912	112,500,226	44,387,921	....	299,997,728	26,210,000	314,905,726	1,296,375,614
May.....	342,712,570	125,234,800	39,666,360	109,443,946	44,049,389	....	299,815,326	25,400,000	312,782,045	1,299,104,436
June.....	342,763,852	128,553,010	39,264,376	105,085,186	43,272,204	....	296,263,907	26,925,000	309,055,740	1,291,185,335
July.....	341,668,411	126,729,730	39,086,969	101,530,946	43,702,921	....	301,633,637	29,585,000	309,124,222	1,293,061,836
Aug......	340,612,138	123,289,000	39,284,433	96,872,106	49,594,894	....	298,202,019	31,420,000	309,249,212	1,290,583,802
Sept.....	342,120,762	123,865,490	41,405,166	96,079,296	50,235,720	....	291,022,360	30,865,000	309,429,219	1,255,043,013
Oct......	345,985,470	118,137,790	45,275,710	93,656,716	51,325,206	....	295,551,684	23,185,000	311,228,025	1,284,346,601
Nov......	349,085,781	109,020,760	49,442,069	93,146,772	52,014,657	....	300,985,675	18,145,000	310,406,927	1,282,249,641
Dec......	355,151,306	105,554,092	50,191,413	92,702,642	47,069,977	....	303,390,373	17,555,000	311,750,452	1,283,395,255
1886—Jan......	359,629,546	105,359,601	52,541,571	93,179,405	47,203,948	....	304,949,816	13,790,000	312,095,687	1,288,749,634
Feb......	362,757,418	115,284,951	51,470,376	89,761,609	45,996,478	....	298,790,627	14,590,000	308,066,375	1,286,717,834
Mar......	361,683,821	105,637,050	51,339,855	88,390,816	46,209,527	....	299,483,724	14,920,000	310,135,171	1,277,799,904
Apr......	362,273,173	90,775,643	51,258,776	90,122,421	46,206,020	....	304,466,531	11,925,000	312,839,324	1,269,866,858
May.....	361,410,158	84,715,225	52,505,619	90,733,141	45,176,268	....	309,077,242	11,515,000	310,046,586	1,266,179,239
June.....	360,443,324	80,120,025	52,906,076	89,184,129	45,138,567	....	306,436,918	13,955,000	306,876,144	1,256,002,183
July.....	358,219,575	76,044,375	52,668,623	88,116,225	46,173,990	....	305,502,699	18,250,000	304,976,044	1,250,011,531
Aug......	359,074,385	74,718,517	54,119,362	87,564,044	46,483,799	....	305,636,874	19,105,000	303,034,348	1,249,736,329
Sept.....	364,667,768	77,698,347	56,503,829	89,021,760	47,118,920	....	299,906,369	11,195,000	301,795,484	1,248,207,477
Oct......	364,720,340	84,691,807	60,018,093	95,387,112	48,183,654	....	302,456,935	7,705,000	301,406,477	1,264,570,018
Nov......	368,190,898	88,294,969	61,148,155	100,306,800	48,790,551	....	306,573,711	7,140,000	298,337,143	1,280,782,227
Dec......	372,072,260	90,530,633	61,991,448	105,519,817	49,290,307	....	310,107,828	7,025,000	296,785,477	1,293,312,770
1887—Jan......	372,290,259	97,215,605	61,117,409	117,246,670	49,444,927	....	317,001,690	6,510,000	293,759,646	1,314,586,206
Feb......	371,729,450	105,665,107	58,539,864	118,315,714	48,789,824	....	313,677,334	8,720,000	288,468,419	1,313,905,712
Mar......	371,792,210	99,958,365	57,340,887	121,130,755	48,635,365	....	312,811,814	8,180,000	285,971,650	1,305,824,046
Apr......	373,205,462	94,046,015	56,899,818	131,930,489	48,526,710	....	318,386,078	7,135,000	284,565,770	1,314,098,342
May.....	375,241,850	94,434,485	55,783,368	137,740,430	48,452,175	....	318,105,542	8,350,000	281,524,602	1,319,632,512
June.....	377,794,496	90,960,977	55,419,623	139,143,328	48,495,501	....	315,923,640	8,990,000	278,433,647	1,315,161,212
July.....	376,540,661	91,225,437	55,545,721	142,118,017	48,583,865	....	317,897,219	8,770,000	276,855,203	1,317,539,143
Aug......	377,350,294	94,990,087	56,059,389	144,166,141	48,947,826	....	318,587,276	8,460,000	273,312,172	1,321,873,185
