Threat of a capital levy, expected devaluation and interest rates in France during the interwar period

by

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I. Introduction

The interwar period was a time of great monetary unrest, especially in continental Europe. In the case of France, the lengthy process towards the stabilization of the franc, the choice of the level of stabilization, as well as the long reluctance to abandon the gold standard have sometimes been interpreted as a succession of economic policy errors based on ideological biases or on an insufficient analysis of the situation (Sauvy, 1984). However, the large number of conflicting interpretations that have been offered for the main episodes of the period (especially the Poincaré stabilization) in itself shows that, at least in some cases, the economic situation was not that easy to analyze. Furthermore, political economists have recently shown how the political process may oppose the implementation of a successful macro-economic policy. When stabilization of the budget or amortization of public debt is needed, the struggle between interest groups as to who will pay the bill may lead to a suboptimal decision or to no decision at all (leading sometimes to inflation as the solution of last resort, the one which is the most difficult to oppose because it does not result from a parliamentary vote). The problem with introducing political economy into the analysis is that it can lead to confusion between purely political gestures (which may have some redistributive impact but bring no durable change in the macro-economic situation, in particular in budget revenues or expenses, savings or investment) and important distributive debates affecting all economic variables. In this paper, we will therefore call political the purely political events that had only short-term effects on the prices of the *rentes*, with no other economic consequences.

We propose assessing the relative validity of the "political" and "economic" interpretations by looking at which future policies were expected by the financial markets, with expectations of taxation (actually of increased taxation of financial assets) being considered as signals of mostly political problems, and expectations of devaluation as a sign of the need for economic solutions to restore the equilibrium *vis-à-vis* the rest of the world. These questions may be examined by looking

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at market interest rates, since changes in and expectations regarding taxation, inflation and exchange rates are reflected in market prices (at least in efficient markets which, we argue, was the case during the period under review).

Our main findings are as follows. During the first critical episode from 1924 to 1926, the delay in stabilizing the franc may be attributed to a political struggle over a capital levy, which explains most of the increase in the market interest rate from 1924 (when the implied 5-year market rate was 13%) to 1925 (about 16%). Nevertheless, this struggle never threatened to degenerate into hyperinflation, contrary to what has been frequently argued. First, interest rates during the *Cartel* period were never as high as they should have been had the country been on the verge of hyperinflation. Second, the expected exchange rate of the British pound was declining and well below its current rate even before the nomination of Poincaré as *Président du Conseil*, so that the apex of the exchange-rate crisis from May to July 1926 appears to be a speculative bubble and not the sign that some other economic stabilization policy was needed.

Concerning the following period, we show that the low interest rates in France during the 1928-1931 period reflected expectations of an appreciation of the franc *vis-à-vis* the pound. After the devaluations of both the pound and the dollar, France followed a deflationary policy in order to maintain the gold standard. If this policy had been expected to succeed, interest rates would have remained low, which was not the case. We examine whether the political struggle between extreme right and left in the years 1933-1936 can explain the rise in interest rates as it did in 1925. We show that expectations of a franc depreciation fully account for the rise in interest rates.

This paper is organized as follows: section II presents the main events that interest us and their various interpretations. Section III explains the methodology used in order to construct medium-term interest rates and justifies the hypotheses used. Section IV presents the derived market interest rates. Section V compares the rates of return on public and private bonds in order to confirm the validity of using the interest rates on public bonds in the subsequent sections. Section VI looks at the impact on interest rates of the possible introduction of a new tax. Section VII uses the prices of the Caillaux *rentes* issued with exchange-rate guarantees to assess exchange-rate expectations.

II. The Debates

After the First World War, a return to the gold standard was considered in France (and most countries) as the condition for a normal economic situation. But high and varying wartime inflation and the accumulation of internal and external debts by most belligerent countries made stabilization difficult. As a victorious nation, France considered it normal to return to the nineteenth century gold parity, a goal the United Kingdom would reach in 1925. Nevertheless, the cost of reconstruction and compensating for war losses was so high that it required enormous amounts of public spending,

which the reparation payments from Germany were supposed to pay for in the near future, and which public borrowing and paper money actually paid for in the interval. The exchange rate of the franc was then highly dependent on both the monetary and budgetary situations and, therefore, on the actual payment of reparations. A first exchange-rate crisis occurred in 1923-1924 when Poincaré sent the French army to the Ruhr region without obtaining much in the way of payments from Germany. A substantial increase in taxation and an international loan were necessary to bring the franc back from 122 to 63 to a pound (the prewar level being 25.22). Soon after that crisis, the left-wing *Cartel des Gauches* won the 1924 general elections, and the franc began to slide again. France simultaneously experienced capital flight and an inflation and political crisis, which all ended in the spring 1926 exchange-rate crisis, when the pound exceeded 240 francs. The nomination of Poincaré as *Président du Conseil* coincided with a spectacular end to the speculation against the franc, followed by a continuous appreciation up to the end of 1926, when it was stabilized *de facto* around 122 francs to the pound (a level which would be almost confirmed in 1928 by the law redefining the gold standard).

Many reasons have been put forward for the economic failure of the *Cartel des Gauches*. Traditional explanations try to account for the exchange-rate crisis by a macro-economic misadjustment that had to be set right. For example, Sargent (1983) considers that the fundamental reason for the exchange-rate crisis was the budget deficit. More recent works show that the problems resulted more from the accumulated debt than from the budget, since the deficit decreased sharply in the last years and equilibrium was almost reached in 1925 thanks to the 20% rise in taxes decided by Poincaré in March 1924 (the so-called "*double-décime*"). The most recent data by Villa (1993, pages 70 and 90) confirm that the debt/GDP ratio was still 1.17 in 1924 and 1.11 in 1925, when the deficit was only 2.9% of GDP (in fact there was a primary surplus of 2.5%). Prati (1991) considers that people feared a default on public debt, which caused a run on long-term public bonds. Other observers (followed by Makinen and Woodward, 1989) contend that the main problem was the term structure of the debt, since holders of short-term government bills were always able to put government credit in danger by refusing to renew their bills. Many contemporaries considered that the main problem was the capital flight that resulted from fears of taxation of capital or of income, a thesis which puts greater emphasis on political issues and which has been substantiated by Jeanneney (1977). He shows that by refusing to recognize past inflation and to ask the Parliament for a rise in the Bank of France's *plafond des avances* in 1924, the Cartel was unable to stabilize and could only develop "*des menaces incertaines*", which would destroy it (Jeanneney, 1977, pp. 35-40).

