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ABSTRACT

In 1933, the U.S. unilaterally restructured its debt by declaring that it would no longer honor the gold clause in Treasury securities. We study the effects of the abrogation of the gold clause on sovereign debt markets, the Treasury's ability to issue new debt, investors' willingness to hold Treasury bonds, and on the Treasury's borrowing costs. We find that the restructuring was followed by a flight to quality in the sovereign market. Despite this, there was little effect on the Treasury's ability to sell new debt or the willingness of investors to roll over restructured debt. The Treasury incurred a marginally higher cost of capital by issuing new bonds without the gold clause.

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1. Introduction

A recurrent myth regarding the U.S. economy is that the federal government has never defaulted on its debt. This notion comes up every time the debt ceiling is reached and Congress wrangles about increasing the public debt limit. Consider the following quote from White House Press Secretary James "Jay" Carney in 2011:[1]

> "The United States government has never defaulted on its obligations to pay its debt. It has never, ever missed a payment. This is one of the reasons that "flights to quality" typically involve buying U.S. Treasury debt. Uniquely in the history of sovereign borrowers, the United States has paid when it said it would pay."

However, the U.S. did restructure its debt unilaterally during the first administration of Franklin D. Roosevelt, and imposed a 41 percent loss on investors. On June 5, 1933, Congress passed a joint resolution altering the nature of debt contracts retroactively. Gold clauses, which established that debts were to be paid in "gold coin," were eliminated for all debts (public and private). This was the first step in what would become one of the largest transfers of wealth (from creditors to debtors) in the history of the world. The next step took place on January 31, 1934, when the U.S. dollar was officially devalued by 41 percent—the price of gold went from $20.67 to $35.00 per ounce.[2] In February 1935, the cycle was closed when the Supreme Court, in a 5 to 4 decision, ruled that the abrogation of the gold clauses was constitutional. Investors collected their monies in depreciated dollars. The debts involved (both public and private) amounted to almost 1.7 times the nation's GDP. Although in recent years most of the popular press and news analysts have ignored this episode, a number of scholars have acknowledged it. For example, Reinhart and Rogoff (2009, p. 113) include it in their list of sovereign defaults.[3]

An important question, and one that has not been addressed in detail in

[1] Carney (2011) in http://www/cnbc.com/id/43140915. The distinction between federal and state debt is important. A number of states defaulted during the 19th and 20th centuries. For example, see MacDonald (2013) and Ang and Longstaff (2013).

[2] This number is close to the historical average market haircut of 37–40 percent computed independently by Benjamin and Wright (2008), Cruces and Trebesch (2013), and Edwards (2015a).

[3] See also Friedman and Schwartz (1963), Kroszner (1999), and Edwards (2015b).

the literature, is the following: What were the consequences of the Treasury reneging on its promises and implementing a generalized breach on contracts? Understanding this issue is not only important from a historical perspective, it is also relevant to understanding current events and to shed light on the likely consequences of modern defaults, including the debt restructurings in Greece and Argentina. According to traditional economic theory, the violation of contracts should have a number of negative consequences for debtors. Among other things, after defaulting and imposing losses on investors, debtors should have trouble accessing capital markets and issuing new debt, the cost of capital should increase significantly, liquidity should be hampered, and there should be a "'stigma effect" on new debt. At the aggregate level, a major credit event and a generalized breach of contracts should result in increased uncertainty and a reduction in investment and, thus, in a lower growth rate. This was indeed the view taken by Friedman and Schwartz (1963, p. 699), who in the concluding chapter of their monumental *A Monetary History of the United States: 1857–1960*, argue that although the devaluation of the U.S. dollar had a positive effect on liquidity, "the abrogation of the gold clauses ... had the opposite [negative] effect by discouraging business investment." However, they offer no empirical evidence on the actual consequences of this chapter of U.S. history on investment or other variables related to the functioning of the capital markets.

Interestingly, since the publication of Friedman and Schwartz (1963), there have been few analyses of the consequences of the abrogation of the gold clause and the unilateral restructuring of the U.S. debt. Meltzer (2003) provides a discussion of the abrogation proper, and of how yields on gold-linked prices impacted the discussions at the Federal Reserve, but provides no analysis of how this event affected real or financial variables. The same may be said about other major works that cover this period, including research by Temin (1991), Eichengreen (1992), Romer (1992), and Bernanke (2000). Important exceptions include McCulloch (1980) who analyzed the consequences of banning indexed bonds between 1933 and 1977, and Kroszner (1999) who studied the evolution of different securities' prices over a two-day window surrounding the Supreme Court's ruling on the gold clause cases in February 1935.

The purpose of this paper is to fill this void in the literature and to analyze in depth the consequences of the abrogation of the gold clause. By studying in detail this important and massive episode we hope to add to the understanding of what happens in the aftermath of a major unilateral restructuring. Four key results emerge from this analysis.

First, we find that after the abrogation of the gold clause, yields on the dollar denominated debt of the remaining high credit quality sovereigns such as the United Kingdom, France, and Switzerland quickly declined to near-zero

or even slightly negative values. This phenomenon closely resembles the classic flight to quality pattern in the wake of major credit events such as the Long Term Capital Management (LTCM) crisis following the Russian default in 1998, or the recent global financial crisis following the default of Lehman Brothers.

Second, we find that despite the apparent global flight to quality, the Treasury experienced little or no difficulty in issuing new debt. In particular, after controlling for key debt features, we find that Treasury auctions were just as oversubscribed after the abrogation as before.

Third, we find that Treasury debtholders whose bonds were involuntarily restructured were only slightly less willing to roll over these bonds into new Treasury securities at maturity as before the abrogation. Thus, there is little evidence that holders of restructured Treasury debt "voted with their feet" by stigmatizing new debt issues.

Fourth, we examine whether the abrogation of the gold clause affected the Treasury's cost of debt by contrasting the yields on bonds with a gold clause to the yields on newly issued bonds without the gold clause. We find that prior to the devaluation, there was no significant difference in the yields of the two types of bonds. After the devaluation, however, gold clause bonds traded at a four to eight basis point premium to non-gold clause bonds. Curiously, the premium for gold clause bonds persisted even after the Supreme Court decision. One possible interpretation of this result is that investors continued to believe that a return to the gold standard might occur once macroeconomic fundamentals improved. Another possible interpretation is that the market believed there was some probability that the Supreme Court would reverse itself and grant some compensation to holders of gold clause securities. Indeed, during the years to come, a number of lawsuits regarding the abrogation made it through the court system. The Supreme Court, however, refused to hear any of these cases.

By studying the effects of the U.S. abrogation of the gold clause, this paper contributes to the general literature on sovereign debt restructurings and defaults. Important papers in that literature include Eaton and Gersovitz (1981), Mendoza and Yue (2012), Reinhart and Rogoff (2004, 2011), Lindert and Morton (1989), and Cruces and Trebesch (2013). Our analysis differs from previous work in several respects. First, we focus on an episode in an advanced country which was one of the two financial centers of the world at the time the debt was unilaterally restructured. Most previous work on this subject has focused on the effects of sovereign restructurings on economic conditions in periphery countries. Second, we use daily time series on bond returns over a span of three years to analyze the behavior of key variables around key moments in this episode. In contrast, in his important contribution, Kroszner (1999) concentrates on returns during two days surrounding the Supreme Court's decision on the gold clause cases (February 16–

18, 1935). Third, we use daily data to analyze whether the Treasury had problems rolling over its maturing debt. This issue has been addressed recently by Cruces and Trebesch who studied how soon emerging countries that restructured their debts between 1978 and 2010 could assess capital markets again. Fourth, we use our data set to analyze the extent to which the unilateral change in contracts increased the cost of public debt in the U.S. Fifth, we complement the work of Bernanke (2000) and others by comparing daily yields on sovereign debt in the U.S. and other advanced nations under different circumstances, (the United Kingdom, France, and Switzerland).

The rest of the paper is organized as follows. Section 2 provides historical perspective on the abrogation of the gold clause in 1933, the subsequent official devaluation of the dollar in 1934, and the Supreme Courts gold clause decisions in 1935. Section 3 examines whether a flight to quality occurred in the sovereign debt markets. Section 4 studies the effects on the Treasury's ability to issue new debt. Section 5 examines whether there was any stigma attached to new debt issued by existing bondholders. Section 6 studies the effects on the Treasury's borrowing costs. Section 7 summarizes the results and discusses their implications.

2. Historical Background

On April 5, 1933, President Franklin D. Roosevelt, who had been in office for exactly one month, issued an executive order requiring people and businesses to sell, within three weeks, all their gold holdings to the government at the official price of $20.67 per ounce. The Secretary of the Treasury Will Woodin tried to explain the policy by saying that "gold in private hoards serves no useful purpose under current circumstances. When added to the stock of the Federal Reserve Banks it serves as a basis for currency and credit. This further strengthening of the banking structure adds to its power of service toward recovery."[4]

The weeks that followed changed America. Between March and June 1933, Congress passed legislation that would fundamentally alter the way the economy functioned, and would set the basis for the welfare state. On March 5, 1933, President Roosevelt convened Congress into an extraordinary session, and the legendary "Hundred Days" began.[5]

[4] *The New York Times*, "President Invokes Law on Hoarders," April 6, 1933.

