Did Adhering to the Gold Standard Reduce the Cost of Capital?

Ron Alquist
University of Michigan

and

Benjamin Chabot
University of Michigan and NBER

Preliminary and Incomplete

Abstract:

Nations that adhered to the Gold Standard were not rewarded with a low cost of capital. We collect new data consisting of more then 38,000 monthly bond returns between 1870 and 1907. These data allow us to compute realized ex-post returns for investments in gold standard and non-gold standard sovereign bonds. We measure the effect of gold standard adherence while controlling for other risk factors by forming managed portfolios that mimic the return an investor would receive had he bet on a spread between the expected return of bonds issued by gold and non-gold standard nations. We use the same methods used to evaluate modern mutual fund managers. We find little evidence that nations that abandoned gold were punished by the capital market. Overall, the return on bonds issued by gold and non-gold nations are indistinguishable from each other. When we alter the sorting criteria to accommodate a period of punishment after returning to gold the spread becomes economically meaningful but remains statistically indistinguishable from zero.

Did adhering to the classical gold standard reduce a nation's cost of capital? Bordo and Kydland (1995) argue that pre-1914 capital markets treated a nation's adherence to gold as a signal of its commitment to prudent fiscal and monetary policy. According to the thesis, governments could use the gold standard to commit to macroeconomic policies that would be time inconsistent in the absence of a currency peg. One testable implication of the theory is that capital markets view gold standard adherence as a "good housekeeping seal of approval," and rewarded nations that maintained gold convertibility with a lower cost of capital.

Empirically, Bordo and Rockoff (1996) find that sovereign borrowing costs "differed substantially from country to country" and "these differences were correlated with a country's long-term commitment to the gold standard."[1] Their findings are consistent with the country studies of Martin-Acena (1993) and Sussman and Yafeh (2000), and have been confirmed in a larger sample by Obstfeld and Taylor (2004). The "good-housekeeping" interpretation of the gold standard has not gone unchallenged. Clemens and Williamson (2004) examine capital flows rather than bond yields and conclude that the gold standard paled in importance compared to the fundamental determinants of capital productivity. In fact, they conclude that "gold was nowhere near the most important determinant of [capital] flows."[2] Niall Ferguson (2003) claims membership in the British Empire rather than gold standard adherence was the key to lower borrowing costs. Flandreau and Zumer (2004) view the good-housekeeping hypothesis most pessimistically. They argue that international lenders focused almost exclusively on a country's ability to repay its foreign obligations and paid little attention to the monetary regime. Conditional on sound public finances, Flandreau and Zumer find adherence to the gold standard had little influence on bond yields.

The good-housekeeping thesis implies that nations on the gold standard received more favorable terms on international capital markets. How can there be such disagreement about a theory that generates such a clean testable implication? As is often the case when historians differ, the available data are insufficient to put the hypothesis to

[1] Bordo and Rockoff (1996) pp.416
[2] Clemens and Williamson (2004), pp. 333.

a proper test. To understand why, it is helpful to think of the good-housekeeping hypothesis as a statement about expected returns rather than a statement about bond yields. While the yield and the expected return of a bond are closely related, they differ in important ways and these differences are likely to be correlated with gold standard adherence. The principal shortcoming of prior tests of the good-housekeeping hypothesis is their inability to measure expected returns accurately.

II. The Gold Standard as a Repeated Game

Bordo and Kydland (1995) model the gold standard as a credible commitment mechanism. Nations and international lenders are engaged in a repeated game. Each period the government may raise funds via a mix of taxation and borrowing. Governments prefer to borrow on favorable terms and therefore promise to follow fiscal and monetary policies that maximize the probability that investors are paid back in valuable currency. In the absence of a credible commitment mechanism, the promise is time inconsistent. Once investors have loaned funds, the future governments have three potential sources of revenue: (1) they can sell bonds to future bond investors; (2) tax future citizens directly; or (3) tax past bond investors indirectly by devaluing the purchasing power of the currency. Once investors have loaned funds, the funds are inelastically supplied to future governments. A future government that chooses the optimal mix of borrowing, taxation and inflation to minimize dead-weight loss has an incentive to tax past bond investors by inflating away the value of their debt. Today's investors, however, recognize that government financial policy is time-inconsistent. They are unwilling to loan money today without a credible guarantee that the future government will repay their debt.

In a one-shot game the problem of time inconsistency is insurmountable and governments are forced to finance expenditures with direct taxes. Borrowing becomes possible in a repeated game when future bond investors force future governments to follow sound monetary policies. Investors could achieve the outcome with the following tit-for-tat strategy. International lenders reward a government that promises to follow sound fiscal and monetary policies with a low cost of capital today. If the future government deviates from sound policies, future lenders punish the future government by raising its cost of capital. Each period the government faces a choice between the benefit of cheating (implicitly taxing the inelastically supplied funds of past bond investors via inflation) and the cost of cheating (the loss of reputation and with it future low-cost borrowing). As long as the present value costs of cheating outweigh the benefits, the government finds it optimal to maintain sound money.

To implement the strategy, bond markets must be able to monitor government's behavior. A government can signal the international bond market that it is following sound fiscal and monetary policies. The signal must be consistent with the sound policy and easy for international investors to monitor. In our setting, it amounts to a signal that the government is not devaluing their currency. Gold standard adherence served as such a signal.

The good housekeeping explanation of the gold standard generates a clean testable hypothesis. If two nations issue bonds with identical expected cash flows, the bond market assigns the same price to each bond provided both nations have maintained sound money. If one of the nations has cheated in previous periods, however, the bond market punishes this deviation by assigning a lower price to the bond of the nation that abandoned gold. The hypothesis therefore predicts that bonds issued by nations on the gold standard will have higher prices and lower expected returns than identical bonds issued by nations off the gold standard.