Alesina (1988) claims to broaden and synthesize preceding interpretations in a model of the political economy of this period. He takes the political crisis, which was characterized by the succession of many governments within a short time, seriously and sees it as the reason for the loss of economic confidence. He considers that none of the three main groups in French society (businessmen, workers and *rentiers*) was able to impose its preferred policy during the *Cartel des Gauches* period since this left-wing coalition was divided between the Socialists, part of the

Radicaux defending the workers and the remaining *Radicaux* defending the *rentiers*. The resulting crisis is contrasted with the success of Poincaré, who was called to head a *Gouvernement d'Union Nationale* in July 1926, which actually signified recognition of the defeat of the left and a coalition of *rentiers* and businessmen. Like most other writers, Alesina concludes: "In the summer of 1926, France was on the edge of a hyperinflation. The success of Poincaré's stabilization is due greatly to psychological effects" (p. 58). He nevertheless does not stipulate whether the economic effects of the political struggles of the Cartel period were long-lasting (if they were the origin of a definitive drop in the exchange rate) or mere short-term fluctuations due to political concerns. One of the aims of our paper is to reject the assimilation of the political struggle from 1924 to 1926 with the brief and dramatic fall in the exchange rate in the spring of 1926. Another is to try to measure these political and economic problems more precisely.

Two years after the Poincaré stabilization, France returned to the gold standard at a fifth of the pre-war parity. Massive inflows of capital, corresponding to the substantial balance of payments surplus that France ran from 1923 to 1929, gave the Bank of France enormous gold reserves, which helped France and the neighboring gold block countries to be considered as an *îlot de stabilité* at the beginning of the Great Depression, but also contributed to deflation in the rest of the world until the sterling (1931) and dollar (1933) devaluations. Most scholars now consider that the accumulation of gold by France was the result of an undervalued franc (Eichengreen, 1992; Sicsic, 1992). Nevertheless, precise measures of that undervaluation will always be lacking, given the limitations of the most commonly used purchasing power parity method. This paper gives a further indication of the undervaluation of the franc relative to the pound, based on interest-rate parities.

The Great Depression produced in France a situation that was symmetrical, but quite similar to that of the mid-1920s. At that time, most countries outside the gold block had either let their currency float (and depreciate) or restricted capital flows. The resulting real appreciation of the franc imposed a policy of deflation as long as no one wanted the gold parity to be changed, a policy which was conducted with special insistence by Laval, *Président du Conseil*, in 1935 and which enjoyed widespread support until 1936. Nevertheless, no government was ever able to balance the budget from 1932 onwards (because of the decline in revenue resulting from the crisis). The budget deficits and the rising public debt made the deflation policy less credible; they were reflected in rising interest rates which, in turn, probably impeded the recovery in investment that occurred during the same period in Great Britain. One may, with Eichengreen and Sachs (1985), consider that the deflationary policy was doomed from the start by the size of the price gap with France’s trading partners, and therefore that the overvaluation of the franc was the only problem. One may also consider the inability of government to implement a deflation policy as an independent factor in the crisis, as Mouré (1991) suggests in the most recent synthesis of the issue, which explains in detail the deterioration of confidence in public finances that resulted from a growing (if hidden) reliance on money issuance to finance the budget.

But all these authors consider the economic problem to be independent of the political crisis that developed during the same period, even if the economic crisis was one of the reasons for the growing doubts about the parliamentary regime and democracy that appeared at that time. This political crisis was probably more radical than that of the 1920s. The rise of the Communist and Socialist parties within the left wing did not only threaten the rich, and the agitation in the streets by a rising anti-capitalist and anti-Semitic extreme right wing was gradually to become a danger for democracy itself after 1932 (Soucy, 1995, p. 36).

On may wonder whether interest rates included a political risk premium, resulting from the mere threat to political stability, or whether they were driven up only by the macro-economic situation: overvaluation of the currency and low credibility of the deflation policy. We shall try once more to disentangle these two dimensions.

This paper attempts to measure the relative importance of purely political struggles and economic problems during the interwar period by looking at developments in interest rates. More precisely, it tries to evaluate the relative importance of the various policies that were at work or anticipated by comparing various kinds of bonds, which characteristics are given in Table 1, that differ from one other only in their responses to these policies.

Table 1: Characteristics of the main bonds used

	3% *rente*	5% *rente* 1915-1916	4.5% *rente* Caillaux	British Consols	Private bonds
Exchange rate guarantee	no	no	yes	yes (1)	no
Date of optional pay-back (call)	any	1931	1942	any	none
Taxes:					
- IRVM	no	no	no	no (2)	yes
- IGR	yes	yes	yes	no (2)	yes
-transmission tax	no	no	no	no (2)	yes

(1) British consols present an implicit exchange rate guarantee for French investors.
(2) British consols are supposed to be held in Britain, and pay British but no French taxes.

A few examples may make the method easier to understand: the variations in the difference between the returns on French public and private bonds can provide an evaluation of expectations of government default. Two important factors help explain the difference between the gross returns on French and British government bonds: taxation and devaluation (or inflation, which will be supposed to be the same). We estimate expectations of taxation directly from the political debate in 1925. The existence after 1925 of French government debt that was quasi-denominated in pounds allows us to measure exchange-rate expectations directly since the difference between the usual and the exchange-rate guaranteed French *rente* prices could result only from exchange-rate variations (both actual and expected).

III. Expected Long-term Rates.

Unfortunately, in France there is no recorded medium-term rate (say up to five years), which would be the most useful for examining the troubled times that interest us. The only observable interest rates are the rates of return calculated on the *rentes* (the French consols). However, these returns are of limited usefulness because they are averages of the rates during these troubled times and of the rates that were expected to prevail afterwards, once stability was reached again.

In order to calculate the five-year interest rates implied by the actual prices of the *rentes*, we have to make a hypothesis concerning the long-term interest rate that the market supposes will prevail in the long term. This expected long-term rate is the rate expected at a horizon more than 6 years away. The choice of this expected long-term rate is central to our derivation of market interest rates because the return on the *rentes* is an average of the market rate we are looking for and the long-term rate. This section is devoted to the choice of the long-term rate; the next section will use it to derive the 5-year market interest rates.

The first piece of information is that the long-term interest rate in the nineteenth century was between 2.5% and 3.5%. No tax was then paid on the coupon. Allowing for an income tax rate of 15% (see below) gives a gross rate of between 3% and 4%.

Another argument pointing in the same direction can be derived from the apparently *bizarre* discrepancy between the apparent returns on French *rentes*. The usual way of looking at returns on long-term unredeemable *rentes* is to compute the ratio of the nominal coupon to the price. The price being equal to the infinite discounted value of the coupons, with a discount factor by definition equal to one plus the rate of return, the infinite sum equals the coupon divided by this rate of return. Such simple computations applied to the different French *rentes* give a puzzling result as shown in Figure 1. In fact, the *rentes* issued during and just after the First World War (1915 and 1916 5%, 1917 and 1918 4%, and the 1920 6%) could be paid back. The 5% and 6% *rentes* could be reimbursed after January 1931, and were eventually converted into a 4.5% *rente* in November 1932. This is why the curves corresponding to these *rentes* disappear in Figure 1 at the end of 1932, and why their yields measured as the coupons divided by the prices converge to the coupons since their prices moved towards par as the redemption date approached (T5 and T6 in Figure 1). The 4% *rentes* could be reimbursed in 1942 and 1943.