Sept.....	381,550,256	88,765,340	57,345,832	147,876,385	49,164,242	....	318,393,477	7,130,000	270,909,783	1,321,135,315
Oct......	391,090,890	97,964,683	60,614,524	154,354,826	50,414,706	....	322,535,804	6,535,000	269,955,257	1,335,455,690
Nov.....	392,585,770	99,684,773	62,934,625	160,713,957	51,290,051	....	324,204,989	7,215,000	267,883,723	1,366,512,388
Dec......	396,450,216	90,780,753	64,627,714	166,149,274	51,751,132	....	323,527,796	6,835,000	266,751,131	1,366,873,016
1888—Jan......	399,361,143	96,734,057	64,377,818	176,855,423	51,968,357	....	324,271,591	6,985,000	263,479,444	1,384,032,833
Feb......	396,561,926	104,853,971	62,076,977	179,321,053	51,325,993	....	318,020,547	10,645,000	258,075,954	1,352,961,421
Mar......	396,280,517	96,697,913	60,747,864	184,452,659	50,972,367	....	313,198,929	11,215,000	256,372,385	1,371,937,638
Apr......	397,745,964	91,953,949	59,418,515	191,526,445	50,767,608	....	313,595,393	8,915,000	254,847,230	1,368,770,124
May.....	398,568,122	99,561,293	58,093,396	194,426,932	50,549,654	....	307,634,402	10,555,000	252,641,851	1,372,030,650
June.....	396,379,632	109,581,730	56,511,820	196,645,405	50,470,265	....	300,522,816	12,230,000	249,106,837	1,371,448,505
July.....	391,114,033	121,094,650	55,527,396	200,759,657	50,302,314	....	293,585,040	14,415,000	245,306,780	1,372,164,870
Aug......	378,606,804	131,959,112	55,138,025	203,680,679	50,476,380	....	291,650,276	15,205,000	241,413,816	1,362,130,092
Sept.....	376,347,905	124,750,394	55,621,358	209,658,966	50,835,476	....	290,455,023	14,645,000	235,548,405	1,360,863,157
Oct......	377,329,865	134,838,190	57,959,356	218,561,601	52,020,975	....	293,322,053	12,730,000	237,578,400	1,384,340,440
Nov.....	380,016,817	140,613,658	59,801,350	229,783,152	52,571,712	....	296,287,696	11,580,000	235,217,283	1,407,871,666
Dec......	381,391,060	129,264,228	60,625,385	237,415,789	52,914,197	....	300,118,060	11,360,000	233,061,711	1,406,150,456
1889—Jan......	379,834,512	120,885,448	60,879,321	246,219,999	53,234,525	....	305,555,156	10,250,000	229,591,961	1,406,453,942
Feb......	380,116,365	130,986,592	58,574,861	245,337,438	52,440,119	....	303,319,518	13,915,000	223,829,799	1,406,519,692
Mar......	379,497,911	130,210,717	57,581,904	246,628,953	51,944,751	....	301,460,505	15,929,000	220,951,155	1,404,205,896
Apr......	378,072,380	128,826,517	56,810,339	251,263,679	51,707,112	....	307,179,785	14,450,000	218,171,864	1,406,481,676
May.....	377,407,306	136,614,789	55,747,772	254,939,203	51,622,110	....	308,330,879	14,580,000	215,009,296	1,414,251,359
June.....	376,962,858	129,044,662	54,754,317	255,537,810	51,460,545	....	302,740,629	16,150,000	210,819,900	1,397,470,751
July.....	376,481,568	117,130,229	54,457,299	257,155,565	51,477,164	....	299,704,191	16,735,000	207,220,633	1,390,361,649
Aug......	374,796,435	118,541,409	54,420,255	259,557,125	51,521,149	....	298,741,650	17,575,000	204,531,904	1,379,686,927
Sept.....	375,811,209	123,393,519	55,093,786	268,580,626	51,860,309	....	297,810,061	16,545,000	201,211,480	1,390,306,010
Oct......	375,947,715	116,675,349	57,554,100	276,619,715	52,931,352	....	310,235,758	15,275,000	199,779,011	1,405,018,000
Nov.....	375,685,071	120,937,229	60,098,480	277,319,944	53,890,881	....	316,867,515	12,510,000	196,812,000	1,414,121,120
Dec......	374,760,489	123,483,119	60,836,637	276,794,380	54,393,786	....	321,721,994	10,140,000	195,394,224	1,417,533,635

* Treasury notes issued under the act of July 14, 1890.