Is the good housekeeping model an adequate explanation of government and market behavior prior to World War I? One problem with the model is that it requires the bond market to behave in a collective manner. The sound money equilibrium is only attainable if the bond market punishes countries today that left gold in the past. Thus if two nations issue bonds with identical expected cash flows, the bond market assigns a lower price to the nation that abandoned gold. Punishment creates an arbitrage opportunity as it implies two assets can promise the same payments but trade at different prices. Despite this, punishment is consistent with equilibrium as long as the bond market is sufficiently patient to forgo current arbitrage profits in exchange for a future of sound money. If bond market prices were set by a small number of patient agents this equilibrium would be easy to attain. In reality, the bond market is made up of many finite lived investors who collectively set prices but individually are approximate price takers. If an individual investor is sufficiently small that his investment decision does not influence the market price, the investor can take advantage of the arbitrage opportunity without altering the equilibrium. Individually each small investor may realize he has no market power. Collectively, however, their actions result in bonds with identical expected cash flows receiving identical prices regardless of past adherence to the gold standard. In sum, the good housekeeping equilibrium relies upon the bond market collectively forgoing present day profits in order to punish governments that deviate from sound money. With many participants, the equilibrium requires a collective action mechanism to prevent arbitrage seeking investors from pushing the prices of gold and non-gold bonds together.

Large institutional investors, who were both sufficiently patient to play the punishment strategy and large enough to influence equilibrium prices, are good candidates for collective punishment of nations that abandoned gold. Historical candidates include the Council of Foreign Bondholders (CFB) and large investment banks. The former was a corporation representing the British bondholders of nations that had defaulted on past obligations. The CFB tried to punish past sinners by restricting their access to the London bond market. Investment banks also behaved in a manner consistent with a repeated-game grim strategy. Banks that underwrote an offering often refused to underwrite new offerings until the country made previous bondholders whole. Whether these or other institutions were sufficiently large to affect equilibrium prices and punish cheaters is the empirical question we seek to answer.

III. Bond Yields, Expected Returns and the Testable Implications of the Good-Housekeeping Hypothesis

The good-housekeeping hypothesis implies that, holding all else equal, bonds of countries adhering to the gold standard trade at higher prices (lower expected return) than bonds issued by non-gold standard countries. The hypothesis is not easy to evaluate. To begin with, expected returns are unobservable and must be proxied for with yield or estimated from realized holding period returns. To make matters worse, the expected returns of bonds vary for reasons other than the credibility of the issuing governments' monetary regime. Past tests of the good-housekeeping hypothesis have attempted to control for these factors by estimating a regression of the following form:

$$Yield_{i,t} = \alpha_i + \delta dumgold_{i,t} + \lambda_i Marketyield_t + \mathbf{X}_{i,t} B_i + \varepsilon_{i,t} \qquad (1)$$

Yield is a proxy for expected return and is often measured as coupon yield. Dumgold is a dummy variable equal to one if the nation is playing by the rules of the gold standard. Market yield captures common changes in all yields and is often the yield on British consols or the average of all bonds[3]. **X** is a vector of country specific fiscal and monetary measures designed to capture differences in economic fundamentals and the ability to repay debt. The test of the good-housekeeping hypothesis then amounts to a test that $\delta < 0$. If, holding all else equal, adhering to gold lowered a nation's yield, we take this as evidence in favor of the good housekeeping hypothesis.

Different authors have estimated versions of equation (1) and reached contradictory conclusions depending upon their choice of nations and control variables. Our complaint with the use of equation (1) is the use of yield as the dependent variable. There is nothing inherently wrong with testing the good-housekeeping hypothesis with yields provided they are measured accurately. Unfortunately, the current practice of employing coupon yield in equation (1) virtually assures that expected return is measured with error and that the measurement error is correlated with gold standard adherence.

Imagine a nation that offers a one-time nominal payment, X_t , payable t-years from now. The bond market evaluates this nation's prospects and assigns price P_0 to the bond today. The annual yield of this bond is the value of z_t that solves the present value

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[3] Some studies move market yield to the left hand side and express the dependent variable as the spread between country i's yield and the market yield.

equation $P_0 = \frac{X_t}{(1+z_t)^t}$. When evaluating the good housekeeping hypothesis, we wish to compare the value of z_t across nations and see if yields vary with gold-standard adherence. Unfortunately, nations did not issue zero-coupon (single payment) bonds during the period of inquiry. Instead, they followed the still common practice of issuing coupon bonds that promised a series of periodic coupon payments and face value at maturity.

Consider a bond with promised cash flow $\{X_1, X_2, ..., X_T\}$ and current price P_0. This bond is simply a portfolio of zero-coupon bonds and the current price can be written as the discounted stream of future cash flow.

$$P_0 = \sum_{t=1}^{T} \frac{X_t}{(1+z_t)^t} \qquad (2)$$

Where z_t is the annual yield on a zero-coupon bond that matures at time t. For most markets and time periods, $z_t \neq z_s$ for $t \neq s$. That is, the term structure of the yield curve is seldom flat. The market often demands different annual yields for cash payments at different times in the future. To further complicate matters, most nations had only a handful of bonds outstanding at any one time. When the term structure is not flat and the number is bonds is small, the individual values of z_t are not identified. That is, given a handful of bonds it is possible to find different sequences of z_t that price each bond perfectly. Unfortunately, this problem is pervasive in the pre-World War 1 sample..