We can check that the hypothesis made regarding the expected long-term rate is consistent with the price of the *rentes* that could be redeemed. The price of a redeemable *rente* is a function of the market interest rate, up to the conversion, the expected long-term interest rate (which will occur after the conversion), and the probability of this conversion (see Appendix I). The price of the unredeemable *rente* is a function of the market interest rate and the expected long-term interest rate. Given the expected rate, one can compute the market rate up to the conversion with the

unredeemable *rente*, and then the probability of conversion.[1] Allowing for a probability of conversion makes it possible to explain the low prices of the 6% *rentes* relative to the price of the unredeemable 3% *rente*. The computed probability, derived from a gross long rate of 3.75%, is plotted in Figure 2. A higher expected long rate would give computed probabilities that are larger than one.[2] Therefore, we may reject excessively high expected long rates.

The British war debt made up of the war loan stock issued in 1917 with a 5% coupon was converted in September 1932 into a "3.5% war loan 1952 or after" (Capie *et alii*, 1986). Using quotations of the 5% war loan and the 2.5% consol, we have derived the probability of conversion (Figure 2). Expectations of conversion of war debts were at least a fourth in England, much smaller than in France.[3]

These computed probabilities of conversion, assuming a long-term rate of 3.75%, look reasonable, thus providing an indirect check on the hypothesis made concerning the expected long rate[4].

A last argument in favor of an expected long-term interest rate of around 3.5% after the current five-year period can be derived from the situation in other countries. The US term structures of interest rates computed by Baum and Thies and Cecchetti make it possible to compute forward interest rates that we interpret as the expected long-term interest rates we need. As the rate of return on a 15-year bond is equal to the return on the operation consisting in buying a five-year bond now and a ten-year bond in five years, one can derive the rate on the 10-year bond in five years (called the 10-year forward rate in 5 years) from the 5- and 15-year rates of return observed at a given date (see Appendix I). Assuming no term premium after 5 years, these forward rates are the long-term (10-year) rates in 5 years. They are drawn on Figure 3, along with the US 5- and 15-year spot rates. The expected long-term rates are much more stable than the spot rates. The difference in level between the two sets of rates comes from the risk premium on Railroad Aaa bonds used in the 1920s. The mean of the expected long-term rates on government bonds over the period 1929-1938 is 3.38%.

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[1] We did not attempt to model the option value stemming from the choice of redemption given to the government because it depends on the stochastic process of interest rates which, in our case, is very different from the usually assumed Brownian motion. As the government owns the option, the price of the callable bonds should be lower that the expected present value of the coupons and the converted capital. Increasing the quoted value of the redeemable bond, to offset this option effect, would decrease the probability of conversion.

[2] The same kind of computation using the price of the 5% redeemable *rente* led to implausible probabilities. It is visible from Figure 1 that the coupon/price ratios for the 5% and 6% redeemable *rentes* were the same until 1927, which is impossible with any probability of conversion.

[3] Capie *et al*. (1986, p. 1119, note 9) do not see expectations of conversion in the evolution of the price. They do not compare the prices of the 2.5% consol and the 5% War loan at a given date.

[4] Using the same expected long-term rate gross of taxes in France and in Great Britain is consistent with a slightly lower rate net of taxes in Great Britain since taxation was heavier in Great Britain: 20 to 25% compared to about 15% in France (see below). At the end of the XIXth century, while taxation did not drive a wedge between gross and net rates of returns, the rate of return on the 2.5% British consols had been slightly lower than the rate on the 3% French *rente*.

There had been a major change in monetary policy regime about one year after the pound left the gold standard (Eichengreen, 1992). Without taking a strong position on the influence of the war debt conversion on long-term interest rates (Capie *et alii*, 1986 and Sayers, 1976), it is likely that there was a downward shift in expected long-term rates after 1932.[5] Therefore, we have computed implied French and British medium-term market rates with gross long-term expected rates of 3.75 and 3.25% (Figures 4 and 5). An expected gross long-term rate of 3.25% leads to a net British medium-term market rate of about 10% during the 1920s, which is not consistent with other information about British market rates.[6] We therefore consider that 3.75% (which leads to a more reasonable implied British market rate of 7%) was the expected world long-term gross rate in the 1920s. In the mid-1930s, an expected rate of 3.75% leads to a negative implied British market rate, so we consider 3.25% to be the expected long-term rate from 1934 onwards.

IV. Market rates

Once it has been established that 3.75% is a reasonable expected long-term rate for the 1920s, one can look at the implied French medium-term market rates (Figure 4). This rate is the discount rate in the next five years which, with the expected long rate used as the discount rate for years further away in the future, equalize the observed price of the *rente* with the present value of the infinite flow of coupons (Appendix III).

These implied rates are much higher than the usually reported yields on government bonds (as depicted in Figure 1). However, it also appears that French financiers never actually believed that their country was on the brink of hyperinflation since they held assets with rates of return for the next five years that were always smaller than 20%.

In 1927, the medium-term market interest rate for public debt was still about 12%. It might seem contradictory with the reported rate of return on the 6% *rentes* with maturities of 50 years issued in 1927 (after the *de facto* stabilization) which, according to Haig (1929, p. 266), was 6.98%. In fact, this rate was not the expected rate of return on these bonds since they could be redeemed in 1931. The rate on the 6% 1927 *rente* as reported by Haig was close to the coupon/price ratio for the 6% 1920 *rente* plotted in Figure 1.[7]

Before turning to explanations of the trends in the implied market interest rate, a remark concerning the lack of alternative methods must be made. One may think that short-term interest

[5] Our framework excludes the possibility of a conversion having an effect on the expected long-term rate.

[6] For instance, the 4% Treasury Bonds, 1931-1933 quoted around 93 in 1925, which leads to a yield from 1925 to 1931 of 5.5% (Pember and Boyle, 1950, p. 261).

