Sovereign Risk and the Gold Standard, 1870–1914

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Abstract

Historical sovereign debt literature employed an inadequate measure of bonds' yields, namely the *internal rate of return* or its special case, the *coupon-price ratio*. It is argued that *periodical rates of return* are a better measurement because they closely emulate an investor who reconsiders her investment position periodically, rather than maintaining a portfolio until bond maturity. The empirical relevance is assessed showing that the "good housekeeping seal of approval" hypothesis hinges on measuring yields by coupon-price ratio.

JEL Codes: N20; F33; G15.

Keywords: Bonds Rate of Return; Gold Standard; Financial Markets.

ANPEC Code: Area 6 – International Economics.

Resumo

A literatura acerca títulos de dívida soberanos históricos empregou uma medida inadequada de retornos de títulos, a *taxa interna de retorno* ou o seu caso especial, a *razão cupom-preço*. Argumenta-se que *taxa periódica de retorno* é uma medida mais apropriada porque simula o retorno obtido por um investidor que reconsidera a posição de investimento periodicamente, em contraposição ao comportamento que supõe a manutenção em carteira de títulos até maturidade. A relevância empírica é avaliada mostrando que a hipótese de "selo de aprovação" depende da medição de retornos pela razão cupom-preço.

Código JEL: N20; F33; G15.

Palavras-Chave: Taxas de Retorno; Padrão-ouro; Mercado Financeiro.

Código ANPEC: Área 6 – Economia Internacional.

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1 Introduction

A large body of international financial history literature made use of a specific measure of yield, the *internal rate of return* or its special case, the *coupon-price ratio*. Examples extend across several different subfields. Making use of the former, Lindert and Morton [1989] discussed the treatment of defaulters since 1850, showing evidence that investors paid little attention to the past payment record of borrowing governments; Eichengreen and Portes [1989] compared the widespread default of the 1930s and the debt crisis of the eighties, evaluating the intensity of defaults for the interwar years and assessing the effectiveness of a range of strategies adopted by the various parties to settle debt. More recently, Mauro et al. [2006] compared the determinants of borrowing costs related to debt floated between 1870 and First World War with similar costs today, using coupon-price ratio for the historical period. Applying the same measure, Tomz [2007] studied the perceived riskiness of a borrower – its reputation – comparing new to "seasoned" borrowers bond yields. In common, all these studies employed internal rates or return of its particular case, the coupon-price ratio, to measure yields.

This paper argues that internal rates of return and coupon-price ratios are not adequate measures of historical sovereign bond yield, which are better measured by *periodical* (monthly, yearly, etc.) *rates of return*. The main criticism is that the formulation usually employed assumes that the portfolio decisions are taken once and kept for an infinite time span or until bond maturity. Moreover, coupon-price ratio is a special case of internal rates of return when considering additionally that *(i)* there are no amortizations and *(ii)* coupon payments are constant and do not cease, i. e., securities are consols. These conditions can also be interpreted as inexistence of defaults (either in principal or coupons), even if on the brink of occurrence, and unlikely to hold. In contrast, periodical rates of return closely emulate a hypothetic investor behavior who reassesses its investment position periodically and to whom asset price revaluation directly matters. Formal definitions and derivations are presented in the second section, where it will also be shown that periodic revaluation of investment position is a close analog for investors that put positive weight on principal revaluation.

In the meantime, several papers stressed what came to be known as the "good housekeeping seal of approval" hypothesis, after the homonymous paper by Bordo and Rockoff [1996], and complemented by Bordo and Rockoff [1996], Obstfeld and Taylor [2003], Cameron et al. [2006], Schularick [2006], Ferguson and Schularick [2006] and Morys [2007], to cite just a few. These papers provide empirical evidence that countries accrued better yields on sovereign debt when they adopted the gold standard during the classical period (1870–1914), because only those that undertook their macroeconomic policy "housekeeping" would be capable of adopting the regime, sending a good signal over to bondholders and improving borrowing

terms[1]. This theory will be reevaluated and the empirical relevance of periodical rate of return *versus* coupon-price ratio duality will be tested.

Some other modifications are made to the existing empirical approach. First of all, a new database is employed, the monthly publication *Investor's Monthly Manual* from the London Stock Exchange, that registered bond-level information for all months and all countries, such as prices, coupon payments, defaults, Funding Loans, and renegotiations, if applicable. The important increase in degrees of freedom due to the new regression frequency does not revert itself in finding more countries in accordance with "good housekeeping". In effect, the opposite effect is more frequently observed.