[5] For a contemporary description of that period see, for example, Moley (1939).

2.1 Abrogation and Devaluation

While the foundations of the American economy were being changed by one act of Congress after another, the gold saga initiated with the April 5, 1933, executive order continued to unfold. On April 16, *The New York Times* reported that global financial markets "were in confusion as a result of the uncertainty that still surrounds the United States Treasury Department's attitude with respect to gold exports." The previous day, a Treasury spokesman had stated that only three licenses for gold exports had been granted since April 6, and that new requests would be judged "on their merits." The *Times* commented that this was "more or less meaningless in the circumstances."[6]

On April 19, 1933, President Roosevelt clarified things, and explained that the country was, in effect, "off gold." He told the press corps:

> "If I were to write a story, I would write it along the lines of a decision that was actually taken last Saturday, but which really goes into effect today, by which the government will not allow the exportation of gold, except earmarked gold for foreign governments, of course, and balances in commercial exchange."

He then explained that the main goal of abandoning the monetary system that had prevailed since 1879 was to help the agricultural sector, which had been struggling for over a decade. The price of gold had been fixed at $20.67 per ounce since 1834. He said: "The whole problem before us is to raise commodity prices." The official announcement came the next day through Executive Order No. 6111, which stated that "until further ... order the export of gold coin, gold bullion or gold certificates from the United States ... are hereby prohibited ... "

The reaction of global currency markets was instantaneous. In one day the dollar, which had been stable until that point in its historical levels, lost 9.8 percent of its value relative to the Pound Sterling, and 7.8 percent relative to the French Franc, one of the few currencies that was still on the gold standard. Astute observers noticed that in spite of the major changes that had taken place in the course of two weeks, there was a fundamental contradiction; while it was illegal for Americans to hold the metal, and it was prohibited to make gold payments to foreigners, the *official* price was still $20.67 per ounce. On the other hand, the value of the currency in global financial centers fluctuated according to market forces. It would take the government almost a year to deal with this thorny issue and to eliminate the inconsistency of a dual exchange rate regime

[6] "Foreign Currencies Continue to Advance against the Dollar," *The New York Times*, April 16, 1933. p. N7.

where market and official exchange rates could differ by significant margins.

The next step came on May 12, 1933, when Congress passed the Agricultural Adjustment Act (AAA). Title III of this legislation included the "Thomas Amendment"— named after its author, Oklahoma's Senator Elmer Thomas— which authorized the President to increase the official price of gold to up to $41.34 an ounce. Less than a month later, on June 5, a joint resolution of Congress annulled all existing contracts denominated in gold dollars and stated that no such contracts could be written in the future. This came to be known as "the abrogation of the gold clauses." The government claimed that the Joint Resolution of June 1933 didn't imply "a repudiation of contracts." Since gold payments had been suspended in April, all Congress had done was clarify that "the holder of an obligation cannot specify in what type of currency [gold or paper money] the contract is payable." The Secretary of the Treasury was quick to state that the annulment of the gold clause "from all contracts and obligations, public and private, should have no depreciating effect on their value."[7]

The amount of debt affected by the abrogation of the gold clause was enormous, almost twice as large as the nation's gross domestic product. Since World War I most public debt—bonds, notes and certificates—were payable in "gold coin" and many private bonds issued by railway companies and public utilities, as well as commercial and residential mortgages, included gold clauses.[8] According to the administration's estimates in 1933, $120 billion dollars of debt—national income was only slightly higher than $66 billion—were linked to the value of gold; of this, $100 billion corresponded to private debt and $20 billion to government debt.

In early August 1933, administration lawyers began to explore the possibility of the government buying—on consignment—newly minted gold at a price that exceeded the official parity. Original discussions revolved around a price of $28 per ounce.[9] On August 29, the plan was announced through Executive Order No. 6261. This plan, which was the brainchild of Professor George F. Warren of Cornell University, moved the U.S. closer to an official devaluation of the dollar in terms of gold. As explained by President Roosevelt himself, the price to be paid for newly minted gold was to be "equal to the best price obtainable in the free gold markets of the world."[10] On October 22, the President announced during

[7]Roosevelt signs gold clause ban," *The New York Times*, April 6, 1933. p. 35.

[8]According to the Liberty Loan Legislation of 1917–1919, the U.S. was not allowed to issue long-term debt that was not indexed to gold. Thus, all long term federal public debt included a gold clause (see U.S. Treasury Department (1921)).

[9]Acheson (1965), pp. 177-178.

[10]Roosevelt (1938, Vol. 1, p. 352). For a detailed discussion of this period, see

his Fourth Fireside Chat, that he was expanding the gold buying program. He said that the "United States must take firmly in its own hands the control of the gold value of our dollars."[11] During the months that followed, prices paid for gold increased steadily from $29.01 per ounce on October 21, to $31.96 on October 30, $33.32 on November 11, and $34.06 on December 30. It stayed at that level until January 31, 1934.

On January 31, 1934, President Roosevelt officially devalued the dollar by fixing the new price of gold at $35 an ounce. Conservatives deplored the decision, and argued that it would inevitably lead to a steep decline in America's power. Others, including the farm lobby, were disappointed by what they considered an insufficient adjustment in the value of the dollar. In explaining the decision, President Roosevelt said that the devaluation was necessary, since the nation had been "adversely affected by virtue of the depreciation in the value of currencies to other governments in relation to the present standard of value."[12]

In Figure 1 we present weekly data on the USD/Sterling and USD/French Franc spot exchange rates between 1921 and 1936. Both rates are in the form of dollars per unit of foreign currency. This figure captures: (a) the return of the U.K. to gold in May 1925; (b) the abandonment of gold by the U.K. in September 1931; (c) the re-pegging of the Franc to gold in late 1926; (d) the abandonment of the gold standard by the U.S. in April 1933; (e) the period of a "managed" currency between April 1933 and January 1934; and (f) the adoption of the new dollar gold parity at $35 per ounce in January 1934.

2.2 The Supreme Court Rulings

Investors that had purchased securities protected by the gold clause—that is securities that specifically stated that payment was to be made "in gold of the present weight and fineness"—claimed that the Joint Declaration of June 1933 was unconstitutional. Various lawsuits were filed and made their way through the court system. Four of them got to the Supreme Court, and were heard on January 8–11, 1935.

The first two cases had to do with private debts. One referred to a railroad bond (*Norman v. Baltimore & Ohio Railroad Co.*), and the second to a mortgage debt secured by a bond denominated in gold dollars (*United States v. Bankers*

Edwards (2015b) and the references cited therein.

[11]Roosevelt (1938, Vol. 1, p. 426).

[12]Presidential Proclamation No. 2072. See Roosevelt (1938, Vol. 3, pp. 67-76).

Trust). The third case involved a government bond in the series of the Fourth Liberty Loan issued on October 15, 1918. The covenants for this 4.50 percent gold bond expressly stipulated that "the principal and interest hereof are payable in United States gold coin of the present standard of value" (*Perry v. United States*). As in the Norman and Bankers Trust cases, the holder of this bond asked to be paid $35 per troy ounce of gold. The Treasury refused, and made a payment in paper dollars using the old parity of $20.67.per ounce of gold. The fourth case referred to a gold certificate (*Nortz v. United States*).

In these four cases the question before the Court was whether Congress had the constitutional power to alter contracts. Under the Constitution, could Congress annul private and public debt promises and, in the process, affect the wealth of debtors and creditors? And, if in the opinion of the Court, Congress had exceeded its power, what were the damages?

The Supreme Court ruled on February 17, 1935. In all cases the vote was 5 to 4 in favor of the government position. However, the majority used different arguments to decide each of the cases. In the private debt cases the majority, led by the Chief Justice Charles Evans Hughes, pointed out that according to the Constitution, Congress had the power to conduct monetary policy; more specifically, under Article 1, Section 8, Congress had the power to "coin money, [and] regulate the value thereof." Thus, based on this constitutional prerogative Congress could invalidate private contracts if they interfered with such power.

In the case involving the Liberty Bonds, the majority used a different reasoning. According to the opinion, which was also written by the Chief Justice, Congress could *not* abrogate the gold clause for government debt. The reason was that although Congress was allowed by the Constitution to regulate the value of money, it could not use that power to invalidate obligations arising from another of its constitutional powers, the power to borrow money on the credit of the United States. Thus, concluded the majority, the abrogation of the gold clause for government debt was unconstitutional. However, the Court added, since gold holdings by private parties had been forbidden since May 1933, if the claimant received payment in bullion for his Liberty Bond, he would be obliged to sell it immediately to the Treasury at $20.67 an ounce. Thus, even though the abrogation of the gold clause for government debt was unconstitutional, there were no damages.