[7] This is not surprising since the rates reported by Haig are computed as if the capital will be paid back at maturity, after 50 years, and it means that the price of the 6% 1920 and 6% 1927 were about the same.

rates could be used to analyze the period. Before the Poincaré stabilization, the short-term interest rate defined as the interest paid on short-term public debt (*Bons de la Défense Nationale*) was pegged. The return on this debt was maintained at 5% from 1923 to 1925. Makinen and Woodward (1989) argue that when this return was below the market rate these bills were not renewed, which led to monetization of the public debt. Actually, the substantial rise in the medium-term rate, which occurred during 1924 and 1925 when it is correctly measured, should have prompted holders to switch from short-term *Bons* to *rentes*, unless they very strongly favored the liquidity of the *Bons* and greatly feared possible capital losses on *rentes*.

Eichengreen (1992, p. 179) does not agree with Makinen and Woodward; using short-term interest rates on "commercial paper," he argues that market rates were not above pegged rates on public debt. In fact, there was no market for short-term private debt, and what *escompte hors-banque* was, even translated as commercial paper, remains unclear to us. So we can imagine that private individuals owning *Bons de la Défense* were not in a position to switch between these *Bons* and "commercial paper." They only had a choice between owning the *Bons* and money. At the end of 1925, they did not renew their *Bons* or sold them to the banks (which can be shown from the great upsurge in the private money supply: see Sicsic, 1992, p. 72, Figure. 1). But if many banks agreed to keep a large amount of *Bons* in their portfolios, it is not only because they had to maintain a sufficient liquidity ratio, but also because they could not obtain higher yields by lending to private firms. One explanation for the apparent contradiction between individuals selling their *Bons* and firms refusing to get into debt at similar rates could be an expectation of forced consolidation of the *Bons de la Défense*. Such a solution to the problem of short-term debt was contemplated at some crucial moments during 1925.[8] Another explanation could be the high level of bank intermediation costs. This has some appeal since there was no market for *escompte hors-banque*. In any case, the absence of such a market as well as the difficulties in mimicking it prompted us to prefer a study based on medium-term rates.

V. There was no run on public debt in 1925.

The first solution to the debt problem faced by the governments in 1925 and 1926 is a simple default on public debt. Prati (1991) claims that there was a run on the public debt motivated by

[8] The forced consolidation was still being examined by the government at the end of June 1925. Even the *régents* of the Bank of France were almost ready to accept a moratorium at that date (Jeanneney, 1976, p. 244). Rumors concerning this solution survived throughout the summer, even after the decision to issue the Caillaux conversion loan (see below). At least, that opinion was reflected by the bankers who were responsible for the issue of the loan, as is shown by their questions during their meetings with top officials of the Ministry of Finance (see the report of the meeting of August 21, 1925 n°618 signed E. Enders, file DAF374/1 at the archives of the Crédit Lyonnais; see also the file "propagandes diverses contre l'emprunt", file B 33.042 at the archives of the Ministry of Finance (quoted below as SAEF). On 22 November, a bill proposing a compulsory renewal of the *Bons de la Défense* was rejected in Parliament by only three votes.

expectations of such a default. As we will later use the internal rate of return on the 3% *rentes* as representative of market interest rates in general, it is important to check that the hierarchy between public and private bond rates did not change during the *Cartel* governments.

Prati (1991, pp. 231-32) quotes *Le Temps* from 11 August 1924, where one can read "à l'heure actuelle, la rente se capitalise en Bourse à un taux plus élevé que celui d'obligations industrielles" (nowadays, the yield on *rentes* is higher than that on industrial bonds) and from 10 August 1925 when it states "le taux de capitalisation des fonds français jouissant de la garantie de l'Etat [a] été cependant supérieur à celui d'un très grand nombre d'obligations industrielles" (the yield on French bonds guaranteed by the government has nevertheless been higher than the rates on many industrial bonds). Prati, following *Le Temps*, interprets these quotations as a proof of a premium that had to be paid on government debt because it was considered more risky than private bonds.

We have compiled prices of 14 utility bonds, and we have computed the implied 5-year rates of return on these private bonds, being very careful to take into account the influence of the capital reimbursement (which was carried out by drawing lots) and correcting for the influence of taxes (see Appendix IV, and below for the tax rules). As shown in Table 2, we find that the returns on government bonds had always been smaller than the average of the returns on the 14 utility bonds.

Table 2: Implied five-year market rates on private and government bonds

	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936
Utility bonds	16.1	15.4	18.4	22.9	22.4	15.8	11.8	10.1	9.3	8.9	10.0	11.0	11.3	10.3	13.3
3% *rente*	12.4	13.1	15.0	18.1	16.7	13.0	8.8	6.1	2.9	3.2	5.3	8.4	6.9	5.6	7.8
Spread	3.7	2.2	3.3	4.8	5.7	2.7	3.0	4.0	6.4	5.7	4.7	2.6	4.4	4.7	5.5

Note: Implied 5-year internal rates of return for 14 utility bonds (see Appendix IV) and the 5-year internal rate of return computed for the 3% *rentes* (RA3_35). Both rates are net of income tax.

There is no sign that a premium had to be paid on government debt. We can definitely conclude that there was no such thing as an expectation of government default or a run on public debt since the rates on government bonds were lower than those on private utility bonds, and because the premium paid on private bonds actually increased in 1925 and 1926.

There is therefore no disadvantage in looking only at the internal rate of return for the next five years derived from the 3% *rente* price and interpreting it as representative of market rates. These market rates are not adjusted for the effects of either an increase in expected taxation or a franc depreciation, the effects which will be dealt with in the remaining sections of this paper.

VI. Taxation

VI. 1. Official and actual tax systems

Taxation of income from securities presented two main characteristics during the interwar period: first, it was very complex, combining many different taxes, paid on different securities, with different bases, to different administrations; second, it increased quickly.

Two types of securities existed: bearer securities and registered securities. Since bearer securities was the most widely-held type, and since stock exchange transactions (and the prices we will use) were conducted with such securities, we will focus here on their tax regime. Every bearer security except French *rentes* had to pay two taxes directly paid by the issuer (*prélevés à la source*): first an income tax, called *impôt sur le revenu des valeurs mobilières* (tax on income from securities, hereafter referred to as the IRVM)[9], which is one of the *impôts cédulaires* composing the proportional (not-progressive) part of the direct taxes (with taxes on wages and profits); and second a tax called *droit de transmission*, which was based on the mean value of the security during the previous year and was intended as a way to balance the fact that transactions on bearer securities could not be registered and taxed if they occurred outside of the stock exchange.[10] Moreover, every source of personal income, including income from the *rentes*, was included in the base for the progressive income tax called *impôt général sur le revenu* (IGR in the rest of the paper).