Secondly, this study distances itself from panel-data techniques to unveil country-specific elasticities estimatives of gold-standard adoption into sovereign bond yields, revealing indeed that yields responded very heterogeneously to the monetary regime. Individual regressions and Seemingly Unrelated Regressions are employed instead. Furthermore, it is documented that gold standard is associated with smaller spread dispersion. Because smaller dispersion is associated with smaller spread in a risk-averse environment, a dispersion measurement establishes itself as a necessary regression control.

In order to allow a direct comparison with the literature, regressions are performed in the same frequency used by previous authors, i.e. yearly regressions. It is shown that the "good housekeeping" hypothesis are very sensitive to sovereign bond yield measurement. Overall, empirical support is only found for Italy in a sample of twenty countries. This result both underlines the importance of internal *versus* periodical rates of return issue and undermines the empirical relevance of sovereign bond yield gains due to gold standard adoption.

[1] As measured by internal rate of return.

2 Rates of Return

The internal rate of return r_t is defined as the rate that zeroes the net discounted present value of a sequence of future cashflow, denoted as $\{C_0, C_1, \ldots, C_t, \ldots\}$. It is the implicit solution (not necessarily unique) to:

$$\sum_{i=0}^{\infty} \frac{C_t}{(1+r_t)^i} = 0 \tag{1}$$

If an investor buys a security and keeps until maturity, the bond price is a negative cashflow at $t = 0$, and coupons (or dividends) and amortizations are accrued over the life of the bond. The calculation of the rate of return thus requires a set of hypothesis concerning the behavior of future cashflow, such as if amortization are at par or market value, if defaults are expected, and in such case, whether a fraction of the amount due was paid. Thus internal rates of return, in its *ex-ante* specification, require a strong set of assumptions regarding the perceived future behavior of bonds for a investor undertaking portfolio investment positions at each point in time. One could replace it by an *ex-post* specification, using realizations in place of forecasts, but this would simply mean perfect previsibility for an investor undertaking portfolio decision some time before.

A even more specific measurement yield is very often employed, the coupon-price ratio, a special case of internal rates of return when considering the following additional hypothesis: *(i)* there are no amortizations and *(ii)* coupon payments are constant over time and do not cease, i. e., securities are consols and defaults do not exist. Then $C_t = C, \forall t \geq 1$ and

$$-P_t + \sum_{i=1}^{\infty} \frac{C_{t+i}}{(1+r_t)^i} = -P_t + \sum_{i=1}^{\infty} \frac{C}{(1+r)^i} = -P_t + \frac{C}{r} = 0 \Rightarrow r = \frac{C}{P_t} \tag{2}$$

Clearly, the non-existence of default cannot be a reasonable assumption, specially when analyzing bonds that may or did enter into distress during the period considered.

Because principal revaluation cannot be considered a cashflow, the internal rate of return or coupon-price ratio fail to fully account for the effects of hikes or stumbles in asset price. The only influence of bond price into yields is indirect: for example, if a country goes into distress without falling into arrears, coupon-price ratio would capture an increase in return due to the fact that coupon payments got cheaper in relation to bond price. Principal reevaluation does not play any direct role.

Suppose a investor who revaluates its position periodically, hypothetically buying bonds in the beginning of the period, carrying over to the end of the period while realizing any eventual coupon payments during the possession of the bond.

This strategy would yield

$$r_t = \frac{P_t - P_{t-1} + C_t}{P_{t-1}} = \frac{\Delta P_t}{P_{t-1}} + \frac{C_t}{P_{t-1}} \tag{3}$$

which shall be called periodical rates of return. This measurement can also be motivated by adapting internal rates of return for the same set of hypothesis, i.e., considering a negative cashflow the price of bond in t, a positive cashflow in $t+1$, so as coupon payments in the meantime. Applying to equation (1),

$$-P_t + \frac{P_{t+1} + C_{t+1}}{1 + r_{t+1}} = 0 \Rightarrow r_{t+1} = \frac{P_{t+1} - P_t + C_{t+1}}{P_t} \Rightarrow r_t = \frac{\Delta P_t}{P_{t-1}} + \frac{C_t}{P_{t-1}} \tag{4}$$

It should be noted that equation (4) is a close analog to the coupon-price ratio, except for a lagged price instead of a price contemporaneous to coupon payments, appended by a principal revaluation term, i.e., the percentage price movement. In this sense, coupon-price reneges principal revaluation. In the situation of a country under stress, this term could be of greater magnitude than coupon-price (or coupon-lagged price increase) and lead a fall in periodical rate of return.

The identity between equations (3) and (4) highlights that the main criticism is aimed at the set of hypothesis concerning internal rate of return calculation, or similarly what should be considered a cashflow, demanding fundamental assessment of investor behavior. Following the literature, in the rest of this article the term "internal rates of return" refers to the set of hypotheses concerning the holding of bonds until maturity. Whether defaults were taken into account or amortizations made at par or market values was specified differently in each particular article.