There was a single dissent signed by the four conservative members of the Court, known as the "Four Horsemen." It was delivered by Justice James C. McReynolds, who said: "The Constitution as many of us understood it, the instrument that has meant so much to us, is gone." He then talked about the sanctity of contracts, government obligations, and repudiation under the guise of law. It was clear, he stated, that Congress had the power "to adopt a monetary

system. But because Congress may adopt a system, it doesn't follow that this may be enforced in violation of existing contracts." He ended his allocution with strong words: "Shame and humiliation are upon us now. Moral and financial chaos may be confidently be expected."[13]

3. Was There a Flight to Quality?

As discussed by Oliner and Rudebusch (1992), Gertler and Gilchrist (1993), Lang and Nakamura (1995), Bernanke, Gertler, and Gilchrist (1996), Eichengreen, Hale, and Mody (2001), Longstaff (2004), Caballero and Krishnamurthy (2008), Pavlova and Rigobon (2008), Beber, Brandt, and Kavajecz (2009), Guerrieri and Shimer (2014), and others, major economic and financial shocks are often associated with a flight to quality. In a classic flight to quality, the prices of the assets considered to be the safest in the market are rapidly bid up as investors rebalance their portfolios towards less risky assets, resulting in a sharp increase in the spread between these and other lower quality assets. Recent examples of flights to quality include the Russian default in August 1998 which triggered the LTCM crisis, the aftermath of the Lehman default in 2008 in which a global flight to quality led to short-term Treasury yields approaching zero, and the Greek debt crisis which resulted in German sovereign yields reaching zero or negative values in response to the flight of investors from the threat of broader credit contagion.

In this section, we study whether the abrogation of the gold clause by the U.S. resulted in a similar type of flight in the global financial markets. Prior to the abrogation, the U.S. with its Aaa rating was viewed as one of the largest and highest quality sovereign borrowers in the world, particularly given the numerous sovereign defaults which had occurred during the 1930–1932 period.[14] After the abrogation, however, disillusioned investors may have turned to the highest-rated bonds issued by the strongest remaining sovereign borrowers.

In examining this issue, we make use of the fact that many sovereigns had issued dollar denominated bonds that were listed on the New York Stock Exchange during the 1930s. Thus, we can contrast the yields on these sovereign bonds directly with those for comparable Treasury bonds since the currency is held fixed. Among the bonds with the highest Moody's Investor Services (1933)

[13]James C. Mc Reynolds "Corrected Dissent in the Gold Clause Cases," *Tennessee Law Review*, Vol. 18, 1945.

[14]A partial list includes Australia, Austria, Belgium, Brazil, Chile, Colombia, Germany, Greece, Hungary, Italy, Mexico, Peru, Poland, Romania, Spain, and Turkey. See Reinhardt and Rogoff (2009).

ratings was the Aaa-rated United Kingdom 5.50 percent bond maturing February 1937, the Aa-rated French 7.50 percent bond maturing April 1941, and the Aa-rated Swiss 5.50 percent bond maturing April 1946. Interestingly, the non-dollar denominated debt of these three countries received only a rating of A from Moody's.[15] This suggests that these three sovereigns viewed the timely payment of coupons and principal on their dollar denominated New York Stock Exchange listed bonds as their highest priority. Thus, these bonds may well have been viewed as among the safest bonds available in the markets.

These three countries provide an interesting sample of very diverse countries. The U.K. had abandoned the gold standard in September 1931, and had allowed the value of Sterling to fluctuate in response to market forces. It had, however, established the "Exchange Equalization Account" in 1932, a fund used to intervene in the market from time to time in order to avoid very large fluctuations in the exchanges. France, on the other hand, continued to be firmly "on gold." It had returned to the gold standard in 1928 at a highly undervalued currency value, and had been accumulating bullion at a very fast rate during the early 1930s. Switzerland was also on gold, and it was universally considered to have a strong fiscal and financial position. The above points confirm that after the abrogation of the gold clause in the U.S., France and Switzerland would have been considered strong countries, safe havens with quality debt. The fact that the U.K. had already made adjustments and had given up attempts to cling to the pre-War parity was also a positive, since it had put an end to uncertainty.

We collected daily closing price quotations for the U.K., French, and Swiss bonds described above. These three bonds are matched to the 2.75 percent Treasury notes maturing December 1936, the 3.375 percent Treasury bonds maturing 1941–1943, and the 3.750 percent Treasury bonds maturing 1946–1956, respectively. The close match in the maturities of the sovereign and Treasury bonds ensures that their yields are directly comparable.[16] The price quotations for all the bonds are hand collected from the Bond Sales of the New York Stock Exchange section of *The New York Times*.

Figure 2 plots the time series of yields for the matched sovereign-Treasury

[15]The U.K. retained an investment grade rating despite having abandoned the gold standard in 1931. Technically, both the U.K. and France defaulted in 1932 on World War I related inter-allied debt owed to the U.S. However, since the payments on the debt were linked to reparation payments by Germany (which defaulted on its obligations in 1931), this has often been viewed as an "excusable default." See Reinhardt and Rogoff (2009).

[16]As will be discussed later, we make the realistic assumption that callable Treasury securities will be called at their first call date.

pairs of bonds for the period from January 1, 1933, to January 30, 1934 (we focus on the period prior to the January 31, 1934, official devaluation to avoid confounding abrogation and devaluation effects). Since the closing prices from *The New York Times* are flat prices, we first add the accrued coupon to the price of the bond before solving for the yield to maturity. Following standard bond market conventions, the accrued coupon is computed using an actual/actual daycount basis and the yield to maturity is based on semiannual compounding but expressed as an annualized rate. As shown, the yields on the three Treasury securities are relatively constant throughout the sample period. Thus, there is little apparent effect of the abrogation of the gold clause on the level of nominal Treasury yields. In stark contrast, however, Figure 2 also shows that the yields of all three sovereign bonds begin to decline precipitously immediately after the abrogation. Within a few months of the abrogation, the yields of the U.K., French, and Swiss bonds all decline by hundreds of basis points. In each case, the yields on the sovereign bonds quickly approach zero and even attain negative values. This common pattern among all three sovereigns has all the hallmarks of a classic flight to quality.

Figure 3 plots the yield spreads between the sovereign bonds and the matching Treasury bonds. Table 1 provides summary statistics for these spreads. Specifically, Table 1 reports the mean pre-abrogation spread, the mean post-abrogation spread, and the change in the means, along with the corresponding t-statistics. As shown, the yield spreads for the U.K., French, and Swiss bonds are all significantly positive during the pre-abrogation period, suggesting that their credit was not viewed as strong as that of the Treasury. After the abrogation, however, the yield spreads all declined very significantly.

These results raise many intriguing research questions. For example, why were these bonds the focus of an apparent flight to quality? As described above, one possible reason was that these bonds with their Aaa or Aa ratings were among the highest-rated sovereign debt issues in the market. A second reason could be that the fact that these bonds were listed on the New York Stock Exchange may have given investors confidence about the ongoing liquidity and tradeability of these bonds. On the other hand, the possibility that investors may have believed that these bonds would be redeemed in gold at "parity" exchange rates seems unlikely since the United Kingdom abandoned the gold standard in 1931 and France followed suit in 1936. Furthermore, the increases in these bonds' prices were larger than could have been explained by the devaluation of the dollar.

4. Was the Treasury's Ability to Issue Debt Affected?

In light of the previous results, a particularly important issue to address is whether the abrogation of the gold clause affected the Treasury's ability to issue debt. The literature suggests that sovereign defaults carry reputational costs that may disrupt access to the capital markets. Key examples of this literature include Eaton and Gersovitz (1981), Grossman and van Huyck (1988), Bulow and Rogoff (1989a, 1989b), and Tomz (2007). Gelos, Sahay, and Sandleris (2011) show that the average duration of the exclusion is around five years. Dias, Richmond, and Wang (2012), using a more restrictive definition for access to capital markets, find that half of the defaulters do not regain market access within seven years of the end of the default. Cruces and Trebesch (2013) show that regaining market access was slower for countries that imposed haircuts in excess of 50 percent. This issue is particularly relevant since during the early stages of the Roosevelt administration, the Treasury was under heavy pressure to raise funds because of the large deficit faced by the government. It is important to note that the vast majority of Treasury debt during the 1930s was held by domestic investors; there was relatively little foreign ownership of Treasury debt during this period.

To explore this issue, we collected data on all Treasury auctions of certificates of indebtedness (short-term coupon bearing Treasury securities), Treasury notes, and Treasury bonds for the 1930–1936 period. The source of the data was the *Annual Reports of the Secretary of the Treasury on the State of the Finances* for the corresponding fiscal years. We obtained data on the type of security, coupon rate, total offering amount, total subscriptions received, and whether the issue had a provision for the exchange of maturing or retiring securities for the issue.

To examine the effect of the Treasury's ability to issue debt, we compute the subscription ratio for each of the auctions. The subscription ratio is defined as the ratio of the total amount of subscriptions to the total amount of the issue. If this ratio is below one, then the auction would be deemed a "failure" since the Treasury would not be able to obtain its desired level of funding. If the ratio is above one, however, then the issue is oversubscribed, allowing the Treasury to raise the total amount of funding planned. In fact, when a Treasury auction is significantly oversubscribed, the Treasury is able to choose among the competing bids and pick those that result in the lowest funding cost. Our approach will be to contrast the subscription ratios during the three years prior to the abrogation of the gold clause to the subscription ratios during the three following years.