TABLE 3

Month	Gold coin	Gold certificates	Silver dollar	Silver certificates	Subsidiary silver coin	Treasury notes	United States notes	Currency certificates	National bank notes	Total
1890—Jan......	$375,706,102	$12,953,900	$42,652,500	$320,040,073	$54,725,670	....	$331,607,000	$9,600,000	$110,720,000	$1,620,849,935
Feb......	374,807,316	135,657,164	59,705,637	301,801,773	54,300,100	....	327,644,782	11,630,000	188,000,579	1,690,881,984
Mar......	373,807,303	130,804,804	55,550,340	304,176,372	53,986,302	....	328,657,351	10,230,000	187,608,229	1,690,104,301
Apr......	373,024,665	134,532,079	57,986,120	299,802,602	53,943,012	....	330,101,859	7,000,000	186,589,936	1,637,604,062
May......	374,310,022	134,642,639	57,194,977	292,023,345	53,	....	330,676,000	9,785,000	185,644,043	1,637,983,773
June.....	375,246,834	130,788,940	55,535,174	294,650,063	54,	....	326,033,217	9,855,000	183,360,833	1,631,193,851
July.....	374,258,023	130,532,859	56,278,749	297,853,228	54,032,887	....	322,858,077	11,630,000	181,604,937	1,639,351,770
Aug......	375,114,190	130,443,749	56,961,268	298,768,913	54,264,363	....	322,697,004	11,520,000	179,825,874	1,631,716,367
Sept.....	379,033,157	124,282,539	55,300,674	303,471,210	54,945,846	$1,375,900	327,387,300	8,930,000	178,317,260	1,636,062,942
Oct......	386,039,723	156,104,739	62,132,454	309,221,207	56,311,846	7,100,800	333,915,720	6,990,000	177,350,814	1,695,072,709
Nov......	400,376,130	125,173,979	65,709,564	305,206,177	57,641,658	11,467,821	334,417,753	6,910,000	176,063,005	1,606,997,617
Dec......	405,105,897	131,316,699	67,245,257	305,576,699	56,272,967	17,218,650	335,575,258	6,270,000	175,131,432	1,804,726,803
1891—Jan......	411,080,597	144,047,279	61,547,023	305,289,603	56,651,154	21,890,763	336,675,365	6,810,000	173,938,259	1,828,935,943
Feb......	409,441,230	155,538,440	61,618,940	303,844,000	57,723,629	25,101,700	328,325,508	11,300,000	169,301,888	1,825,736,251
Mar......	408,752,574	147,119,129	63,540,557	305,622,229	57,345,635	26,571,279	325,004,651	12,270,000	168,692,726	1,818,439,319
Apr......	408,468,550	144,317,069	62,921,010	309,032,535	57,354,002	33,921,073	334,030,196	11,145,000	165,389,827	1,830,080,464
May......	408,862,761	135,890,759	61,692,618	312,953,440	57,364,507	37,029,254	332,184,018	14,000,000	166,303,616	1,829,316,833
June.....	406,603,861	122,124,339	59,868,710	316,541,375	57,653,226	28,312,250	327,318,740	17,750,000	164,047,969	1,804,276,809
July.....	407,319,163	120,073,662	58,533,179	307,233,962	58,219,220	60,348,704	321,642,360	21,365,000	162,221,046	1,497,440,707
Aug......	407,630,012	115,715,589	58,163,879	307,291,114	57,763,464	43,694,078	319,892,564	27,260,000	162,618,112	1,500,023,612
Sept.....	405,745,325	108,273,079	58,555,697	317,588,321	58,554,648	65,748,350	317,690,436	25,455,000	164,512,087	1,500,131,973
Oct......	408,333,504	112,451,569	60,194,175	322,016,457	59,664,446	57,200,225	320,731,201	17,845,000	160,240,620	1,830,682,030
Nov......	406,770,307	135,100,219	62,135,460	321,142,642	62,100,196	60,473,454	332,853,969	10,765,000	160,645,763	1,564,692,161
Dec......	405,931,402	162,649,909	62,697,214	320,873,010	62,645,437	70,963,256	333,364,809	9,765,000	166,151,853	1,577,202,070