The rates of all these taxes were quite low before the war (for example, it was 4% for the proportional IRVM, and there was no progressive income tax). They subsequently increased quickly, rising initially until 1926 and then from 1933 until the Second World War (Table 3). In 1925, excluding the progressive IGR, about one fourth of the nominal coupon paid on private bonds was taxed. If we add to this rate the maximum marginal rate of the IGR (which peaked at 60% from 1923 to 1925), really high rates are reached. In fact, these rates were probably never paid since it was very easy to avoid paying IGR on bearer securities, because coupons were paid to the bearer without any requirements enablilng his future IGR declaration to be checked.[11] Only wealthy people who were known to live on income from securities (*rentiers*) were obliged to declare at least a part of their income.

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[9] We should add that stocks were also indirectly liable to pay tax on profits, which was not deductible from income tax. The level of this *impôt sur les bénéfices industriels et commerciaux* is given in Table 3.

[10] Although this tax was called a transaction tax, it was in fact an income tax, and should be distinguished from another tax on transactions called *impôt sur les opérations de Bourse* that was always paid only in case of effective transactions, and that we will ignore here.

[11] This situation was almost officially accepted, since the rate on the *droit de transmission* on bearer securities was raised relative to that on registered securities on the basis of this tax evasion probability.

Table 3: Tax rates on securities

	dtr	IRVM	IGR	IGRm	BIC
1914	0.29	4	0.62	0.17	0
1921	0.15	10	50	37.7	8
1922	0.15	10	50	37.2	8
1923	0.55	10	60	46.2	8
1924	0.69	12	60	47.9	9.6
1925	0.815	12	60	48.8	9.6
1926	0.699	18	30	25.6	10
1927	0.5	18	30	25.8	15
1928	0.5	18	33.3	28.5	15
1929	0.5	18	33.3	28.6	15
1930	0.3	16	33.3	28.7	15
1931	0.25	16	33.3	28.5	15
1932	0.25	16	33.3	28	15
1933	0.292	17	36.3	30.4	15
1934	0.3	17	33.3	27.5	15
1935	0.3	24	36	28.4	12
1936	0.3	18	40	27.1	12
1937	0.35	24	48	35.7	14

Note: dtr is the *droit de transmission* on bearer securities, as a percentage of the mean price of the security during the previous year (when the rate was changed during a year, we calculated the mean rate by weighting each rate with its duration). IGR is the maximum marginal rate of the IGR. IGRm is the mean rate paid on the IGR by a tax-payer with an income equal, in constant francs, to the limit of the maximum marginal rate in 1936 (1.332 million francs). BIC is the rate of the tax on profits.
Source: Hautcoeur (1994, pp. 228-229).

It is difficult to assess the scale of the evasion because income from securities is not separated in the aggregate figures for the IGR base. But contemporary accounts give high evaluations: Mouchet (1934, pp. 26-27), Battiglini (1923, p. 110), Couderc (1923, p. 29) or Cottin (1938, p. 6) all consider evasion very easy (without being socialist). They summarize the evaluations of IGR evasion given in Parliament by Bokanovsky (on 12 November 1922), Pietri (on February 17, 1933) and Auriol (on December 31, 1936), all of which estimate evasion as being equal to at least half the income on securities.[12] Given the high degree of income inequality during the period (Morrisson, 1991), and the likely role of income from securities in that inequality, the low mean level of IGR taxation is also an argument in favor of a high level of evasion. We may conclude that the effective

[12] Couderc (p. 35) cites the speech of Bokanovsky at the Chambre des députés on November 12, 1922, in which he evaluates income from securities at 21.5 billion francs, of which a maximum of 10 billion is legally tax-free. As only 3.5 billion was found by the tax administration in the IGR declarations, the evasion was at least two-thirds of the taxable amount. Mouchet reports (pp. 35) the evaluations presented by Pietri, according to which income from securities reached 30 billion in 1930, on which 5 billion was tax-free and 12 billion escaped the IGR. Cottin (p. 2) cites Auriol who evaluates income from securities at 26 billion francs, of which 10 billion was tax-free and 8 billion evaded the IGR. These two last evaluations correspond to a tax evasion rate of one half, except if we suppose that security holders had total income below the IGR minimum threshold.

tax rate paid on income from securities by way of IGR was at most half the official rate.[13]

In 1925 the *Cartel* was reluctant to increase indirect taxes, and could not raise direct taxes since the tax rates had already been massively raised during the previous decade. There were then two ways to increase government receipts in order to pay back the public debt, either a capital levy or an attack against tax evasion. IGR evasion was thought of by many left-wing deputies as the main inequality in the tax-system, and its elimination was thought to be the solution to the budget problem. The attempts made to limit this evasion did not succeed during the interwar period. From 1920 to 1924, the rightist majority resisted almost all proposals intended to limit evasion of tax on bearer securities (accepting only a few advantages for registered securities). The compulsory declaration of all coupons via the *bordereau de coupons* imposed by Poincaré in 1924 was (paradoxically) abandoned by Herriot in 1925. The similar *carnet de coupons* voted by the Parliament in December 1925 suffered the same fate in 1926 as did the *carte d'identité fiscale* voted in late 1933. Many other proposals failed to get the support of Parliament, from a provisional payment by the issuer (and refundable for non-IGR payers) proposed by the senator Pasquet in 1924, and then by Blum in 1924 and Pietri in 1933, to the prohibition of bearer securities (which was the profound desire of the parliamentary left in late 1925 but which did not obtain government support).[14]

VI. 2. Politics and the capital levy

Another solution contemplated in 1924-1926 was the capital tax, which was thought of as a way to "take the money where it is."[15] The mere idea of a tax based on property and not on income was an old one, and it had been supported by many progressist proposals before World War I (no less than 23 bills from 1882 to 1914, including one by Caillaux, Finance minister in 1914[16]). A specific feature of the period 1924-1926 is that the proposal for a tax on capital was then defended as a "one shot" high-level tax, with the purpose of radically reducing the level of the public debt. This reasoning allowed the Socialists, who were the traditional supporters of such a proposal for distributive purposes, to defend it as a radical and definitive solution to the financial problems caused by the war. The title of the bill presented by 22 members of Parliament in July 1924 is a perfect illustration of how the "*extraordinaire et unique*" capital tax was for the Socialists the ideal solution, allowing both "*l'amortissement rapide et total des avances de la Banque de France à l'Etat, des Bons et obligations de la Défense nationale, des Bons du Trésor à trois, six et dix ans*" (the repayment of short- and medium-term public debt) and "*la suppression de la taxe sur le chiffre d'affaire, de la taxe de luxe et des impôts cédulaires sur les revenus*" (a decrease in direct taxation,

[13] In 1922, when the IGR tax rate was 50%, allowing for a 2/3 evasion rate leads to an effective tax rate of about 15%; When the IGR tax rate was 30%, the evasion rate being 1/2, the effective tax rate was also 15%.

[14] On these points, see Sauvy (1984, vol. III, ch. 5).

[15] This is a Blum's expression.