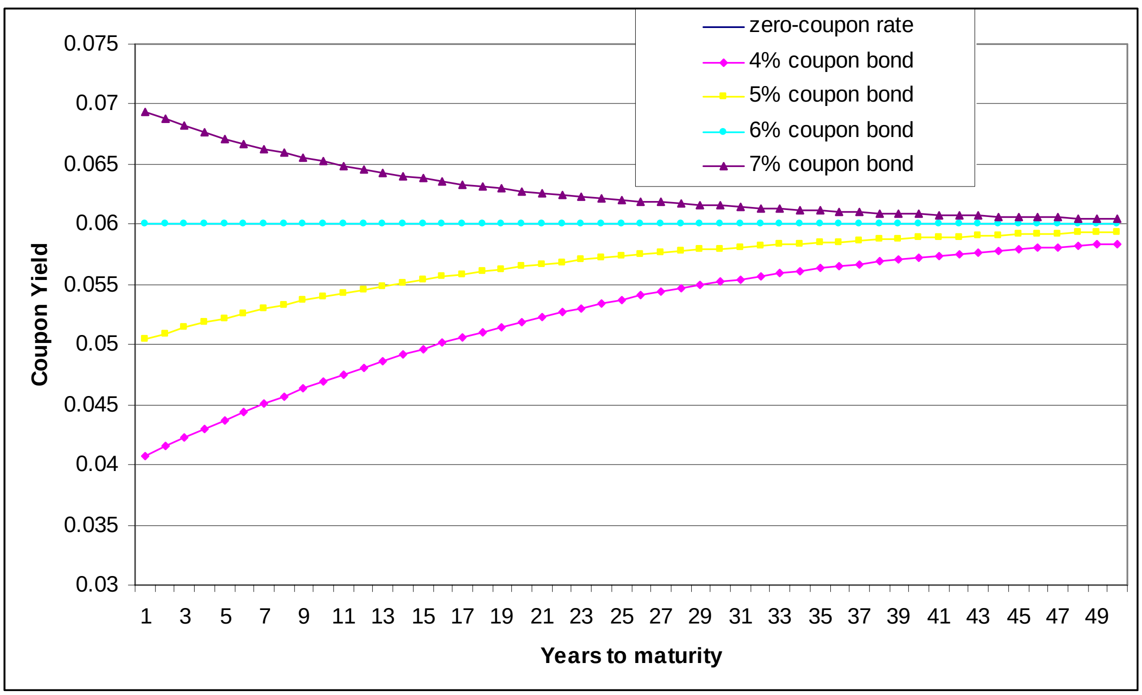
The difficulties that arise when one uses observed yields to evaluate the good-housekeeping hypothesis are now apparent. Suppose one nation issues a 10-year coupon bond and another nation issues a 20-year coupon bond. How can we compare their yields? One common method is to ignore the term structure and compute an average "yield to maturity". The yield-to-maturity is computed by assuming all zero-coupon rates are equal to the common rate that solves the present value equation

$$P_0 = \sum_{t=1}^{T} \frac{X_t}{(1+ytm)^t} \qquad (3)$$

Yield-to-maturity is the annual return an investor will receive if the bond makes all payments and the investor re-invests all coupon payments at the same yield-to-maturity. It is also equal to the true (unobservable) zero-coupon yields if the yield curve is perfectly flat.

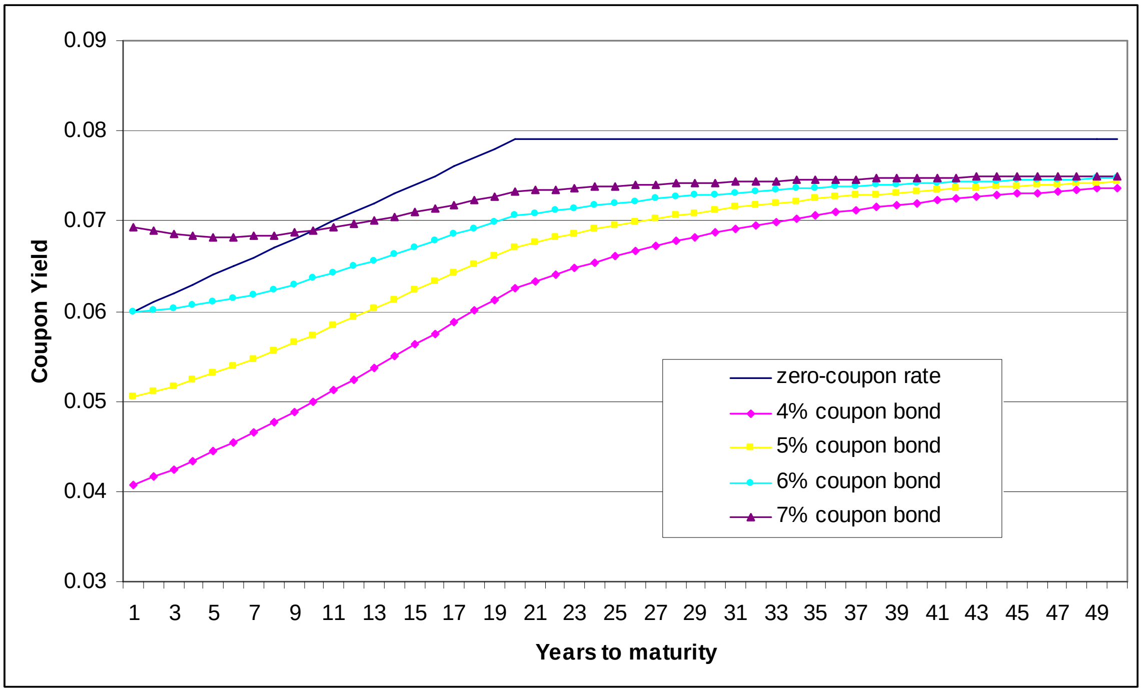
Figures I and II graph the relationship between coupon yield, yield-to-maturity, and time to maturity for a flat (figure I) and upward-sloping zero coupon bond yield curve. The bond prices and yields in figures I and II are derived from exactly identical sequences of z_t yet the coupon yields and yields-to-maturity vary as we alter the time to maturity and coupon payment. Figures I and II highlight the measurement error when one uses coupon yield as a proxy for expected return.

Figure I: Coupon Yields for Different Times to Maturity



All Yields computed with a constant 6% zero-coupon curve.