Preference for a particular set of hypothesis should be related to the liquidity of asset or investment considered, i. e., the possibility that the investment position is undone. Principal revaluation may be indeed irrelevant when evaluating investment projects comprised of assets that cannot be sold or undone at reasonable cost, because the decision of undertaking an investment project composed of illiquid assets require that it is *ex-ante* assigned a very low or nil probability to the course of actions that involves a complete bail out. This depicts a situation where, for example, it is being evaluated whether a factory should be erected. In contrast, financial securities in general are highly liquid.

The next section assesses whether this theoretical query results in different conclusions in empirical exercises. From a menu of possible applications, the traditional "good housekeeping seal of approval" hypothesis is reevaluated and very different conclusions emerge.

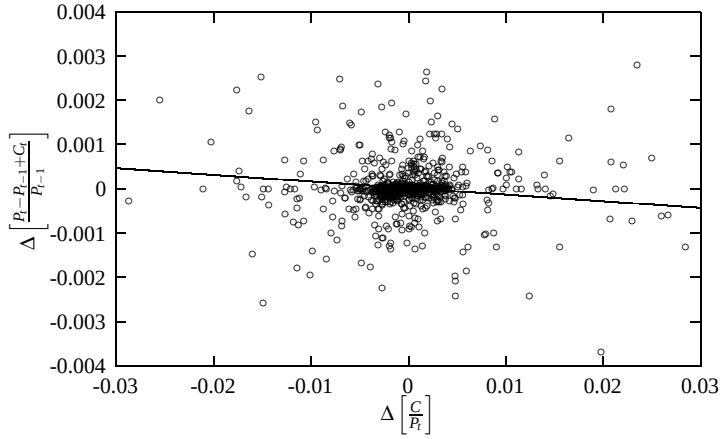
A first evidence is shown in Figure 1 below. For twenty countries[2], for all its bonds floated in London and for all years comprised 1870 and 1915, the first difference of coupon-price ratio is plotted against the first difference of yearly rates

[2]Argentina, Austria-Hungary, Belgium, Brazil, Bulgaria, Chile, Denmark, Ecuador, Egypt, France, Greece, India, Italy, Mexico, Norway, Peru, Portugal, Russia, Sweden, United States of America

of return. It evidences a slight *negative* correlation between the growth of the two definitions of rates of return, indicating that empirical conclusions can be very significantly modified. The next section shows that it is indeed the case.

Figure 1: Internal Rates and Periodical Rates of Return

A pair is yearly rate of return and coupon-price ratio in a country-year.



3 Good Housekeeping Seal of Approval

Between 1850s and the beginning of the First World War, the world witnessed a period of intense financial integration. Flows of commerce, labor and capital became more intense than ever[3]. This heyday of globalization was also characterized by the diffusion of one aspect of economic policy: the gold standard was adopted by over 30 countries[4] in the period comprised between 1870 and 1914. The regime, characterized by the pegging of local currencies in terms of a gold weight, implicitly determined a fixed exchange parity between participating countries.

In a seminal paper entitled the "Good Housekeeping Seal of Approval", Bordo and Rockoff [1996] pointed to the reduction of spreads of sovereign bond yields against its risk-free counterpart, the British consols, when countries adopted the regime. Several other articles found similar results, such as Obstfeld and Taylor [2003], Cameron et al. [2006], Schularick [2006], Ferguson and Schularick [2006] and Morys [2007]. All of them measured yields as coupon-price ratios.

The recurrent proposition is that gold standard adherence signaled to international investors the good quality of internal economic policies, due to the fact that only those with conservative fiscal and monetary stances would be capable of adopting the regime. In an environment deeply characterized by informational asymmetry between borrowers and lenders (mostly the London City), signaling would be of foremost importance. Alternatively, it was argued by Bordo and Kydland [1995] that gold standard adoption could be interpreted as a binding commitment over governments, implying better previsibility of future behavior and smaller chance of debt reneging.

However, it is not clear that an asymmetric environment prevailed. Judging by the availability and quality of information available, one could assume that investors were all but isolated. Several publications contained economic news, such as *Investor's Monthly Manual* itself, *The Times* newspaper and the informational bundle was often complemented by country-specific publications. For instance, even for a remote country such as Brazil there was a weekly *Brazilian Review*, edited in Rio de Janeiro and circulated also in London. Several other publications were available for the remaining countries. If the fundamental asymmetry of information highlighted by the authors concerns the states of economic policies, it is very likely that these publications covered that information; if asymmetry concerns the underlying type of borrower, the gold standard could hardly enhance the beliefs, insofar countries could simply at any time renege the regime.