1892—Jan......	407,999,180	145,100,119	62,326,190	320,617,568	62,776,530	75,295,007	333,761,031	9,205,000	165,427,433	1,585,761,729
Feb......	407,633,022	163,178,959	60,216,630	320,138,307	62,415,971	76,008,319	330,097,313	10,760,000	167,176,007	1,603,853,125
Mar......	407,813,501	160,001,279	59,264,520	325,141,159	62,308,717	75,718,553	322,131,688	39,350,000	167,829,448	1,609,558,892
Apr......	407,614,416	154,329,229	58,471,743	325,653,149	62,547,654	77,601,410	325,904,472	29,840,000	166,644,955	1,608,641,520
May......	407,615,949	153,713,699	57,554,437	327,289,896	62,633,523	61,501,770	324,763,801	30,210,000	166,007,059	1,613,572,244
June.....	408,911,607	157,290,209	57,098,925	327,290,103	62,736,334	57,068,072	318,453,302	35,730,000	167,477,963	1,620,010,220
July.....	405,566,824	141,093,619	56,617,402	326,693,065	63,293,704	96,255,692	309,859,904	29,840,000	167,221,517	1,601,847,187
Aug......	410,447,360	136,861,829	57,031,802	327,336,823	63,340,937	101,750,363	311,852,276	26,720,000	166,595,935	1,601,949,325
Sept.....	411,154,411	125,357,579	57,022,855	325,289,145	63,897,139	104,114,086	317,545,420	22,210,000	160,033,118	1,599,256,554
Oct......	411,524,329	121,210,398	59,569,103	326,849,627	64,916,209	107,001,650	322,603,158	17,290,000	165,065,108	1,590,049,963
Nov......	411,252,197	120,255,349	61,672,455	324,552,532	65,955,405	114,567,423	332,080,234	10,550,000	165,224,137	1,600,139,732
Dec......	410,367,863	123,185,809	62,556,860	323,464,533	66,515,135	118,677,559	333,772,877	8,230,000	167,766,384	1,614,790,260
1893—Jan......	412,970,960	117,093,139	62,622,936	322,035,011	67,827,207	122,039,656	330,933,540	7,100,000	168,361,305	1,610,663,874
Feb......	411,688,068	129,645,619	61,190,355	323,192,660	66,640,937	123,927,340	319,694,138	14,450,000	166,023,063	1,607,935,439
Mar......	409,817,138	114,358,729	60,432,090	321,279,132	64,021,638	126,447,613	314,174,742	19,250,000	169,844,260	1,599,655,542
Apr......	407,799,951	111,485,009	59,557,190	322,955,953	66,032,175	125,950,751	316,793,314	16,070,000	172,207,433	1,602,521,800
May......	410,759,520	105,272,029	58,835,353	321,707,720	66,257,142	125,779,103	319,807,117	15,540,000	171,770,315	1,599,026,335
June.....	407,945,944	101,469,909	58,053,689	322,115,592	66,163,602	132,505,153	319,022,323	36,955,000	171,920,799	1,590,151,901
July.....	406,535,603	92,642,189	56,929,673	326,823,845	65,469,866	140,655,014	319,059,426	11,715,000	174,609,902	1,590,701,245
Aug......	410,902,941	87,671,029	56,223,959	330,188,390	64,007,129	143,774,138	324,394,404	7,855,000	180,134,997	1,611,079,017
Sept.....	409,466,308	80,414,049	61,654,630	326,200,330	64,335,235	145,420,209	331,635,060	8,605,000	195,822,761	1,680,562,671
Oct......	464,295,109	79,627,599	55,632,668	324,955,134	64,100,205	145,824,193	332,225,900	8,200,000	200,575,095	1,701,939,918
Nov......	496,123,079	76,589,309	56,725,516	325,717,232	64,309,807	150,616,552	321,892,025	22,325,000	197,745,227	1,718,544,682
Dec......	505,055,011	78,165,079	56,425,922	326,421,997	65,541,645	150,770,409	311,266,072	33,205,000	196,139,558	1,720,934,290