Figure II: Coupon Yields for Different Times to Maturity



The difference between coupon yield and yield-to-maturity was often large and exacerbated by lottery provisions inserted into bonds. The following example illustrates the difference. At the end of 1899, the Brazilian 1920 4.5% bond traded at 57 in London. The coupon yield of this bond was 4.5/57 or 7.89%. Past tests of the good housekeeping hypothesis have used this coupon yield to proxy for Brazil's cost of capital. The bond had a sinking fund provision that required Brazil to retire 1% of the bonds via lottery each year with selected bonds retired at par. From Brazil's perspective, the bond is a portfolio of bonds with varying yields to maturity. 1% of the portfolio consists of bonds that mature next year at an annual yield of 104.5/57 or 83.3%! Another 1% will be retired in 2 years at par plus coupons for an annual yield of 38.2%. Another 1% will be called in 3 years, and so on. If we take the total cash flow that this bond obligates Brazil to pay, and discount it at a constant rate for all maturities the resulting yield-to-maturity is 10.19%. Thus the bond's yield-to-maturity was 230 basis points higher than its coupon yield.

Coupon yield is a poor proxy for a nation's true cost of capital. To make matters worse, the magnitude of this measurement error is likely correlated with the likelihood that a country was on the gold standard. Peripheral countries were far more likely to issue bonds with shorter maturities or sinking fund provisions. These countries were also more likely to leave the gold standard. As a result, the magnitude of the measurement error is correlated with gold standard adherence. Figure III compares the computed yield-to-maturity to the coupon yield on the bonds of 16 nations used by Flandreau and Zumer (2004). Core countries such as France, The Netherlands, Austria-Hungary and Belgium issued long dated bonds with yield-to-maturity close to coupon yield for most years. Argentina, Brazil, Greece and Italy, on the other hand, issued bonds with shorter maturities or sinking funds that resulted in large differences between yield-to-maturity and coupon yield.

Yield-to-maturity is generally a better proxy for z_t than coupon yield but the literature evaluating the good-housekeeping hypothesis almost exclusively uses coupon yield in regression (1) [4]. The reason is coupon yield is easy to compute from observable data whereas yield-to-maturity often is not. Many 19th century bonds included lottery provisions that required the issuing nation to redeem a certain number of bonds at a preset price. If these lotteries, like the examples above, took the form of a mandatory sinking fund, the yield-to-maturity could be computed but for many bonds the sinking fund was an option where the price of future redemptions was a function of future (unknown) prices. In these circumstances, estimating the yield-to-maturity is extremely difficult and requires assumptions about future returns.

A Solution: Expected Return

The principal shortcoming of prior tests of the good-housekeeping hypothesis is their inability to measure yields accurately. Past tests of the good-housekeeping hypothesis have relied upon coupon yield as a proxy for yield. We argue that the coupon

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[4] Bordo and Rockoff (1995) use bond quotations from London and Paris. Obstfeld and Taylor (2003) use the coupon yield on long-term gold or sterling government bonds, with a maturity of at least 10 years, based on the London quotations, if available. See their discussion and data appendix. The data are available from the *Economic Journal*'s website. Although Flandreau and Zumer (2004) discuss the problems associated with correctly measuring the cost of capital in the appendix, they use coupon yield, ignoring the difficulties that we consider. Their data are freely available at http://eh.net/databases/finance/. Mauro, Sussman, and Yafeh (2006) use the IMM data, just as we do, and compare coupon yield with yield to maturity. They document how the two measures diverge, particularly as the bond approaches maturity. Ultimately, they opt to use coupon yield.

yield methodology is biased by measurement error. Instead, we propose that expected return be used in place of coupon yield.

Given a bond with current price $P_0 = \sum_{t=1}^{T} \frac{X_t}{(1+z_t)^t}$, the expected one-period gross return is

$$E_0\{R_1\} = P_0^{-1} E_0\{X_1 + \sum_{t=2}^{T} \frac{X_t}{(1+z_t)^t}\} = E_0\{\frac{X_1 + P_1}{P_0}\} \qquad (4)$$

Thus the expected return of the bond is the sum of the expected capital gain $\{\frac{P_1}{P_0}\}$ and coupon yield $\{\frac{X_1}{P_0}\}$. Past tests of the good housekeeping hypothesis have ignored the capital gain and attempted to evaluate the effect of gold standard adherence on coupon yield alone. Because coupon yield ignores capital gains and losses, it understates the true cost of capital when bonds are issued below par or contain sinking fund provisions. As a result, coupon yield based evaluations of the good-housekeeping hypothesis understate the true cost of capital many countries faced in the international bond market.

Expected return is a function of the unobservable z_t sequence but it can be estimated. If financial markets are informationally efficient, the realized return is the sum of the expected return and an independent mean zero random error

$$R_t = E[R_t] + \varepsilon_t \qquad (5)$$

Sample averages can therefore be expected to converge to expectations.

The expected return of a bond is the sum of the coupon yield and expected capital gain. We should therefore expect trailing average returns to do a better job of forecasting future return then coupon yield. To illustrate this point we formed 10 managed portfolios sorted by coupon yield and average lagged return. Specifically, for each time period in our 1870-1907 sample we computed the coupon yield of each bond and also computed the bond's return over the previous 3 years. With coupon yields and trailing returns in hand we then sorted bonds into 10 portfolios based on coupon yield and trailing return.

Thus, if a bond's time t trailing return was in the 20^{th} percentile it was assigned to the second decile portfolio and held until t+1. At time t+1 bonds were resorted based on updated returns. We form 10 yield sorted portfolios via the same procedure. Figures IV and V graph the realized returns of the yield and lagged return sorted portfolios. Portfolios sorted by lagged returns were more closely correlated with future returns.