The database is composed by the *Investor's Monthly Manual*, from the *London Stock Exchange*. It consists of a monthly record of several data about the London financial market, such as bond prices, yields, amounts unredeemed, coupon payment

[3]Hogendorn [1998] studies capital mobility in historical perspective. He finds that only in the 1990s the same level of mobility of the classical period was reached.

[4]Meissner [2005]

dates, so as a brief summary of news of countries and private companies with debt floated in the City.

For each country, yields are calculated in six different ways, all possibilities between three different prices constructions (opening price, mean of last and latest prices, mean of high and low prices) and two definitions of return (coupon-price ratio and periodical rate of return). Robustness was required among models that only differ by price definition. A 10% significant regressor awarded one point; 5%, two points, and 1%, three points. A specific regressor is considered robust to price definition if at least two thirds of possible "significance points" were awarded. Hence, for example, a regressor was considered robust if it had two 1% and one 10%-significant estimatives. Only central government bonds were included in the sample[5] and bond-specific yields are grouped by country weighting by the amount unredeemed, as registered in the same publication. The difference between average yield of loans for a specific country and British consol is taken to construct a spread series[6].

The sample is constituted of twenty countries with corresponding gold standard adoption dates presented in Table 1 below. It is bounded below by data availability (for most countries, starting in 1871), and by the assassination of Archduke Franz Ferdinand in Sarajevo, in 28th June 1914.

Gold standard could have as a side-effect the enhancement of previsibility of spreads and its lower dispersion, i.e., it is possible that the regime is associated with smaller spread dispersion as well as with smaller spreads. Because risk-averse investors would charge for greatest risk dispersion, it is a necessary control in the forthcoming regressions. To gain intuition whether it is empirically relevant, each point in Figure 2 indicates a country in all gold standard years against a country in all other exchange rate regimes. Albeit some outliers, spread dispersion diminishes as countries adopted the gold standard. This is clearer in Figure 3, were it is shows spread dispersion and gold standard exhibit a remarkable association (once again) for the Brazilian case.

[5]See appendix for a full index of bonds included in the sample. Provincial, municipal and railway debt were excluded from the sample with an assumption that they behave differently than sovereign debt. The former was often not guaranteed by central government and the latter has tangible collateral, the rail or the rail company themselves.

[6]British consol yields are computed with same methodology.

Table 1: Countries in Sample and Gold Standard Adoption Dates

COUNTRY	GOLD STANDARD ADOPTION
Argentina	1871–1876, 1883–1885, 1899–1914
Austria-Hungary	1892–1914
Belgium	1878–1914
Brazil	1888–1889, 1906–1914
Bulgaria	1906–1914
Chile	1871–1878, 1895–1898
Denmark	1873–1914
Ecuador	1899–1914
Egypt	1885–1914
France	1878–1914
Greece	1885, 1910–1914
India	1898–1914
Italy	1884–1894
Mexico	1905–1913
Norway	1905–1914
Peru	1874–1914
Portugal	1871–1891
Russia	1897–1914
Sweden	1873–1914
United States	1879–1914

Sources: Bordo and Kydland [1995] and Meissner [2005].

Figure 2: Gold Standard and Spreads Dispersion

Each $\circ$ means a country on gold standard; $\times$ means a country off gold standard.
Dispersion in period t is measured as spread variance in window $[t-11, t]$.
Axis rescaled by 10^{-4}.

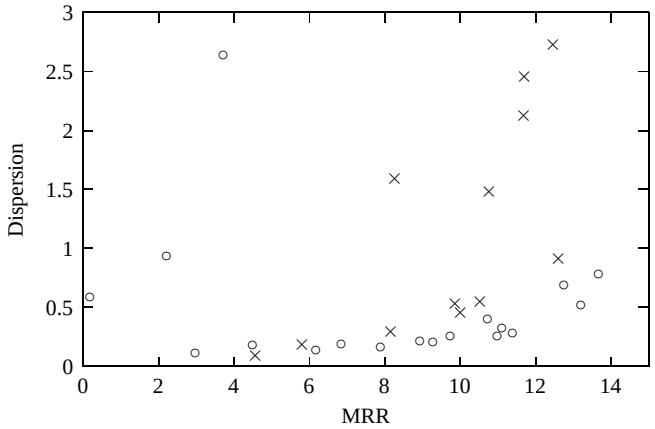
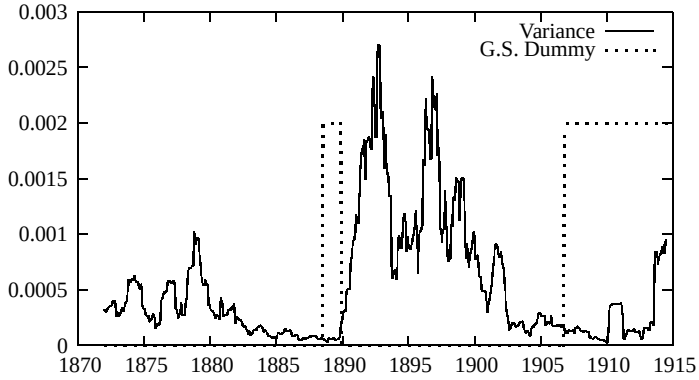