Table 2 reports summary statistics for the subscription ratios for the auctions during the 1930–1936 period. As shown, the subscription ratio based on the total amounts offered and subscribed during the pre-abrogation period is 5.23. In contrast, the corresponding ratio during the post-abrogation period is slightly

higher at 5.93. At first glance, these simple averages appear to suggest that Treasury auction performance actually improved after the abrogation of the gold clause. Table 2 shows, however, that there were some significant changes in the nature of the securities being auctioned by the Treasury in the post-abrogation period. In particular, the Treasury began to auction more long-term bonds and fewer short-term certificates of indebtedness in the post-abrogation period. Furthermore, this trend towards increasing the average maturity of Treasury debt occurred even though the yield curve steepened as short-term yields decreased relative to longer-term yields.

In light of this, we use a regression approach to conduct a more formal analysis of the effects of the abrogation on the Treasury's ability to issue debt. Specifically, we regress the subscription ratios for the individual auctions on a number of control and explanatory variables. First, we include dummy variables for whether the security being auctioned is a Treasury note or a Treasury bond. Thus, the intercept in the regression reflects the fixed effect for certificate of indebtedness, while the coefficients for these dummy variables reflect the incremental effects for Treasury notes and bonds. By including these dummy variables, we control for the possibility that some types of issues are more popular among investors than others. Second, we also include a dummy variable for whether the debt issue includes a provision for owners of maturing or retiring securities to exchange their existing securities for the new debt issue. This provision could potentially make an offering more attractive to these investors since they are in effect able to purchase the new security at par rather than at the market price. Including this dummy variable allows us to control for the effects of the provision on the auction outcomes. Next, we include the offering size of the issue as well as its coupon rate as control variables. Finally, we include a dummy variable that takes value one for auctions after the June 1933 abrogation, and zero otherwise. By including this dummy variable, we are able to test directly whether there were changes in auction outcomes after the abrogation after controlling for the other factors.

Table 3 reports the regression results. In this table, and in all other tables in the paper, t-statistics are based on the standard Newey-West (1987) heteroskedasticity and autocorrelation consistent estimator of the covariance matrix. As shown, there are clear differences in auction outcomes based on the type of Treasury security being auctioned. The intercept for the regression is 8.57, while the coefficients for the Treasury note and Treasury bond dummy variables are 5.36 and 4.41, respectively. This suggests that there was a definite market preference for longer-term debt, which may help explain the Treasury's tendency towards issuing longer-duration securities during the study period. The coefficient for the exchange provision is positive, but not statistically significant. Thus, there is little evidence that allowing holders of maturing or retiring securities to

exchange them for new issues results in better auction outcomes.

The coefficient for the size of the offering is negative and marginally significant with a t-statistic of -1.95. Intuitively, this result makes sense since it implies that larger security offerings were more difficult for the market to absorb. This is consistent with the view that there was limited investment capital during the Great Depression. In contrast, the coefficient for the coupon rate of the issue being auctioned is not significant. This is likely because the Treasury chooses the coupon rate for the offering to allow the security to be priced at or close to par. Thus, the coupon rate is determined endogenously by the current market level of the term structure.

Focusing now on the key issue of whether the Treasury found it more difficult to issue debt after the abrogation of the gold clause, Table 3 shows that the coefficient for the post-abrogation dummy variable is negative but not significant. Thus, there is no discernable correlation between the abrogation and auction outcomes once the type of debt being issued and the size of the offering are controlled for.

These results are consistent with the literature on excusable defaults. In particular, Grossman and van Huyck (1988) suggest that some defaults are excusable, and that when that is the case, investors do not punish debtors. Dias, Richmond, and Wang (2012) find that market access occurs faster for defaulters experiencing a natural disaster; half of them regain access to capital markets within three years of the end of default. Edwards (2015a) shows that countries facing more severe negative external shocks receive a more favorable treatment from creditors. Finally, Drelichman and Voth (2015) provide historical evidence supporting the view that excusable defaults do not affect terms or conditions to issue or maintain debt. Our results are consistent with the abrogation of the gold clause having been viewed as an excusable default.

5. Was Treasury Debt Stigmatized?

A separate but related issue is whether the abrogation of the gold clause resulted in infringed holders of gold clause bonds becoming disillusioned and less likely to own Treasury securities in the future—in other words, stigmatizing Treasury debt. This issue is closely related to recent research by Guiso, Sapienza, and Zingales (2004, 2008), Alesina and Fuchs-Schündeln (2007), Brunnermeier and Nagel (2008), Malmendier and Nagel (2011, 2015), and many others who show that agents' beliefs and investment decisions depend on their lifetime experiences.

Ideally, we would like to have full information on the portfolio choices of

gold clause bondholders in order to explore this issue. Although full information is not available, the historical record does allow us to shed light on one key portfolio decision. Specifically, whether holders of maturing or retiring gold clause securities were willing to exchange them for non-gold clause securities when given the option to do so. For example, if existing bondholders who lost their right to redeem in gold subsequently chose to reduce their portfolio holdings of Treasuries, they could simply accept payment in cash when the bonds matured or were called and reallocate their portfolio holdings to other asset classes. On the other hand, if current bondholders chose to continue holding Treasuries, they could avoid any minor transaction costs by rolling over their holdings into new Treasury debt issues whenever the exchange provision was available.

Table 4 provides summary information about the exchange outcomes for the Treasury auctions during the 1930–1936 period in which the offering included an exchange provision. Of the 40 auctions with an exchange provision, 14 involved the exchange of a gold clause security for another gold clause security, 10 involved the exchange of a non-gold clause security for another non-gold clause security, and 16 involved the exchange of a gold clause security for a non-gold clause security. We are primarily interested in the outcomes for this latter category.

As shown, even after losing their right to redeem in gold, more than 80 percent of the gold clause securities were still exchanged for new issues of Treasury securities without the gold clause. This suggests that a large majority of the infringed bondholders were willing to simply "forgive and forget" and continue holding Treasury securities after the abrogation. This is consistent with the "excusable default" theory discussed above.

An interesting example of this is the case of the Liberty bonds which were issued during 1917–1918 to fund the U.S. government during World War I. These bonds were sold directly to the public who were encouraged to invest as a patriotic duty. Many Hollywood celebrities helped popularize the bonds and held rallies to encourage their sales including Al Jolson, Mary Pickford, and Charlie Chaplin. The Girl Scouts and the Boy Scouts participated in drives to sell Liberty bonds. On October 16, 1933, just over four months after the abrogation of the gold clause, $1.9 billion of the 4.00 percent Fourth Liberty Loan bonds were called by the Treasury for redemption at their next coupon payment date of April 15, 1934. By the call date, $1.728 billion of these bonds had been exchanged for new Treasury bond issues, representing 90.95 percent of the total amount called for redemption.

On the other hand, the results in Table 4 also suggest that the participation in the offers to exchange gold clause securities for non-gold clause securities may not have been as enthusiastic as for other types of exchange offers. In particular, the percentage of non-gold clause bonds exchanged for non-gold clause bonds in

the post-abrogation period was nearly 98 percent. This contrasts, however, with the percentage for the gold clause for gold clause exchanges in the period prior to the abrogation which was only about 68 percent.

To explore this issue in more depth, we use a regression framework that allows us to control for other factors that may affect the likelihood that investors choose to roll over their Treasuries through an exchange. The dependent variable in this analysis is the exchange ratio. Specifically, for each offering with an exchange provision, we compute the exchange ratio as the total amount exchanged divided by the total amount outstanding or available to exchange. To control for possible changes over time in the tendency to roll over Treasury positions by exchanging them, we include a dummy variable that takes value one in the post-abrogation period, and zero otherwise. To control for the size of the transaction, we include the total outstanding amount of the maturing or retiring security as an explanatory variable. Since the redemption of bonds through a call by the Treasury may be perceived differently by investors than if the bonds simply mature, we also include a dummy variable that takes value one if the exchange provision is associated with a call, and zero otherwise. Finally, to explore whether investors are less likely to exchange abrogated gold clause bonds for issues without the gold clause, we also include a dummy variable that takes value one when a gold clause security is exchangeable for a non-gold clause security, and zero otherwise.

The results from estimating the regression model are reported in Table 5. As shown, there is clear evidence that investors were more likely to roll over maturing or retiring Treasuries through exchange in the post-abrogation period. In particular, the coefficient for the post-abrogation dummy variable is positive and highly significant. In contrast, the amount of the maturing issue has no significant effect on the fraction that is exchanged.[17]

Table 5 also shows that when the exchange provision occurs because the original security is called by the Treasury, the fraction exchanged is significantly less than otherwise. The point estimate of the coefficient for the dummy variable for whether the original security was called indicates that the exchange ratio for called securities is ten percent less than for noncalled securities. To understand the intuition behind this result, we note that Longstaff (1992) shows that the Treasury followed a near-optimal strategy in calling issues of callable bonds during the 1930–1950 period (in contrast to corporations which were far less efficient in calling their callable bonds). This implies that when the Treasury called a bond

[17]We also estimated the model using a logit transform of the exchange ratio since the ratio is bounded between zero and one. The results are very similar to those reported.

issue, investors would only have been able to roll over their holdings into bonds with lower coupon rates than the original called bonds. We confirmed this conjecture by looking at the actual transactions where callable bonds were refunded by new issues. Taken together, these considerations suggest that investors may have responded negatively to having their investments in higher coupon bonds terminated by the Treasury by being less willing to roll over called bonds into new issues with lower coupon rates.