Figure IV

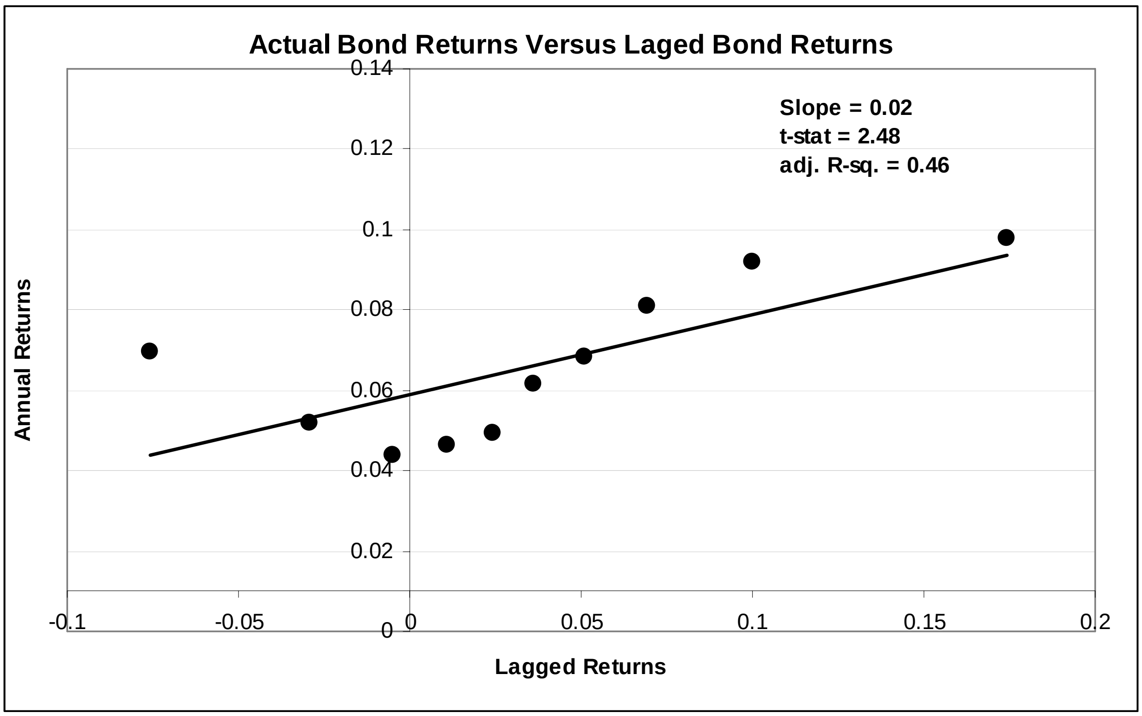
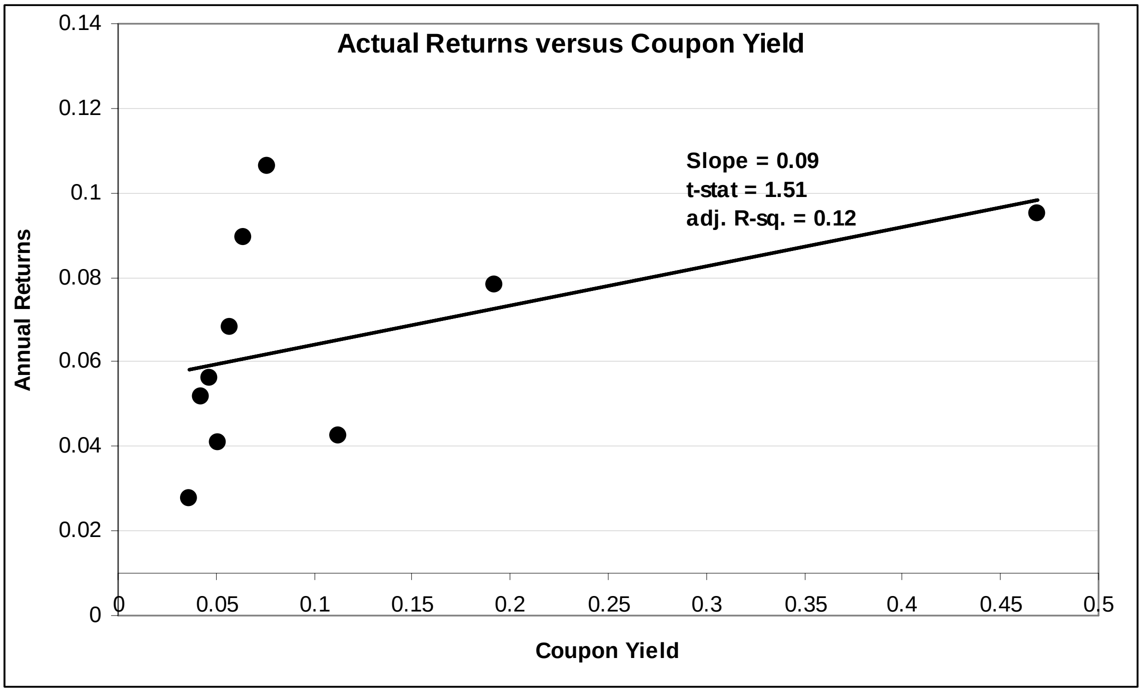


Figure V



IV. Data and Tests

The good housekeeping hypothesis generates testable predictions about expected returns, but expected returns are unobservable and proxies used in past tests are biased. We propose a simple though data intensive solution. We collect a high frequency database of sovereign bonds trading in the London between 1870 and 1907. The data consists of bid, ask, and dividend prices for 213 foreign bonds issued by 36 nations and listed in London between 1870 and 1907. The data was collected every 28-days from the official quotations published in the *Money Market Review*.

These new data allow us to sidestep the measurement error problem inherent in the coupon-yield based tests by computing the actual holding period returns of over 38,000 monthly bond investments. If the bond market demanded high returns from nations that abandoned gold we should be able to use information about gold standard adherence to form portfolios with high expected returns.