[16] The list with some details on many proposals can be found in the SAEF file B 43.281.

keeping almost only the IRVM and the progressive IGR from the previous direct tax system). The rate proposed was 15% for land and 20% for other assets. The capital levy was not contemplated at that time either by the leaders of the majority or by the government.

In March 1925, the project reappeared, probably under the influence of Blum (who on April 7 presented a bill proposing a 10% tax on capital). Herriot seems to have been convinced, since he asked the Finance minister Clémentel to work on the issue. As Clémentel opposed the project, he resigned when Herriot insisted that the capital levy be included in the budget bill for 1925 (not yet voted at that date). On April 10, his successor Monzie submitted a proposal to Parliament for a capital tax disguised as a forced loan at a flat rate of 3% (and subject to all taxes), that all taxpayers would have to subscribe to in an amount of up to 10% of their wealth. Both projects increased the fears of the right, particularly when a parliamentary amendment to the Monzie bill proposed an annual tax on capital and the creation of an extraordinary tax on enrichment since the war.[17] In spite of this, it seems that the probability of a capital tax being voted was quite low at this date, since a part of the Radical-Socialist party, whose support was necessary for a majority in the *Chambre des députés*, opposed it. Finally, it seems that it ended up as a mere alibi for Herriot who wanted to "fall on the left", when the scandal of the breaching of the Bank of France's issuing-limit began (Jeanneney, 1977; Bonnefous, 1960).

After Herriot resigned, the Painlevé government included Caillaux as Finance minister. Caillaux opposed the idea of a high-rate capital tax, but was probably favorable to a low tax on "unproductive capital".[18] The budget bill for 1925, which was finally passed on July 12, 1925, did not include the capital tax and it gained the support of a majority of the center-left (without the Socialists and a part of the Radical party), which was not the *Cartel* majority. However, the *Cartel* was not dead: when the Socialist Party congress in August 1925 decided to break off with the government owing to its refusal to introduce the capital tax, the issue became the center of the discussions with the Radical party. The capital levy then became the litmus test for the political alliance between the Socialist and Radical parties. At the Radical Party congress in Nice in October, Herriot (who could only make a comeback with the support of the left) convinced the party to rebuild the *Cartel*. Caillaux was forced to resign, and the new Painlevé government (with Painlevé himself as Finance minister) was then supposed to make the capital tax its priority. In fact, Painlevé proposed an extraordinary national contribution in November, which gave holders of securities a choice between a one-time payment of 150% of the income and 14 annual payments of 15%. Another

[17] Note that an extraordinary tax on corporate war profits, at very high rates, had been voted during the war by a large majority.

[18] This tax was included in the first draft of the 1926 budget presented in October 1925, but it had not been voted when he resigned. The idea was not Caillaux's, as is shown by the existence of similar projects at the Finance ministry from 1924 at least. Note that the same method (a very low rate) had been used by Caillaux himself in order to obtain approval for the income tax in 1914. The rapid increase in the rate of income tax in the following years made that method much more difficult to use in the case of the capital tax. The fact that this tax was seen as "inquisitorial" and as allowing the creation of wealth registration (*cadastre des fortunes*) did not help.

proposal was made by two deputies (Bibié and Falcoz) for a progressive capital tax with rates ranging from 5 to 25% (for fortunes greater than 45 million francs), with an advantage for payment in government bonds. By then, the divisions inside the Radical party had allowed the opposition of the right-wing Senate to become powerful. All projects implying radical tax measures aimed at securities were rejected, and the resulting government instability blocked resolution of the fiscal problem until the definitive change of majority and the appointment of Poincaré as *Président du Conseil*.

Three conclusions emerge from this review of the history of the *Cartel*. During 1925, the capital levy was the most seriously studied of the radical solutions to the debt problem, much more so than the forced consolidation of the floating debt or the suppression of bearer securities.[19] Secondly, the probability of a capital tax being implemented rose from July 1924 to a peak in November 1925. Lastly, the capital levy that was under discussion was a unique event, with a high rate (something like 20%), but could be paid over several years.

VI. 3. A measure of the influence of the expected capital levy on market interest rates

Expectations of a capital levy should lead to a drop in the prices of taxed capital assets. The purpose of this section is to measure the rise in interest rates corresponding to the fall in the prices of the *rentes*. One might object that the capital levy could lead to a depreciation of the exchange rate. This point is examined in detail in appendix V. In the remaining part of this section, we will assume that the taxation had no impact on expected movements in the exchange rate, and is fully reflected in the domestic currency asset price. Arbitrage with foreign bonds (which would remain de facto free of the capital levy) was always possible. Furthermore, we assume that non-financial assets would not have been taxed[20]. Therefore, we interpret the capital tax proposal as a tax to be specifically levied on French securities.

To measure the influence of a possible capital levy on French interest rates, we have first estimated what the flows of taxes to be paid would be for somebody holding a 3% *rente*. Assuming that the tax base was fixed at a *rente* price of 50, and that the rate was 20% to be paid over five years, the taxes to be paid would be 2 francs per *rente* over the next five years.[21] We have computed, using the second equation of Appendix III, the implied internal rate of return consistent with observed prices, assuming that in the next five years only 0.55 francs would be paid, net of taxes (3 francs of coupon minus 15% of income tax minus 2 francs of capital tax). This rate of return is the rate of return net of expected taxation, that is the rate of return allowing for the fact that

[19] The fact that the capital levy was almost voted does not mean that it would have solved the debt problem. For the difficulties in implementing such a tax during that period, see Eichengreen (1990).

[20] We could not find prices of other capital assets (land, properties) to check that they did not drop in 1925.

[21] The price of the 3% *rente* before the 1924 elections was about 55. It reached 50 (see Figure 1, coupon/price ratio is about 6%) at the end of 1924.

the quoted prices of *rentes* (gross of taxation) had been driven down because people were convinced that there would be such a capital levy of 20% to be paid over five years. The resulting rate is plotted as RI_375 on Figure 6, while RA3_375 is the internal rate computed with the first equation in Appendix III, without any expected capital levy (but with income tax of 15%) and with a gross long-term rate of 3.75% (net rate equals .85 times 3.75). The measured influence of expected taxation could seem to be maximized, in the sense that applying a probability of less than one to the possibility of paying two francs per *rente* in the next five years would give a rate between RI_375 and RA3_375. On the other hand, the threat of taxation could be larger than the 20% capital levy, if one is willing to accept that, if applied, the *bordereau de coupons* would induce an increase in the amount of general income tax paid.