Table 5 shows that a similar effect may be associated with the situation where securities with an abrogated gold clause matured or retired and were exchangeable into a new issue without the gold clause. In particular, the point estimate for the coefficient for the gold into non-gold dummy variable indicates that this situation resulted in an exchange ratio nearly seven percent lower than otherwise. The coefficient for this dummy variable is also statistically significant as evidenced by its t-statistic of -2.31.

In summary, these results suggest that infringed bondholders responded to the abrogation of the gold clause by being less willing to exchange their gold clause bonds for non-gold clause bonds. The magnitude of the effect, however, appears to have been relatively modest. For example, based on the coefficient estimates in Table 4 and on the averages for the sample, the effect would be on the order of reducing the exchange ratio from 89.06 percent to 82.25 percent. This is broadly consistent with the unconditional averages shown in Table 4. To put these results into perspective, we observe that the effect of the abrogation of the gold clause on investors' willingness to exchange maturing or retiring issues for new issues is only about two thirds as large as the effect resulting from bonds being called by the Treasury. Despite the fact that a number of bondholders sued the Treasury because of the abrogation of the gold clause, these results suggest that little stigma resulted from the abrogation since most investors voluntarily exchanged their maturing abrogated bonds for new issues without the gold clause.

6. What was the Effect on Treasury Borrowing Costs?

We turn next to the important question of how the abrogation of the gold clause may have affected the Treasury's borrowing costs. The literature suggests that sovereigns with a history of defaults generally are charged higher rates when they return to the capital markets. For example, see Lindert and Morton (1989), Flandreau and Zumer (2004), Tomz (2007), and Cruces and Trebesch (2013).

Providing a definitive answer to this issue is challenging for the simple reason that there is no direct way of knowing the counterfactual of what Treasury interest rates would have been had the gold clause not been abrogated. What we

can do, however, is to contrast the yields on bonds with the gold clause issued prior to the abrogation to the yields on bonds without the gold clause issued subsequently. Given that the probability of the Supreme Court ruling the abrogation unconstitutional was far from zero, the difference in yields of gold clause and non-gold clause bonds could provide insight into how the gold clause was valued by investors in the market. For example, if the difference in yields were zero, then one possibility might be that the gold clause was not valued, and, therefore, its abrogation would likely have little effect on rates. In contrast, finding a significant difference in yields would provide evidence that the abrogation may have had a major effect on Treasury rates.

To contrast the pricing of gold clause and non-gold clause bonds, we hand collected daily closing price quotations for U.S. Treasury bonds for the January 1933 to May 1935 period. The use of this extended sample period allows us to include all of the key events associated with the abrogation of the gold clause. The price quotations are again obtained from the Bond Sales of the New York Stock Exchange section of *The New York Times*. To check the accuracy of the data, we also compared price quotations from *The New York Times* with price quotations from *The Financial and Commercial Chronicle* and found the two sources to be very consistent with each other. Although data for the U.S. Liberty bonds issued during the World War I era are available, we do not include them in the analysis since many of the Liberty bonds were called during the study period, rendering their effective maturity too short to be comparable to the other bonds.

As described, our approach will be to contrast the yields on bonds with the gold clause and issued prior to the abrogation to the yields of non-gold clause bonds issued afterwards. In doing this, it is important to ensure that the two sets of bonds be as comparable as possible. This is particularly relevant given the term structure of interest rates steepened significantly during the study period. Thus, unless care is taken, there is a significant risk of confounding gold clause effects with term structure effects. To mitigate this risk, we only include bonds in the two sets that have very similar coupon rates and maturities. Table 6 lists the set of five gold clause bonds and the set of five non-gold clause bonds included in the sample. As shown, the gold clause bonds have coupons ranging from 3.000 to 3.375 percent, while the non gold clause bonds have coupons ranging from 3.000 to 3.250 percent. The average coupon rate for the gold clause bonds is 3.250 percent, which is very close to the average coupon rate of 3.175 percent for the non-gold clause bonds.

Table 6 also shows that, with one exception, all of the Treasury bonds are callable. The earliest call dates for the bonds, however, are not until 1940 or later. Despite the long horizon until the bonds are first callable, it is still important to consider the possible effects of the call feature on the analysis. In particular,

Table 6 shows that the average prices of the callable bonds during the sample period are all significantly above par, implying that the implicit call option is deep in the money. Given this, we control for the effect of the deep-in-the-money call feature on bond prices by assuming the most probable scenario in which the call is exercised at the first call date. Accordingly, we compute yields and durations using the first call date as the effective maturity date.[18]

Even though Table 6 shows that the two sets of bonds are generally comparable in terms of their effective maturity dates, it is clear that there may still be slight differences in average effective maturity across the two sets of bonds. To address this, we construct indexes of the yields for the two sets of bonds in a way that insures that both indexes are based on portfolios of bonds with identical durations. This is done in the following way. Let Y_t be the average yield for all of the non-gold clause bonds in the sample at date t. Similarly, let D_t be the average duration for these bonds. Now let XL_t and DL_t be the average yield and duration, respectively, for the gold clause bonds with durations less than D_t. Let XH_t and DH_t be the average yield and duration, respectively, for the gold clause bonds with durations greater than or equal to D_t. We then construct the yield index X_t for the gold clause bonds as the weighted average of XL_t and XH_t, where the weights are chosen so that the weighted average of DL_t and DH_t equals the duration D_t of the non-gold clause bonds. Finally, to guard against the potential effects of illiquid bond prices in constructing the yield indexes, index values are only included on days where all five gold clause bonds and all issued non-gold clause bonds have current prices in the *New York Times*. The upper panel of Figure 4 plots the time series of the two yield indexes. As shown, the two time series track each other closely throughout the sample period.

Next, we define the gold clause spread as the difference between the yield index for non-gold clause bonds and the yield index for gold clause bonds. Given this definition, a positive value for the gold clause spread implies that yields on gold clause bonds are lower than those for non-gold clause bonds, or equivalently, that gold clause bonds have higher prices than non-gold clause bonds. The lower panel of Figure 4 plots the time series of gold clause spreads.

Table 7 presents summary statistics for the gold clause spread for the entire sample period as well as for four key subperiods. As shown, there is clearly a positive gold clause spread during much of the sample period. This provides support for the view that bondholders valued the gold clause, even after it was abrogated. In turn, this suggests that the Treasury did in fact increase its borrowing costs

[18]This is consistent with the evidence in Longstaff (1992) that the Treasury was very efficient in calling its debt optimally. The results are similar when we use the actual maturity dates for the bonds.

by eliminating the gold clause. The actual magnitude of the increase, however, is relatively modest since the average value of the gold clause spread is only 4.26 basis points over the sample period.

Focusing on the four subperiods, the results in Table 7 may be summarized as follows:

- Subperiod 1—August 11, 1933 to January 30, 1934—is the period before the official devaluation.[19] As noted, during this period the gold clause had been abrogated, the official value of the dollar in terms of gold was still at its historical (since 1834) level of $20.67 per ounce, and there had been no legal recourses filed by aggrieved investors. That is, during these five months there we were still doubts about what would happen to securities payable in gold. The fact that the gold clause spread was equal to zero suggests that the market thought that the "official" value of gold would not be altered. Given the existence of the "gold buying program" discussed above, and that the Administration had been willing to pay $35.06 per ounce, this is somewhat surprising.

- Subperiod 2—January 31, 1934, to December 31, 1934—is the 11-month period immediately after the official devaluation but before the Supreme Court heard the gold clause cases. During this period, the gold clause premium increased by almost 5 basis points to a mean value of 4.82 basis points. This is a small spread, but as may be seen from Table 7, it is very significantly different from zero (t-statistic = 18.88). This suggest that during this period the market believed that there was a positive probability that the Courts would rule that the combination of the abrogation and the official devaluation were unconstitutional. If that was the case, the abrogation would be reversed, and holders of gold clause securities would have been paid at the higher price of $35 per ounce of gold.

- Subperiod 3—January 1, 1935, to February 17, 1935—is the relatively short period surrounding the hearing of the gold clause cases and the announcement of the decision. During this period, the gold clause spread increased to almost an average of 9 basis points. As may be seen, the t-statistic shows that it was significantly different from zero. This result indicates that once arguments were made before the Court, markets believed that the probability of an unconstitutional ruling had increased. This is consistent with

[19]Notice that during this period, the U.S. engaged in the "gold buying program," where the Treasury purchased newly minted gold—and occasionally gold in the external market—at prices that exceeded the official price of $20.67 per ounce. As pointed out above, for all practical purposes, the U.S. was under a "dual exchange rate regime" during this period.

the narrative provided by Meltzer (2003) in his monumental history of the Federal Reserve.