1894—Jan......	508,601,811	77,412,179	57,869,589	329,545,650	65,935,740	151,935,250	302,841,814	39,045,000	196,151,210	1,729,018,266
Feb......	527,357,910	77,015,419	55,735,720	330,161,308	71,106,700	150,755,492	229,375,826	44,935,000	193,835,720	1,739,783,511
Mar......	496,830,353	70,935,720	54,574,540	331,119,247	69,921,912	141,054,700	293,010,523	47,805,000	194,839,041	1,690,075,102
Apr......	490,101,955	70,306,909	53,525,295	329,447,264	69,555,287	141,316,655	290,501,350	52,720,000	197,116,680	1,690,714,806
May......	497,894,733	69,990,419	52,655,123	330,305,980	69,125,312	141,021,114	284,445,068	57,270,000	199,082,593	1,691,793,900
June.....	488,799,152	69,374,549	51,952,691	329,954,959	67,944,250	140,074,600	270,590,089	59,250,000	199,724,021	1,675,609,401
July.....	495,976,730	66,339,849	52,544,642	329,990,730	65,510,907	134,661,429	268,859,602	56,935,000	200,716,200	1,601,307,165
Aug......	499,103,577	65,947,229	50,959,549	324,491,738	66,250,802	129,918,527	264,574,225	61,695,000	202,642,601	1,657,574,239
Sept.....	497,407,599	65,668,909	51,512,484	325,217,977	65,440,869	124,552,449	263,775,103	56,005,000	202,025,053	1,646,671,451
Oct......	500,125,248	64,790,439	54,274,247	330,520,719	65,244,768	121,495,274	262,250,482	63,755,000	202,540,710	1,655,008,952
Nov......	500,151,389	64,252,619	55,445,070	331,145,270	66,242,999	122,718,256	259,674,705	64,040,000	202,594,900	1,672,090,422
Dec......	495,789,157	58,935,869	57,449,865	332,317,064	61,605,967	124,574,590	274,936,459	67,135,000	202,517,054	1,667,226,851
1895—Jan......	$485,501,376	$53,361,909	$57,839,090	$331,077,784	$62,072,086	$122,453,761	$254,761,858	$47,005,000	$201,845,738	$1,620,505,022
Feb......	500,180,411	52,647,809	55,873,630	326,407,272	61,710,439	117,180,225	256,999,343	37,425,000	198,904,390	1,613,657,515
Mar......	463,568,100	51,507,769	54,649,360	325,810,415	60,940,597	114,249,700	264,985,258	56,925,000	199,889,358	1,574,534,557
Apr......	479,493,899	49,843,189	53,917,857	323,746,756	59,573,046	121,457,600	256,935,759	36,525,000	203,091,318	1,584,184,424
May......	483,111,525	48,751,009	53,413,709	323,215,271	59,653,010	121,540,500	267,303,905	37,295,000	204,760,225	1,599,434,154
June.....	483,770,430	48,539,569	52,812,570	321,553,171	59,786,457	117,954,807	260,935,032	49,245,000	206,579,490	1,601,179,556
July.....	479,637,961	48,351,309	51,980,043	319,022,941	60,350,014	115,943,109	271,349,327	55,445,000	206,953,051	1,611,908,473
Aug......	485,778,010	48,117,579	51,746,700	320,355,118	60,090,156	109,436,662	247,536,753	76,555,000	204,735,609	1,603,583,028
Sept.....	479,787,653	49,061,089	55,146,527	323,772,261	61,409,543	107,035,420	240,364,416	63,840,000	206,533,159	1,585,593,509
Oct......	469,854,002	50,645,539	55,554,092	330,434,537	63,832,759	114,576,669	238,955,280	56,740,000	207,364,026	1,505,859,310
Nov......	475,181,593	50,417,659	55,554,092	333,455,236	63,832,759	114,576,669	238,955,280	56,740,000	207,364,026	1,505,859,310
Dec......	480,252,104	50,233,979	55,760,713	335,855,693	65,416,119	115,260,322	234,912,497	45,935,000	207,568,852	1,594,195,479

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