Figure 3: Brazilian Gold Standard and Spreads Variance

Gold standard dummy multiplied by 2×10^{-3}.



For all countries, within an individual regressions and Seemingly Unrelated Regressions framework, the following models were estimated in yearly frequency[7]:

$$\begin{aligned} SPREAD_t &= \beta_1 + \beta_2 \cdot GS_t + \beta_3 \cdot \Delta AM_t + \beta_4 \cdot UK_t && (5) \\ &\quad + \beta_5 \cdot SPREAD_{t-1} + \varepsilon_t && (6) \\ SPREAD_t &= \beta_1 + \beta_2 \cdot GS_t + \beta_3 \cdot DISP_t + \beta_4 \cdot \Delta AM_t + \beta_5 \cdot UK_t && (7) \\ &\quad + \beta_6 \cdot SPREAD_{t-1} + \varepsilon_t && (8) \end{aligned}$$

where GS_t stands for a gold standard dummy (= 1 in case the country adopted the regime); $DISP_t$ is a measurement of spreads dispersion, the mean of monthly spread variance in previous eleven months; ΔAM_t is the first difference of amount unredeemed[8] and UK_t is British consol yield.

Because monthly data are available in the publication, the regressions are also adapted for monthly frequency. A sixth-order autorregressive structure and five seasonal dummies[9] are appended to the previous model. Notwithstanding the increase of lag structure and inclusion of seasonal dummies, some regressions fail to pass the Breusch-Godfrey serial correlation residual test. The conjecture is that prices are not falling as expected in coupon payment months, generating regular spread spikes. If that is the case, it could be understood as a violation from expected arbitrage conditions, since investors could increase profit by buying bonds in coupon payment dates and selling in all other months. This query will be left as a future research suggestion and it will not be analysed in this article. However, it can be shown that in such case the magnitude of the bias over least squares estimator is minimal[10].

Due to unavailability of data for all economies, three variables were omitted: level of reserves, exchange rates and a fiscal variable. Higher levels of reserves are likely correlated with smaller spreads, but also tend to be associated with gold standard adoption, since only in good times the country would venture adopting a fixed exchange rate regime. Thus it is possible that, by omitting this variable, a perceived negative effect of gold standard into spreads is actually due to increase of level of the reserves. Similar reasoning applies to both of the remaining variables. By possibly holding exchange rate overvalued, gold standard avoids wealth-effects of foreign-denominated debt; holding exchange rates fixed requires a conservative fiscal stance. Common to all these arguments is that their omission generates a negative bias in regressors[11].

[7] Results show that *spread* between countries' yield and british consol yield are correlated with british consol yield itself.

[8] Augmented Dickey-Fuller and Phillips-Perron tests fail to reject unit root null hypothesis in level.

[9] The i-th dummy equals one if in month i or $i+6$.

[10] Proof available upon request.

[11] It is unlikely that a suitable instrument could be found for the gold standard dummy variable, because the instrument could not be correlated with residuals and one could always argue that the market looks into all available information to price a security.

Results are shown in the two tables that follow. Table 2 collects significance on gold standard dummy and dispersion variable (if applicable), according to price definition robustness requirement previously commented[12].

Results show that yield measurement matters. For the yearly regressions, the same periodicity used in all the other studies, the set of countries that exhibit better yields under gold standard adoption (under Seemingly Regressions Framework) is Ecuador, Egypt, Italy, Peru and United States. Argentina and Sweden exhibit the opposite (significant) effect. Changing to periodical rates of return, only Chile and Italy show the reckoned effect. A similar result is obtained using the individual regressions framework: five countries are reduced to none.

Because monthly data are available, the exercise is repeated using this frequency, although regressions result needed adjustments to control for serially-correlated residuals and periodical spikes due to possibly unarbitraged coupon payments. "Good housekeeping" does not find empirical support, even using coupon-price ratios. Now, more countries show the contrary effect than avowed by the literature – Austria-Hungary, Norway, Sweden – than in accordance with it – only Denmark. Again, only Italy is robust to frequency and yield measurement changes. That is, only for this country the hypothesis is possibly confirmed.