- Subperiod 4—February 18, 1935, to May 31, 1935—begins on the day after the Supreme Court ruling that upheld the constitutionality of the Joint Declaration of Congress and goes through May 31, 1945. During this period, the gold clause spread continues to be significantly positive (with a mean of 8.43 basis points) and only slightly lower than its mean during subperiod 3. Thus, the resolution of uncertainty about the constitutionality of the abrogation had only a small effect on the gold clause spread. Furthermore, we collected additional data on selected dates during the 1935–1938 period and found that the gold clause spread remained at similar levels over this extended horizon.

The persistence of the gold clause spread after the Supreme Court decisions leaves us with an interesting puzzle. Is it possible that investors believed that the abrogation of the gold clause and the subsequent devaluation were temporary and would be reversed when the economic outlook improved? The fact that many European countries suspended the gold standard during World War I and later reinstated it during the 1920s provides precedent for the view that the abrogation of the gold clause might only have been temporary. The abrogation of the gold clause could have been reversed, for example, by a new ruling by the Supreme Court.[20]

In an effort to shed additional light on this issue, we again use a regression approach to examine the factors affecting the gold clause spread. In particular, we regress the spread on several key explanatory variables. The first is the price of gold as determined in the daily London fixing and reported in *The New York Times*. We include the gold price since it should clearly be an important driver of the differential between gold clause and non-gold clause bonds.[21] The volatility of daily stock market returns is estimated using a Garch(1,1) model. The intuition for including this variable is that stock market volatility reflects uncertainty about economic fundamentals that could play a role in determining investor expectations about a return to the gold standard. The third is a measure of the liquidity of the Treasury security market. Specifically, we compute the ratio of the total daily trading volume of Treasury securities to the total daily trading

[20]We note that there was precedent for the Supreme Court reversing itself. For example, the Supreme Court reversed its earlier decision in *Hepburn v. Griswold* in the legal tender or "greenback cases" of 1871, (*Knox v. Lee* and *Parker v. Davis*).

[21]Towards the end of the sample period, the price of gold was essentially fixed and the variation in the gold price was minor.

volume of all bonds. The data are collected from the *New York Times.* A decline in this ratio would indicate that the Treasury market is playing a smaller role in fixed income markets, and vice versa. We also include several lags of the gold clause spread in the regression to control for any persistence in the value of the spread which might affect inferences about the other explanatory variables.

Table 8 reports the regression results. As shown, the first three lags of the gold clause spread are significant, confirming that there is considerable persistence in the value of the spread.[22] The coefficient for the price of gold is positive and highly significant. This result is intuitive since the higher the price of gold, the higher is the opportunity cost faced by a bondholder who is not able to receive payment in gold. Thus, this result indicates that the variation in the gold clause spread rationally reflects economic fundamentals.

The coefficient for the volatility of the stock market is negative and significant. This negative relation is consistent with the interpretation that investors may have had ongoing hopes that the gold standard might be reinstated once the economic uncertainty associated with the Great Depression was resolved. Thus, when stock market volatility increased, investors' hopes for a quick return to the gold standard faded, resulting in the decline in the gold clause spread. Finally, the positive and significant coefficient for the Treasury market liquidity factor suggests that as the Treasury bond market increased in importance, investors may have viewed a remediation of the effects of the abrogation as being more likely, resulting in an increase in the gold clause spread.

These results also shed light on the debate about the effect of the gold standard on sovereign funding costs. Early studies argued that one of the benefits of adopting the gold standard is access to cheaper funding, finding yields between 30–40 basis points lower for countries that adopted the gold standard during the 1870–1914 period (see Bordo and Rockoff (1996) and Obstfeld and Taylor (2003)). More recent evidence, however, challenges these results. Flandreau and Zumer (2004) and Alquist and Chabot (2011) find that there is no relation between yields and the gold standard after controlling for differences in monetary and fiscal policies and common risk factors. Our results indicate that bonds with the gold clause had yields that were slightly lower on average than those without the gold clause during the sample period

[22]Regression specifications including additional lagged values produce results similar to those reported here.

7. Conclusion

In this paper we analyze an important, and almost forgotten, episode in U.S. economic history: the unilateral restructuring of public and private debt contracts by Congress in June 1933. Clauses that linked debt to the price of gold were annulled in a retroactive fashion. This measure eventually resulted in losses of the order of 41 percent.

With few exceptions—the most notable being McCulloch (1980) and Kroszner (1999)—there has been almost no academic work on the consequences of the abrogation of the gold clauses by Congress, and the consequent ratification of its constitutionality by the Supreme Court in February 1935.

We are particularly interested in investigating the consequences of this generalized breach of contracts. Understanding this issue is not only important to set the historical record straight, but it is also relevant to understand current events, and to shed light on the likely consequences of modern defaults, including debt restructuring in Greece and Argentina. According to traditional theory, after unilaterally restructuring the debt and imposing large losses on investors, debtors should have trouble accessing the capital markets and issuing new debt, the cost of capital should increase significantly, liquidity should be hampered, and there should be a "stigma effect" on new debt. At the aggregate level, a major credit event and a generalized breach of contracts should result in increased uncertainty and a reduction in investment and, thus, in a lower growth rate.

Our results show that this episode did not have significant effects on the U.S. Treasury's ability to roll over maturing debt, or to issue new securities. We also find that investors did value the existence of a gold clause in contracts. Surprisingly, this gold clause premium continued after the Supreme Court decision, suggesting that the market thought that there was some probability that the Supreme Court would reverse itself at some point in the future. Furthermore, we find that after Congress abrogated the gold clause, there was a flight to quality in global financial markets. This was reflected by the fact that the spread of foreign securities over U.S. Treasuries declined significantly.

The results in this paper leave us with some intriguing puzzles. For example, why did the abrogation of the gold clause have such a small effect on the Treasury's ability to issue new bonds or rollover existing debt? Was the abrogation perhaps viewed as an excusable action necessitated by the economic circumstances? Did the majority of debtholders actually understand that they had suffered a loss through the abrogation, or was there some degree of "money illusion" involved? The resolution of these puzzles may provide additional useful insights into one of the most important episodes in U.S. economic history.

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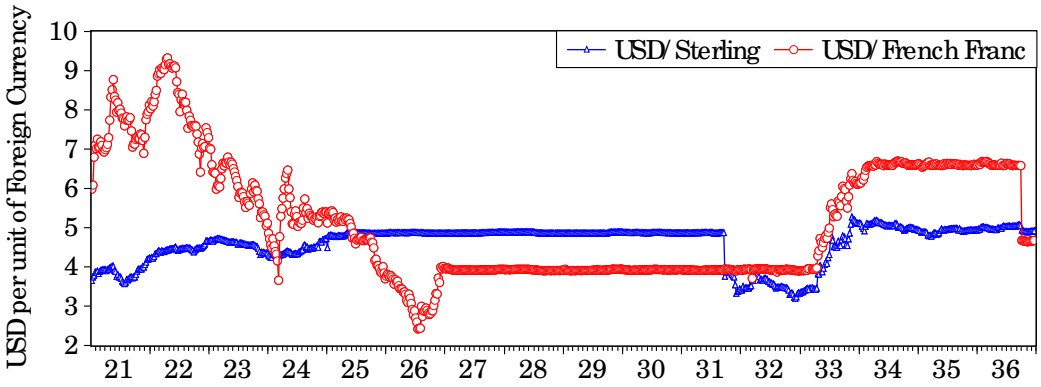
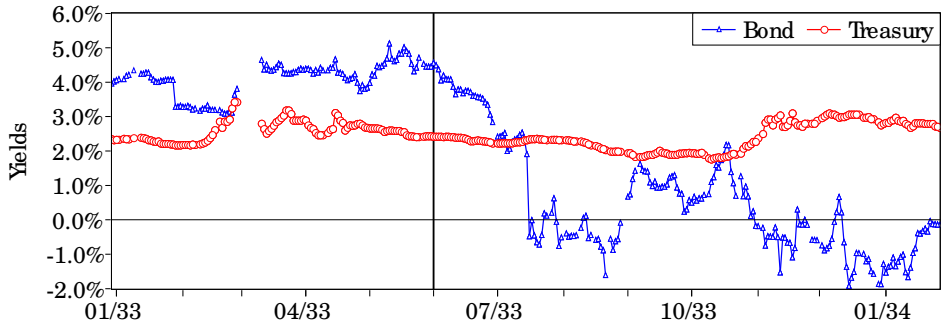
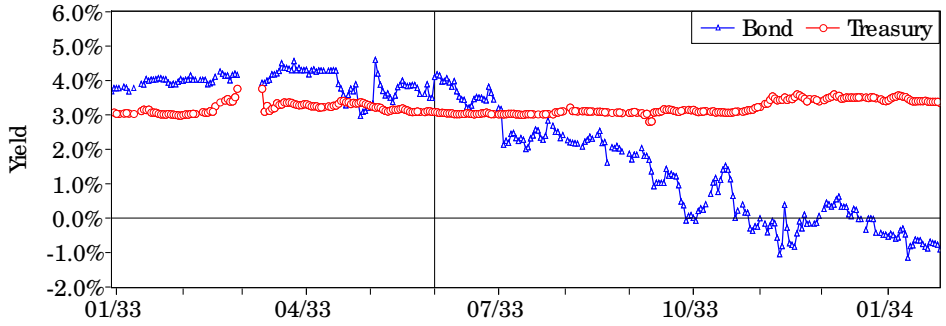


Figure 1: **U.S. Nominal Exchange Rate**. The figure plots the end-of-week nominal exchange rate between the U.S. dollar and the Sterling and the French Franc for the period 1921 – 1936. Both rates are in the form of "dollars per unit of foreign currency".