Specifically, we use the same methods financial economists employ to evaluate modern mutual fund managers or trading strategies. Our test evaluates the null hypothesis that a Victorian investor could not beat the market, on a risk adjusted basis, by following a strategy based on knowledge of gold standard adherence. According to the good housekeeping thesis, international lenders punished countries that did not adhere to the gold standard by assigning their bonds lower prices and demanding a higher risk-adjusted return. We test this hypothesis by forming managed portfolios that mimic returns an investor would have earned had he purchased a value-weighted portfolio of bonds issued by countries off gold and shorted another portfolio comprised of bonds issued by countries on gold. If the good housekeeping hypothesis is false, we do not expect an investor to be able to beat the market by sorting bonds via a publicly observable criterion such as gold-standard adherence. On the other hand, if the good-housekeeping hypothesis is correct, the market punished countries that abandoned gold and a portfolio of sinners offered an opportunity for excess returns.

The Models:

We test the null hypothesis that expected returns differed because a country adhered or did not adhere to gold. Countries did not leave gold randomly, however. If a country wanted to remain on gold but was forced off due to war or the business cycle, we need to be careful not to conflate the risks with the repeated game punishment. British investors might legitimately demand a high expected return as compensation for assuming greater business cycle risk. In such a case, the good housekeeping hypothesis could be false but the return on the debt of gold standard countries would still be smaller due to lower business cycle risk.

The counterfactual we ask is, are British and foreign assets treated *exactly* alike regardless of whether the foreign country adheres to the rules of the game? That is, assuming a British and a foreign asset offers the same risk of default, does the foreign asset command a lower price, and thus a higher return, because the market is punishing departures from the gold standard? To answer this question, we require a model of risk and return. If a foreign security earns a return above what the model suggests that a similar British security would earn, we interpret this as evidence of gold standard risk.

We estimate two models of risk-adjusted expected return. The first is the well-known Capital Asset Pricing Model (CAPM) which equates the excess expected return of an asset to the risk-free rate, R_f , and its beta with the market portfolio, R_m

$$\text{CAPM:} \qquad E[R_t] = R_f + B E[R_m - R_f] \qquad (6)$$

We use the London banker's bill rate as our risk-free rate and the market portfolio of British assets to estimate the CAPM[5]. We estimate the risk-adjusted excess return via the following regression.

$$(R_t - R_f) = \alpha + B(R_m - R_f) + \varepsilon_t \qquad (7)$$

Alpha measures the difference between the return of the asset and its expected return conditional on market risk. If the asset in equation (7) is a managed portfolio, alpha is a measure of the manager's ability to beat the market. In the context of our tests, the asset in question is a portfolio of bonds issued by countries off the gold standard minus a portfolio of bonds issued by countries on the gold standard. If the good housekeeping hypothesis is correct, the portfolio has $\alpha > 0$, which is equivalent to saying the expected return of a portfolio of countries off gold is greater than the expected return of a portfolio of other traded assets with the same risk.

Changes in the market portfolio may not capture all consumption risk. If consumption fluctuations are correlated with foreign bonds but independent of the British market portfolio, London investors would demand a premium to hold these risks. This would result in estimated alphas greater then zero even if the good housekeeping

[5] We form the market portfolio of British assets from three portfolios. The first is the return on the British Consol. The second and third are a value-weighted stock portfolio consisting of virtually every British stock trading in London between 1866 and 1907, a value-weighted corporate bond portfolio consisting of most railway bonds trading in London between 1866 and 1885 and a sample of the 7-10 largest bonds from 1886-1907. The market portfolio is the weighted average of these three portfolios with the weights re-set annually to match the respective weights of the asset class reported in the Stock Market Intelligence.

hypothesis is false. To check the robustness of the CAPM,,we also estimate a 5 factor pricing model:

$$\text{APT:} \quad (R_t - R_f) = \alpha + B_1(R_m - R_f) + B_2(f_2) + \ldots B_5(f_5) + \varepsilon_t \qquad (3)$$

Where $f_2 \ldots f_5$ are common risk factors extracted from the covariance matrix of all asset returns via principal components. If the APT holds, $\alpha = 0$. Alpha is therefore a measure of the difference between the return of the asset and its expected return conditional on market and factor risk.

Test Portfolios:

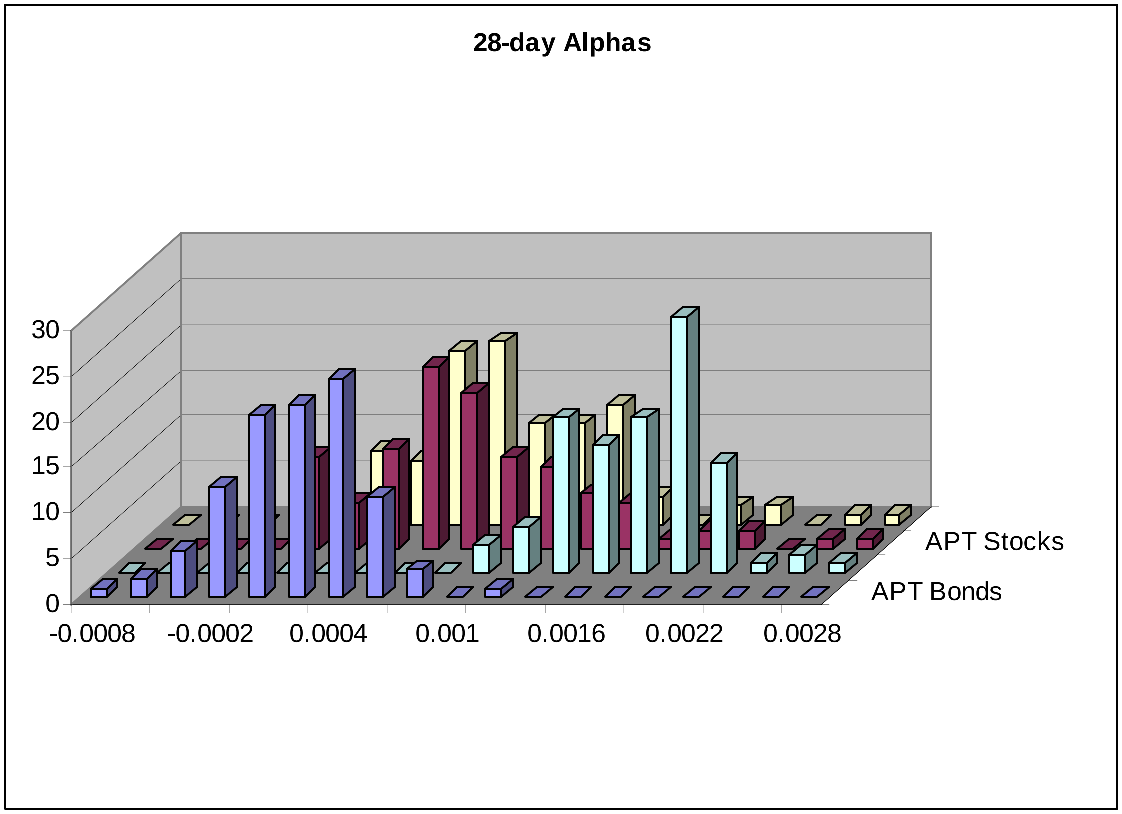
We evaluate the null hypothesis that international lenders punished countries off the gold standard by demanding higher expected returns than other assets with the same risks. To test the hypothesis, we form three portfolios comprised of bonds issued by nations off the gold standard. The first portfolio mimics the return an investor would have realized if he managed his portfolio by purchasing a value weighted portfolio of all bonds issued by nations currently off gold and sold short the bonds of all nations on the gold standard. The portfolio is managed each period. If a nation adopts the gold standard, we remove the country's bonds from the off-gold portfolio and add it to the on-gold portfolio. We identify the month of every suspension and resumption of gold convertibility and update the portfolio monthly. The appendix contains the list of countries in our sample and the dates we use to identify when a country went on or left gold.

The managed portfolios may reflect anticipation of gold standard resumption. If the market values gold-standard adherence and expects a country to return to gold, bond prices may rise on the anticipation of resumption of specie payments. Likewise, if investors expect a nation to abandon gold they may sell in anticipation. The return of our off-gold minus on-gold portfolio will be biased upwards if our dating procedure lags market expectations and the null hypothesis is true. On the other hand, Bordo and Kydland (1995) and Bordo and Rockoff (1996) predict that the punishment for leaving the gold standard should continue until a nation has rebuilt its reputation with the bond market. If the market continues to punish nations until they have been on gold for a sufficient period, our off-gold minus on-gold portfolio will be biased downward. We therefore form a two more portfolios derived in the same manner as the first with the exception that bonds are not added to the on gold portfolio until they have been on the gold standard for one or two years respectively.

Our tests are joint tests of the good housekeeping hypothesis and the asset-pricing model. As a robustness check, we also compute 100 randomly managed stock and bond portfolios. These portfolios are compiled by random draws from the uniform [0,1] distribution. Each period, a draw is made for each security. The security is included in the portfolio for that time period if the draw exceeds .75. The selection is repeated each period and the resulting portfolio return is compared to the CAPM and APT predicted returns. This procedure highlights the goodness or fit and average alpha one would expect if the managed portfolios were selected at random instead of selected via a gold-standard criteria.

The distribution of alphas is plotted in figure VI.

Figure VI



The APT does and excellent job pricing randomly managed portfolios of bonds. The median CAPM mispricing of a randomly managed portfolio of bonds is 18 basis points, however. If one were to choose bonds at random they should expect to beat the predicted CAPM return by 2% or more per annum.

V. Results

Table II contains the regression alphas for the managed portfolios. The managed portfolio comprised of bonds issued by nations off gold minus bonds issued by nations on gold has a return of -7 basis points per annum. Had a portfolio manager attempted to beat the market by betting on gold-standard bonds underperforming non gold-standard bonds he would have soon found himself out of a job. The difference between the gold and non-gold realized returns was both statistically and economically small.

The one and two-year lagged portfolios do provide some evidence in favor of the good housekeeping hypothesis. Whether the mutual fund manager waits 1 or two years to add a bond to the on-gold portfolio the average return rises to 84 and 89 annual basis points respectively. These are small absolute returns but they are achieved with minimal systematic risk. In fact, once one controls for systematic risk via the CAPM or APT the excess return rises as high as 221 basis points. In 100 random draws none of the random portfolios beat these returns in a risk adjusted sense. However, the returns are two noisy to reject the null that this is statistically different then zero via a conventional regression t-test.

Conclusion

The good-housekeeping hypothesis predicts that the international bond market rewarded countries that adhered to the classical gold standard with a more favorable cost of capital. Past tests of this hypothesis incorrectly measured expected returns. We address the measurement error problem by introducing a new data set consisting of the 28-day holding period return of every sovereign bond trading in London between 1870-1907. The new sample allows us to measure actual holding period returns and apply modern asset pricing models to evaluate the testable implications of the good housekeeping hypothesis.

We reject the good housekeeping hypothesis. The returns on bonds issued by nations on and off the gold standard were too small to distinguish statistically. The data suggest bond markets were unable to collectively punish countries that abandoned gold.