It is noteworthy that the dispersion variable, which is remarkably significant for most countries in the sample, is clearly a necessary regression control.

[12]Complete results are comprised of approximately a thousand regressions. Due to size limitation, they are not presented here and are available upon request.

Table 2: Yearly Regressions

	WITHOUT DISPERSION	WITH DISPERSION	
	Gold Std. Dummy	Gold Std. Dummy	Dispersion
Individual & YRR	$(+)$: DEN. $(-)$: —	$(+)$: DEN. $(-)$: —	$(+)$: — $(-)$: —
Individual & IRR	$(+)$: SWE. $(-)$: ECU, EGT, GRC.	$(+)$: SWE. $(-)$: BEL, DEN, EGT, ITA, PER.	$(+)$: **All but** BEL, BUL, FRA, IND, USA. $(-)$: —
SUR & YRR	$(+)$: — $(-)$: FRA.	$(+)$: — $(-)$: CHL, ITA.	$(+)$: ECU, NOR, SWE. $(-)$: —
SUR & IRR	$(+)$: SWE. $(-)$: EGT, USA.	$(+)$: ARG, SWE. $(-)$: ECU, EGT, ITA, PER, USA.	$(+)$: **All but** BUL, FRA, SWE, USA. $(-)$: —

ARG $\equiv$ *Argentina; AUS* $\equiv$ *Austria-Hungary; BEL* $\equiv$ *Belgium; BRZ* $\equiv$ *Brazil; BUL* $\equiv$ *Bulgaria; CHL* $\equiv$ *Chile; DEN* $\equiv$ *Denmark; ECU* $\equiv$ *Ecuador; EGT* $\equiv$ *Egypt; FRA* $\equiv$ *France; GRC* $\equiv$ *Greece; IND* $\equiv$ *India; ITA* $\equiv$ *Italy; MEX* $\equiv$ *Mexico; NOR* $\equiv$ *Norway; PER* $\equiv$ *Peru; PRT* $\equiv$ *Portugal; RUS* $\equiv$ *Russia; SWE* $\equiv$ *Sweden; USA* $\equiv$ *United States of America.*

Table 3: Monthly Regressions

	WITHOUT DISPERSION	WITH DISPERSION	
	Gold Std. Dummy	Gold Std. Dummy	Dispersion
Individual & MRR	$(+)$: — $(-)$: CHL, ITA.	$(+)$: — $(-)$: CHL, ITA.	$(+)$: — $(-)$: —
Individual & IRR	$(+)$: NOR, SWE. $(-)$: PRT.	$(+)$: AUS, ECU, NOR, SWE. $(-)$: BEL, ITA.	$(+)$: **All but** BUL, NOR. $(-)$: —
SUR & MRR	$(+)$: — $(-)$: FRA.	$(+)$: — $(-)$: ITA.	$(+)$: — $(-)$: —
SUR & IRR	$(+)$: NOR, PER, SWE. $(-)$: ARG, EGT, FRA, PRT.	$(+)$: AUS, NOR, SWE. $(-)$: DEN.	$(+)$: **All but** BUL, NOR. $(-)$: —

ARG $\equiv$ *Argentina; AUS* $\equiv$ *Austria-Hungary; BEL* $\equiv$ *Belgium; BRZ* $\equiv$ *Brazil; BUL* $\equiv$ *Bulgaria; CHL* $\equiv$ *Chile; DEN* $\equiv$ *Denmark; ECU* $\equiv$ *Ecuador; EGT* $\equiv$ *Egypt; FRA* $\equiv$ *France; GRC* $\equiv$ *Greece; IND* $\equiv$ *India; ITA* $\equiv$ *Italy; MEX* $\equiv$ *Mexico; NOR* $\equiv$ *Norway; PER* $\equiv$ *Peru; PRT* $\equiv$ *Portugal; RUS* $\equiv$ *Russia; SWE* $\equiv$ *Sweden; USA* $\equiv$ *United States of America.*

4 Conclusion

The choice of yield measurement methodologies for historical sovereign bonds has received scant attention on the literature. This article attempts to fill this omission. The discussion is highlighted by an empirical exercise that generates different conclusions if the definition of rate of return is modified.

It was argued that the two most commonly used measurement of yields, the internal rate of return and the coupon-price ratio require a very stringent set of hypothesis, often very difficult to comply with. In the former case, it has been widely supposed that investment position would be held for infinite periods ahead; the latter additionally supposes that defaults are nonexistent and unpredictable, even if on the brink of occurrence. These measurements were used in the literature even to evaluate bonds in distress.