A. Great Britain and Ireland 5.50%, 1937



B. France 7.50%, 1941



C. Switzerland 5.50%, 1946

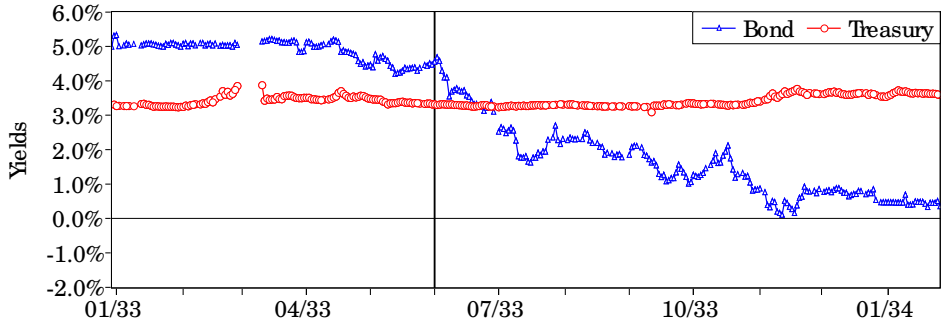
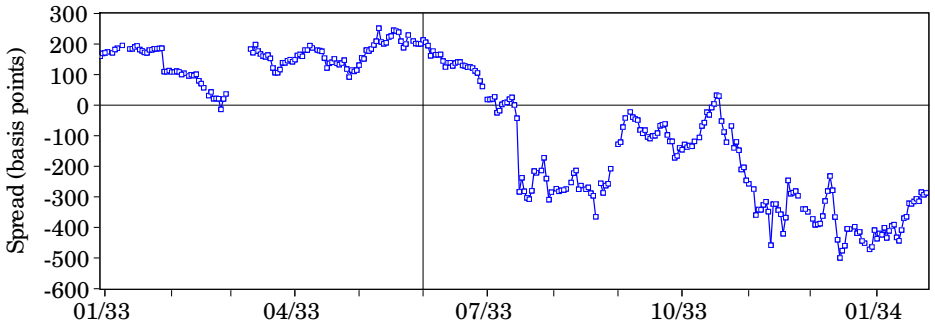
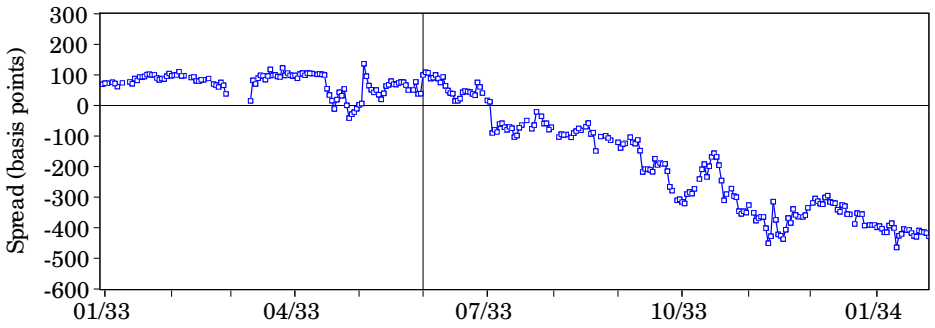


Figure 2: **Yields on Sovereign Bonds vs. Yields for Matching Treasury Bond**. The upper panel plots the yields for the indicated Great Britain and Ireland bond and a Treasury bond with a matching maturity. The middle panel plots the yields for the indicated French bond and a Treasury bond with a matching maturity. The lower panel plots the yields for the indicated Swiss bond and a Treasury bond with a matching maturity. The vertical line in each panel is for June 5, 1933, the date in which the Congress passed House Joint Resolution to suspend the gold standard and abrogate the gold clause in the national constitution. All yields are expressed as percentages.

A. Great Britain and Ireland 5.50%, 1937



B. France 7.50%, 1941



C. Switzerland 5.50%, 1946

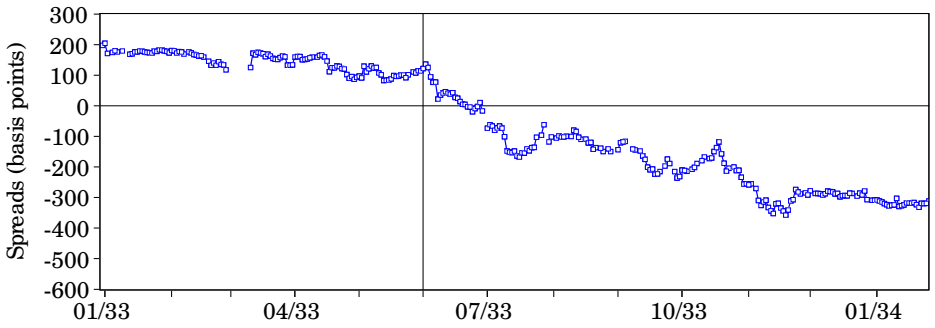


Figure 3: **Yield Spread Between Sovereign Bonds and Matching Treasury Bond**. The upper panel plots the spread between the indicated Great Britain and Ireland bond and a Treasury bond with a matching maturity. The middle panel plots the spread between the indicated French bond and a Treasury bond with a matching maturity. The lower panel plots the spread between the indicated Swiss bond and a Treasury bond with a matching matching maturity. The vertical line in each panel is for June 5, 1933, the date in which the Congress passed House Joint Resolution to suspend the gold standard and abrogate the gold clause in the national constitution. All spreads are expressed as basis points.

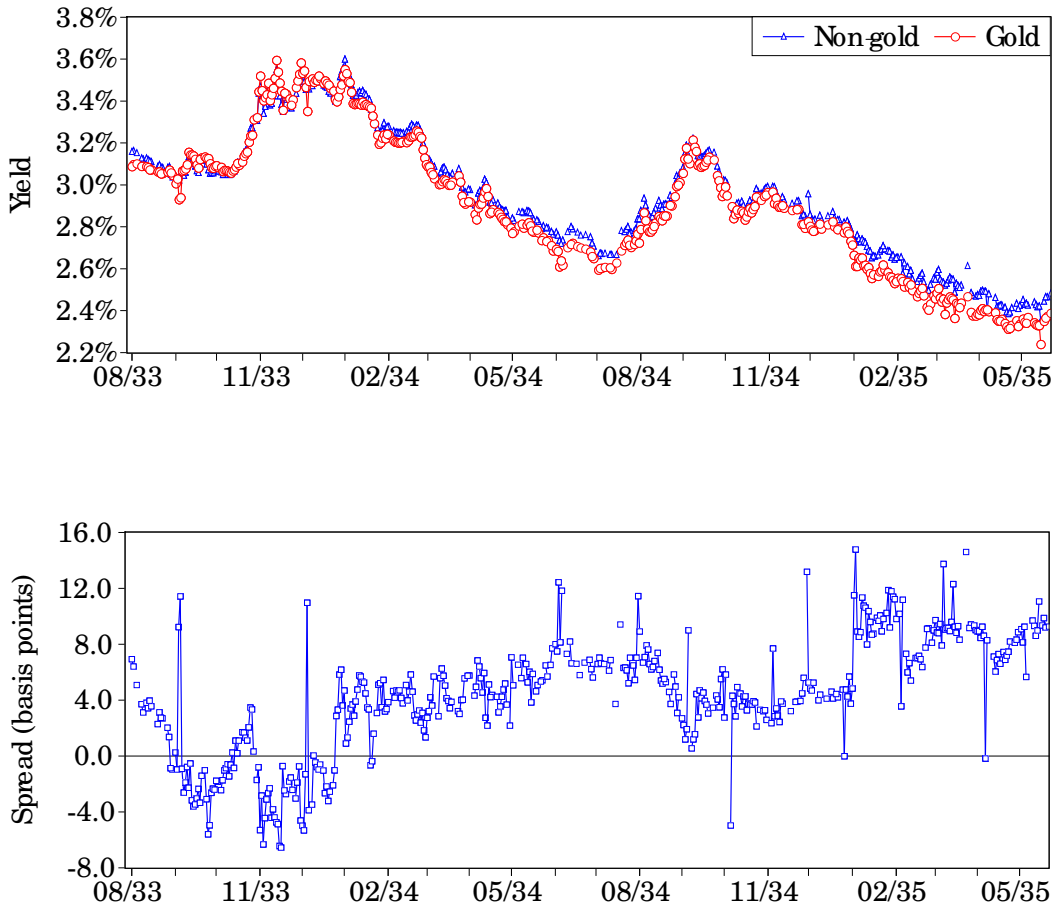


Figure 4: **Gold Clause and Non-Gold Clause Yields and the Gold Clause Spread.** The upper panel plots the yields for the index of gold clause bonds and the index of non-gold clause bonds. The lower panel plots the gold clause spread which is computed as the yield on the index of non-gold clause bonds minus the yield on the index of gold clause. The yields are expressed as percentages. The gold-clause spread is expressed in basis points.