We explain the increase in the market rate RA3_375 observed from mid-1924 to mid-1925 as being due to the threat of a capital levy. It appears from Figure 6 that the difference in interest rates between France and Great Britain from 1923 to 1927 probably reflects some expectations of a depreciation of the franc. The difference between the French rate of return net of any expected capital levy and the British rate (RI_375-RCO_375) from mid-1925 to mid-1926 was on average 5.1% while the difference between the French and British rates (RA3_375-RCO_375) was on average 5.3% in 1923, and it rose to 8.6% in the year from July 1925 to June 1926.

The rise in French market interest rates in the second half of 1924 can be explained by the threat of a capital levy. It should be noticed that the exchange rate did not move a lot during the period of growing fears of a capital levy. The franc began to drift in the fall of 1925, and the run on the franc occurred during the first half of 1926. Furthermore, the exchange rate movements are not of an order of magnitude of 20% that would correspond to the capital taxation. As we assumed that the base for the capital levy would be narrow (limited to securities), its possible macro-economic effect on the reduction of public debt would have been negligible. Therefore, we did not investigate the optimistic argument whereby a tax increase would lead to a decrease in interest rates, thanks to the revenue-enhancing effect for the government which would make an inflation tax useless, and would thus have increased the expected value of the franc.

Another economic policy measure akin to a change in *rente* taxation had been the deflation policy of the Laval government in 1935, which imposed a cut in the coupon paid on *rentes* as part of the compulsory decrease of 10% in all budget expenditure items (including civil service pay).

The influence on interest rates of the 10% cut in *rente* coupons is similar to a rise in the rate of tax levied on *rente* holders' income. It is based on the internal rate of return of the 3% *rente* assuming that it will pay a coupon of 2.7 francs (3 times .9) forever. This rate (noted RLA_325) is the solution of the first equation of Appendix III (with cp=2.7, instead of cp=3 when the solution is RA3_325). As shown in Figure 6, the *de facto* conversion of the 3% *rente* into a 2.7% *rente* implied a rise of 2.4% in the rate of return.[22] The French market rate did not rise by this amount from 1934

[22] The means from July 1935 to June 1936 of RA3_325 and RLA_325 were 8.8% and 6.4%.

to 1935-36 because there were two offsetting effects. First, the British rate declined by 1.2 points (from 3.3 to 2.1%), and second, the expected depreciation became smaller.[23]

VII. Interest rates and expected movements in the exchange rate

VII.1 The Caillaux loan with an exchange-rate guarantee

Before the stabilization of the franc, inflation and devaluation were, with the threat of a capital levy, the second fear of bond holders. The issue of the Caillaux loan in the summer of 1925 was conceived as a response to this fear. Caillaux had a reputation for being a good *financier*. He tried to find a solution to the main short-term financial problem faced by the governments of the *Cartel*: the renewal of the *Bons de la Défense Nationale*. As it was said that people sold their *Bons* in order to export capital, he proposed a consolidation loan (so he could not be criticized for increasing the debt) offering a low interest rate (4% nominal, actually 4.3%[24]) in return for an exchange-rate guarantee (both for income and capital) and an exemption from the general income tax IGR.[25] This was generally considered to be a good idea both in France and abroad, where people saw the issue as offering good conditions to investors and as a first step towards stabilizing the franc.[26]

However, the issue was not successful, since only 5.9 billion francs of *Bons de la Défense Nationale* were consolidated, whereas outstanding *Bons* totalled 50 billion. Many explanations for this relative failure have been put forward: the *rente* was issued in late July, when many investors were on vacation; a long-lasting bank strike made the issue of the loan difficult; peasants, who were said to hoard large amounts of money in these troubled times, did not subscribe because of the harvest or because they did not understand the complex functioning of the exchange-rate guarantee; last, many firms or banks held *Bons de la Défense* as liquid assets and could not transform them into long-term investments. These reasons are not convincing, and a closer examination suggests other explanations.

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[23] The 1934 mean of RA3_325 was 8.4%; the average expected exchange rate was 111 francs per pound in 1934 and 104 francs from mid-1935 to mid-1936 (see below for details).

[24] This takes into account the fact that the francs per pound exchange rate on which the return was indexed was lower than the prevailing rate at the date of issue (see "*l'emprunt de libération nationale*", SAEF file B 33.042).

[25] Jeanneney (1976, p. 255) reports that the idea was suggested to Caillaux by a group of influential financiers and industrialists including de Wendel and Rothschild.

[26] The Rothschild bank praised the conditions of the issue highly (much more than for most government issues) in the letter announcing it to its clients on July 20, and also in direct letters to clients (see Archives nationales 132 AQ 36, file "Emprunt 4% 1925", and AN 132 AQ 4218 the letter of July 7 to Miss Peltier). However, contrary to what Jeanneney (1976, p. 261) reports, the Rothschild bank only subscribed 0.64 million francs of the new *rente* on their own account, compared with at least 17 million for every *rente* issue from 1915 to 1928 (see "Tableau général sur opérations lors d'émission de rentes françaises", AN 132 AQ 36). For the opinion prevailing in the United States, see the report by the French ambassador to the U.S. in SAEF file B 33.042.

The tax break given to investors, mostly to rich ones, was apparently important, although it could be justified by arguing that the *rente* was intended to allow consolidation of *Bons* that were not subject to the IGR. In fact, this advantage was not that important since, as we have shown previously, most bearer securities were not liable to pay the IGR, particularly the foreign securities with which the loan was in competition.[27]

A closer look at the issuing period reveals another reason, which is perhaps the most important one: commentaries, including the most independent ones (in the foreign press) are confident of the success of the loan until the Socialist Party congress in August 1925. After that date, the growing concern surrounding the possible introduction of a capital levy coincides with a decrease in subscriptions, paradoxically just at the time when they should have been at their strongest. It seems logical that the prospect of a new tax, which was the only one against which the loan was not protected, should be largely responsible for its failure. It was seen as the taking away of an advantage that had just been promised.

Above all, the most likely explanation for the failure of the issue is the proposed interest rate, which was very low in comparison with the yield on other *rentes*. It had been chosen with reference to the foreign currency yield of foreign securities quoted in Paris, the British consol for instance.[28] We will argue below that the par on this loan was consistent with expectations of a large depreciation of the franc, expectations that were in contradiction with the stabilization aim.

More details are needed in order to understand the fluctuations in the price of the Caillaux loan in the remaining part of our period. On July 16, 1935, the fiscal status of the Caillaux *rente* was changed, since it was decided that it could only exist in registered form. The purpose of this modification was to prevent people from pretending they owned this kind of *rente* when the tax administration asked them why they did not declare any security income for IGR purposes (a reply that could not be verified if the *rente* was in bearer form). The effect was to submit the *rente* to the inheritance tax that it had largely escaped before, like most bearer securities. Since the marginal rate of that tax for direct heirs was about 25%, it easily accounts for the sharp decrease in the relative price of the Caillaux *rente* vis-à-vis other public bonds. While the price of the 3% *rente* remained flat from April to September 1935, the price of the Caillaux loan dropped from 96 francs on the first of July to 84 on the 16th of September. After September 1935, we have corrected the price of the Caillaux *rente* by a factor of 1.15 in order to account for this regulatory change. We were unable to find quotations of the Caillaux *rente* before January 1926, when it was worth 90. We have fixed the price at par (100) in the issuance period (from July to October, 1925).