Periodical rates of return are used instead. They take into account that a typical investor undertakes portfolio decisions at each period, rather that once in a lifetime. This measurement is simply the coupon-price ratio appended by a principal-revaluation additive term.

Both rates of return of bonds floated in London in the classical period (1870–1914) for twenty countries were collected and compared. The growth of periodical rates of return is slightly *negatively* correlated with coupon-price ratios in yearly frequency, implying that the principal revaluation term is indeed of foremost importance in the calculation of yields of historical sovereign bonds. A zero-correlation, or even positive and badly correlated situation would suffice to argue that the considered measurements are very different.

The second section analyzed the empirical relevance of "good housekeeping seal of approval" hypothesis in the light of the previous discussion. Several papers on the literature, such as Bordo and Rockoff [1996], Obstfeld and Taylor [2003], Cameron et al. [2006], Schularick [2006], Ferguson and Schularick [2006] and Morys [2007], argued that countries acquired a better reputation when adopted the gold standard, and as a result were able to obtain borrowing terms than otherwise out of the regime. This paper tries to reproduce their results without changing the yearly frequency and the measurement of yields. The "good housekeeping seal of approval"was found for five out of twenty countries (one exhibited positive and significant response to gold standard adoption).

Using monthly rates of return, there are one or two countries that exhibit the expected effect. Again, "good housekeeping"does not find much empirical support. Even in the class of models that make use of internal rates of return, more countries seem to exhibit an effect contrary effect to what is expected. Despite the increase of degrees of freedom due to the increase in frequency, periodical rates of return detect evidence of "good housekeeping" only for Italy in the preferred specification.

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Appendix – Bonds in Sample

ARGENTINA		
6% 1866-68	6% *Public Wks, 1871*	6% 1882
6% Hard $	9% *Treasury Bds*	5% 1884
5% 1886	5% *Treasury Com.*	4.5% *Internal Gold Loan*
7% *National Cedulas*	4.5% *Stg. Bonds*	3.5% *External* 1889
6% *Funding Loan*	4% *Rly. Guar. Resumption Bonds*	4% *Bonds I* 1898
4% *Bonds II* 1898	4% *Bonds III* 1898	4% *Bonds IV* 1898
4% *Bonds V* 1898	5% 1890	5% *Int. Gold Loan* 1907
7% *National Cedulas*	5% *Gold* 1909	5% *Gold* 1910

AUSTRIA-HUNGARY		
Aus. 5% *Bonds I*	Aus. 5% *Bonds* 1859	Aus. 5% *Bonds II*
Aus. 5% *Consolidated Silver Rentes I*	Aus. 5% *Consolidated Silver Rentes II*	Aus. 4% *Gold Rentes*
Aus. 5% *Silver Rent. I*	Aus. 5% *Silver Rent. II*	Aus. 5% *Income Tax I*
Aus. 5% *Income Tax II*	Hung. 5% 1871	Hung. 5% 1873
Hung. 6% *Gold Rentes*	Hung. 4% *Gold Rentes*	Hung. 3% *Loan* 1895
Hung. 6% *Treasury Bonds* 1873	Hung. 6% *Treasury Bonds* 1874	Hung. 4% *Rentes*
Hung. 4.5% *Loan* 1914		

BELGIUM		
2.5%	3% 1874	3% 1914
4%	4.5%	7% *Stabn. Loan*

BRAZIL		
4.5% 1860	4.5% 1863	5% 1865
5% 1871	5% 1875	4.5% 1883
5% 1886	4.5% 1888	4% 1889
5% 1895	5% 1898 *Funding*	4% 1901
5% 1903/05	5% 1907	5% 1908
4% 1910	4% 1911	5% 1913

Continued...

BULGARIA

6% 1888	6% *St. Mrt. Bonds*	5% *Gold Loan* 1902
4.5% *Gold Loan* 1907	4.5% *Gold Loan* 1909	

CHILE

6% 1822	3% 1842	4.5% 1858
5% 1870	7% 1866	6% 1867
5% 1873 *I*	5% 1873 *II*	4.5% 1875
4.5% *Conversion*	4.5% 1886	4.5% 1887
4.5% 1889	4.5% 1892	4.5% 1893
4.5% 1895	5% 1896 *I*	5% 1896 *II*
5% 1905	4.5% 1906 *Gold*	5% 1909
5% 1910	5% 1911	

DENMARK

3% 1825	4% 1862	4% 1850-61
5% *Debenture 1864*	3% *Gold Loan 1894*	4% *Intl.* 1887
3% *Amortsble Bds 1897*	4% 1912	