Table 1

Summary Statistics for Sovereign Minus Treasury Yield Spreads. This table provides summary statistics for the differences between the yields of the indicated dollar-denominated sovereign bond and a maturity-matched Treasury security. The spreads are measured in basis points. The pre-abrogation period is from January 3, 1933 to June 4, 1933. The post-abrogation period is from June 5, 1933 to January 30, 1934. The t-statistics are based on the Newey-West estimator of the covariance matrix. N denotes the number of observations.

Sovereign Bond and Period	Mean	t_{Mean}
United Kingdom 5.50% February 1937		
Pre-Abrogation	151.17	14.66
Post-Abrogation	−183.99	−6.29
Change	−335.17	−9.98
France 7.50% April 1941		
Pre-Abrogation	73.05	11.76
Post-Abrogation	−209.24	−7.98
Change	−282.34	−9.58
Switzerland 5.50% April 1946		
Pre-Abrogation	145.32	23.25
Post-Abrogation	−184.61	−9.48
Change	−326.71	−14.72

Table 2

Summary Statistics For Treasury Auction Outcomes. This table provides summary statistics relating to the outcome of the Treasury auctions for certificates of indebtedness, Treasury notes, and Treasury bonds during the pre-abrogation period (1/1930 to 5/1933) and the post-abrogation period (6/1933 to 12/1936). The total amounts offered and subscribed are expressed in $ millions. Ratio denotes the ratio of total amount subscribed to total amount offered. N denotes the number of auctions.

Period	Security	Amount Offered	Amount Subscribed	Ratio	N
Pre-Abrogation	Certificates	7,025	27,679.6	3.94	20
	T-Notes	4,175	38,257.7	9.16	10
	T-Bonds	2,100	3,684.0	1.75	3
	All Securities	13,300	69,621.3	5.23	33
Post-Abrogation	Certificates	1,850	6,520.5	3.52	3
	T-Notes	5,550	31,977.5	5.76	12
	T-Bonds	5,000	35,092.6	7.02	14
	All Securities	12,400	73,590.6	5.93	29

Table 3

Results from the Regression of the Subscription Ratio on Explanatory Variables. This table reports the results from the regression of the subscription ratio (total subscriptions divided by total offering size) for the individual Treasury auctions of certificates of indebtedness, Treasury notes, and Treasury bonds on the indicated explanatory variables. Treasury Note is a dummy variable that takes value one if the auction is for a Treasury note, and zero otherwise. Treasury bond is a dummy variable that takes value one if the auction is for a Treasury bond, and zero otherwise. Exchange Provision denotes a dummy variable that takes value one if the auction includes an exchange provision, and zero otherwise. Issue Size denotes the offering size of the issue expressed in $millions. Coupon denotes the coupon rate for the issue being auctioned. Post-Abrogation denotes a dummy variable that takes value one if the auction occurs after the abrogation of the gold clause in June 1933, and zero otherwise. The t-statistics are based on the Newey-West (1980) estimator of the covariance matrix (with three lags). The sample period is 1/1930 to 12/1936.

Variable	Coefficient	t-Statistic
Intercept	8.5703	2.80
Treasury Note	5.3630	1.93
Treasury Bond	4.4099	1.86
Exchange Provision	2.1175	1.48
Issue Size	−0.0096	−1.95
Coupon	−0.9092	−1.12
Post-Abrogation	−1.8494	−0.75
Adj. R^2		0.1538
N		62

Table 4

Summary Statistics For Exchange Outcomes. This table provides summary statistics for the outcomes of auctions in which retiring Treasury securities are exchangeable at par for newly-issued Treasury securities. Results are shown seperately for the cases where gold clause securities are exchanged for gold clause securities, gold clause securities are exchanged for non-gold clause securities, and non-gold clause securities are exchanged for non-gold clause securities. The amount of the retiring securities outstanding and the amount exchanged for newly-issued securities are are expressed in $ millions. Exchange Ratio denotes the ratio of total amount exchanged to the total amount outstanding. N denotes the number of auctions.

Type of Exchange	Amount Outstanding	Amount Exchanged	Exchange Ratio	N
Gold for Gold	7,439.21	5,057.13	0.6798	14
Non-Gold for Non-Gold	5,081.75	4,973.49	0.9787	10
Non-Gold for Gold	13,281.92	10,669.01	0.8033	16

Table 5

Results from the Regression of the Exchange Ratio on Explanatory Variables. This table reports the results from the regression of the exchange ratio (total amount of bonds offered for exchange divided by total outstanding amount of bonds) for the individual exchange offerings on the indicated explanatory variables. Post-Abrogation denotes a dummy variable that takes value one if the exchange offering occurs after the abrogation of the gold clause in June 1933, and zero otherwise. Amount Outstanding denotes the total outstanding amount of exchangable bonds expressed in $millions. Called denotes a dummy variable that takes value one if the exchangable bonds are being called, and zero otherwise. Gold to Non-Gold denotes a dummy variable that takes value one if the exchange offering converts a gold-clause security into a non-gold clause security. The t-statistics are based on the Newey-West (1980) estimator of the covariance matrix (with three lags). The sample period is 1/1930 to 12/1936.

Variable	Coefficient	t-Statistic
Intercept	0.7069	6.84
Post-Abrogation	0.2887	3.05
Amount Outstanding	−0.0001	−0.56
Called	−0.1007	−2.25
Gold to Non-Gold	−0.0681	−2.31
Adj. R^2		0.3726
N		40

Table 6

Summary Statistics for the U.S. Treasury Bonds. This table reports the average prices, yields, and durations of the gold clause and non-gold clause bonds in the sample. The bond prices are full prices that include accrued coupon. Yields are expressed as percentages. Duration is expressed in years. N denotes the number of daily observations. The sample period is daily from January 1, 1933 to May 31, 1935.

Coupon	Maturity	Year of Issuance	Average Price	Average Yield	Average Duration	N
Gold Clause Bonds						
3.375	Jun 1940-43	1928	103.82	2.823	5.65	659
3.375	Mar 1941-43	1931	103.76	2.882	6.24	660
3.375	Jun 1943-47	1927	103.60	3.021	7.97	658
3.125	Jun 1946-49	1931	101.44	3.057	10.18	691
3.000	Sep 1951-55	1931	100.14	3.043	13.61	690
Non-Gold Clause Bonds						
3.250	Aug 1941	1933	104.01	2.724	6.36	523
3.250*	Oct 1943-35	1933	103.30	2.981	7.91	459
3.250	Apr 1944-46	1934	104.04	2.847	8.17	329
3.000	Jun 1946-48	1934	102.33	2.835	9.77	276
3.125	Dec 1949-52	1934	104.56	2.806	11.93	131

* Coupon is 4.250 until October 1934.

Table 7

Summary Statistics for the Gold-Clause Spread This table reports summary statistics for the gold-clause spread, defined as the difference between the yield on the non-gold-clause bonds and the gold-clause bonds. Spreads are expressed in terms of basis points. The t-statistic for the mean is based on the Newey-West estimator of the variance (with five lags). N denotes the number of daily observations. The sample period is daily from January 1, 1933 to May 31, 1935.

Period	From	To	Mean	t_{Mean}	N
1	11-Aug-1933	30-Jan-1934	−0.04	−0.06	129
2	31-Jan-1934	31-Dec-1934	4.82	18.88	211
3	1-Jan-1935	17-Feb-1935	8.79	10.50	35
4	18-Feb-1935	31-May-1935	8.43	23.22	68
Full Sample	11-Aug-1933	31-May-1935	4.26	9.82	443

Table 8

Results from the Regression of the Gold Clause Spread on Explanatory Variables. This table reports the results from the regression of the gold clause spread, measured as the difference between the yields on gold clause bonds and on non-gold clause bonds, on the first three lags of the gold clause spread and the indicated explanatory variables. Gold Price denotes the daily London fixing for gold. Volatility denotes the volatility of daily stock returns computed using a Garch(1, 1) model. Liquidity denotes the ratio of total Treasury security trading volume divided by total bond trading volume on the New York Stock Exchange. All data are daily. The t-statistics are based on the Newey-West (1980) estimator of the covariance matrix (with five lags). The sample period is August 11, 1933 to May 31, 1935.

Variable	Coefficient	t-Statistic
Intercept	−6.4892	−2.77
Spread_{t-1}	0.4727	6.51
Spread_{t-2}	0.1974	2.37
Spread_{t-3}	0.1922	3.97
Gold Price	0.2086	2.92
Volatility	−0.0006	−2.07
Liquidity	0.0011	2.81
Adj. R^2		0.7379
N		443