Figure 1: Actual Cost of Capital versus Coupon Yield Cost of Capital

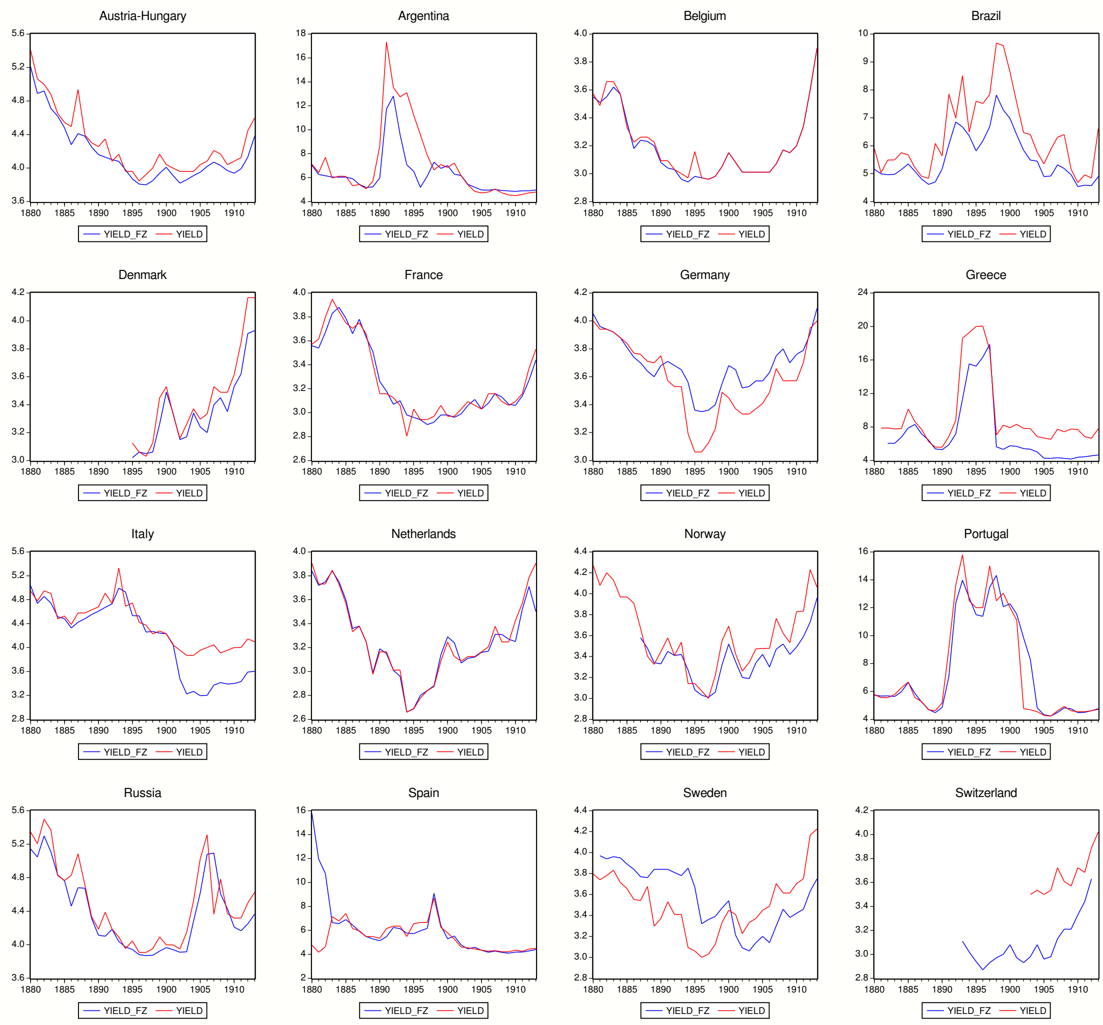


TABLE I: SORTED PORTFOLIOS

Lagged Return Sorted Portfolios		
Decile	Returns	Lagged returns
Lowest lagged return	0.069	−0.075
2	0.052	−0.029
3	0.043	−0.005
4	0.046	0.011
5	0.049	0.024
6	0.061	0.036
7	0.068	0.051
8	0.081	0.069
9	0.092	0.100
Highest lagged return	0.098	0.174
Coupon Yield Sorted Portfolios		
Decile	Returns	Avg. coupon yield
Lowest Yield	0.028	0.036
2	0.052	0.042
3	0.056	0.047
4	0.041	0.051
5	0.068	0.057
6	0.089	0.064
7	0.106	0.076
8	0.042	0.113
9	0.078	0.192
Highest Yield	0.095	0.469

Notes: Returns are annualized.

TABLE II: Managed Portfolios.

Alpha and Average Return computed with 28-day data and reported as annual rates

	Off Gold − On Gold	Off Gold − On Gold (1 year+)	Off Gold − On Gold (2 year+)
Avg. Return	-0.0007	0.0084	0.0089
Std. Dev.	0.0972	0.0924	0.0941
		CAPM	
$\hat{\alpha}$	0.0033	0.0131	0.0145
	(0.21)	(0.86)	(0.93)
$\bar{R}^2$	0.0030	0.0001	0.0015
		APT	
$\hat{\alpha}$	0.0055	0.0221	0.0208
	(0.35)	(1.49)	(1.35)
$\bar{R}^2$	0.0108	0.0623	0.0408
Sample	1870-1907	1871-1907	1872-1907

Notes: $\hat{\alpha}$ is from the monthly regression $r_{i,t+1} - r_{f,t} = \alpha + \beta(r_{M,t} - r_{f,t}) + e_{t+1}$. The APT model is the same regression with 4 additional factors included. Off gold − on gold is the managed portfolio one obtains by going long the stocks off gold and shorting the stocks on gold. Off gold − on gold (1 year+) and off gold − on gold (2 year+) are the managed portfolios one obtains going long the stocks off gold and shorting the stocks that have been on gold for at least 1 (2) years. t-statistics in parentheses.

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Appendix

Argentina: January 3, 1867-May 1876: Dated from establishment of Office of Exchange to control amount of paper pesos outstanding. July 1883-December 1884: de facto suspension of convertibility by banks. October 31, 1899: Law establishing external convertibility. Source: della Paolera, Gerardo and Alan Taylor, "Straining at the Anchor: The Argentine Currency Board and the Search for Macroeconomic Stability: 1880-1935," University of Chicago Press, 2001, pp. 25, 41, 47.

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