ECUADOR

1% *New Consol*	*New Ext. Bond*	

EGYPT

5% *Pref.* 1877-80	4% *Unified*	5% *Daira Sanieh*
5% *State Domn. 1878*	3.5% *Government Pref.*	3.5% *Government Pref. Inscribed*
4.25% *State Domain*	4% 1890 *Daira Sanieh*	3% *Gtd. Loan*
7% 1862 *1st Issue*	7% 1862 *2nd Issue*	7% 1862 *2nd Issue II*
7% 1864 *I*	7% 1864 *II*	7% 1866 *I*
7% 1866 *II*	9% 1867	7% 1862
7% 1868	7% *Khedive's Sinking*	7% 1873
6% *Unified*	5% *Khedive* 1870	

FRANCE

4% 1852	6% *Sterling* 1870	3.5% 1878 *Redm.*
3% 1881	4.5% 1883	3% Rentes
3% *Redeemable*	3.5% Rentes	4% Rentes
4% *Treasury Bds.*	4.5%	4.5% *Treasury Bds.*
5% Rentes		

GREECE

5% *Independence* 1879	5% 1881	5% 1884
4% *Monopoly Loan*	6% 1888	4% *Rentes I*
4% *Rentes II*	5% *Eng. Scrip* 1890	5% *Funding* 1893
4% *Loan* 1902	5% *Nat. Loan* 1907	4% *Bonds*

Continued...

5% *Loan* 1914	5% 1824-5 *I*	5% 1824-5 *II*
5% 1824-5 *III*	5% 1824-5 *III*	

INDIA

4% *India*	3.5% *India I*	4% *Deben. Dbs.*
3% *India I*	3.5% *Deben. Dbs.*	3.25% *Deben. Dbs.*
3% *India II*	10.5% *India I*	10.5% *India II*
10.5% *India III*	10.5% *India IV*	10.5% *India V*
10.5% *India VI*	10.5% *India VII*	10.5% *India VIII*
10.5% *India IX*	10.5% *India X*	5% *India Bonds*
5% *India I*	5% *India II*	5% *India III*
3.5% *India II*		

ITALY

5% *Rentes* 1861	5% 1851 *Sardinian*	6% *Italian Irrigation*
5% *Maremm'na* 1862	5% 1865	6% 1868
5% *2nd Issue* 1869	3.75% *Rentes*	4% *Rentes*
5% 1881		

MEXICO

3% 1846	3% 1851 *I*	6% *Anglo-French*
6% 1851 *II*	3% *Cons.* 1886	6% 1851 *III*
6% *Silver Currency*	5% *Cons.* 1894	5% *Cons. II* 1894
4% *Gold* 1904	6% *Cons.* 1888	5% Bonds
5% *Bonds* 1893	5% *Bonds* 1893 *Silver*	
6% *10-year Treasury*		

NORWAY

4.5% 1876	4.5% 1878	4% 1880
3% 1886	3% 1888	4% 1911
3.5% *Bonds*		

PERU

4.5% 1862	5% 1865	5% *Consolidated 1872*
5% *Gold Bonds*	5.5% *Salt Loan*	6% *National*
7.5% *Guano*		

PORTUGAL

3% 1853-56-57-59-60-62-63-67-69-77-*I*	3% 1853-56-57-59-60-62-63-67-69-77-*II*	3% 1880
5% 1882	3% 1884	3% 1867
3% 1869	6% *Minho Douro Rail*	3% 1877
3% 1853		

Continued...

RUSSIA

5% 1822	4.5% 1850	4.5% 1860
3% 1859	5% 1862	5% *Anglo-Dutch I*
5% *Anglo-Dutch II*	5% *Anglo-Dutch III*	5% *Anglo-Dutch IV*
5% 1877	5% 1878 *I*	5% 1878 *II*
4% *Eng. Scrip. Conv. I*	4% *Eng. Scrip. Conv. II*	4% *Series III*
3.5% *Bonds*	4% Dvsk Vbsk	4% *Rentes I*
4% *Rentes II*	5% 1906 *Eng. Scrip.*	4.5 1909 % *Scrip.*

SWEDEN

4.5% *Gov.* 1864	5% 1868	4.5% *Funded* 1875
4.5% 1876	4% 1878	3.5% 1880
3% 1888	3% *Con.* 1894	3.5% 1908
3.5% 1900		

UNITED STATES OF AMERICA

6% 1862	7% *Conf. Loan* 1863	5% 1864
6% 1865	6% 1867	5% *Funded* 1871-3
5% *Redeemable* 1874	4.5% *Funded* 1876	4% *Funded* 1877
6% *Redeemable* 1881	6% *Registered* 1881	6% *Coup. Bonds* 1882
6% 1884	6% 1885	6% 1887
3%	3.5%	4% *Loan*