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[27] Remember that in the computations of the net implied market rates of the 3% *rente*, we have used a flow of coupons of 3 times 0.85 francs.

[28] See "Tableau indiquant le taux net du revenu de quelques valeurs mobilières étrangères (...)" (SAEF B 33.042): the calculations made on the basis of quotations on July 9, taking into account a future rise in the income tax levied on foreign securities from 18 to 25%, gave 3.25% as the net yield on the British consols, 3.53% on Swiss *rentes*, 3.55% on Swedish bonds, 3.75% on Norwegian bonds and 4.3% for Argentinean bonds. France could not pay more!

VII.2 A measure of the influence of expected exchange-rate movements on market interest rates

The market price of the 4% *rente* with an exchange-rate guarantee can be used to assess the impact of the expected loss in value of the French franc on interest rates in France. The coupons of these *rentes* were indexed on the pound/franc exchange rate, and the *rentes* could be redeemed at a value in francs equal to 50 times the last half-yearly coupon. This means that they could be redeemed and that the capital itself was indexed on the exchange rate. We will assume that the *rentes* were expected to be redeemed in 10 years, and we will compute an internal rate of return over the next five years, with the price and the coupon being expressed in pounds and expected pounds. This rate of return is the solution of the equation in Appendix VI, and is plotted as RERA_375 and RERA_325 in Figures 4 and 5. The expected exchange rate (ERA), plotted in Figure 7 along with the actual exchange rate, is computed according to the uncovered interest rate parity formula over the next five years since the interest rates are five-year interest rates:

$ERA = \left(\frac{1 + RA3\_375/100}{1 + RERA\_375/100} \right)^5 ER$ for the years before 1933 and

$ERA = \left(\frac{1 + RA3\_325/100}{1 + RERA\_325/100} \right)^5 ER$ for the years 1934 to 1937 (for the change in the expected long-term interest rate from 3.75 to 3.25% after 1933, see section III above)

Using the issue price of the Caillaux loan to compute first the rate of return in constant francs, and secondly the expected exchange rate, leads to a very low expected exchange rate (160 francs per pound, see Figure 7). This signals that people were willing to subscribe to the Caillaux loan only when they expected a large depreciation of the franc. The first quoted price we found, for January 1926, did lead to a much higher expected exchange rate of about 130, close to the spot rate at the same time. We may conclude that the failure of the Caillaux loan resulted from the fact that the implied exchange rate was below that expected by most market participants: the expected gain through the exchange-rate guarantee was not enough to compensate for the low nominal return.

The rate of return in constant francs (RERA_375) is very high in early 1926, which means that there were expectations of an appreciation while the current value of the franc was extremely low. The expected exchange rate derived from the price of the Caillaux *rente* never reached 150 francs per pound (Figure 7), so we can consider that the sharp depreciation of the franc (fluctuating between 150 and 200 francs per pound) in the first half of 1926 did not reflect the medium-term expectations of the market and can be considered a speculative bubble.

From 1928 to 1931, the rate of return in constant francs was between the rate of return in francs and the rate of return in pounds of the British consol. The very low level of the rate of return in francs relative to the internal rate of return in pounds can be largely explained by expectations of an appreciation of the franc. In the two years following September 1929, the difference between British and French rates was 5.3 points on average, while the difference between the constant franc rate and

the French rate (RERA_375 - RA3_375) was 3.1%. Expectations of an appreciation of the franc explain about 3/5th of the gap between French and British rates.

Symmetrically, after 1931, expectations of a depreciation account for the rise in French interest rates, while constant franc and British rates were falling. In 1934 and 1935, the gap between the French rate and the constant franc rate was larger than the gap between French and British rates (Fig. 5). The expected depreciation therefore explained more than the observed gap between French and British rates.

The rise in the budget deficit after 1932 did not have any impact, independently of depreciation expectations, until 1936, since the constant franc rate declined until mid-1935, and the subsequent rise could initially be explained by the 10% Laval coupon cut, which also applied to the Caillaux loan. After the September 1936 devaluation (which had been correctly expected for a while[29]), expectations of further depreciation appeared almost immediately in late 1936.

There was still a difference between the rate of return in constant francs in Paris and the rate of return in pounds in London. This difference cannot be explained simply by the existence of capital controls, since the prices of British consols in London and in Paris, where they were also quoted on the stock exchange, were very close when converted with the pound/franc exchange rate. Another explanation has to be found. Taxation cannot provide this explanation since our implied market interest rates have been computed net of taxes.

VIII. Conclusion

This paper tries to improve understanding of the interwar French monetary situation by using one indicator throughout: long-term interest rates. As such, it could be criticized from a methodological point of view as relying too heavily on that one indicator and on a small number of hypotheses (although we have empirical arguments for each of these). We do consider that while each of our hypotheses (and then our measures) may be debated, the overall picture we draw is the only one which puts all the available data into a consistent order. This picture is different from the prevailing one as regards some aspects of the Poincaré stabilization, and it reinforces one of the interpretations of the 1930s.

First, interest rates during the *Cartel* period were quite high (about 16%), but very far from what one would expect if the country were on the brink of hyperinflation. Moreover, the increase in the rate after 1924 (when the implied market rate was 13%) could be explained by the threat of a capital levy. The apex of the exchange rate crisis from May to July 1926 (when rate went from 140 to 200 francs per pound) appears to be a speculative bubble, since exchange-rate expectations (as deducted

[29] One should have taken into account the Laval 10% cut, estimated above at 2%, in the computation of net of tax French interest rates RA3_325 and RERA_325; but this omission on both rates cancels out in the computation of the expected exchange rate.

from the interest-rate differential between interest-rate-guaranteed and usual government bonds) were already declining and were well below the actual rate. Second, the low interest rates in France during the 1928-1931 period reflected expectations of an appreciation of the franc *vis-à-vis* the pound. Symmetrically, after 1931, expectations of a depreciation of the franc account for the high level of interest rates in France.

The interpretation that results from these findings is as follows: the politically motivated struggle over the capital levy increased interest rates in 1925 but the capital levy by itself was not important enough to prevent a stabilization, which was still possible and even expected before Poincaré took over. His supposed victory over inflation was then more a question of luck than design since there had been no signs of nascent hyperinflation and a return to stability (although at a somewhat lower exchange rate) was likely. This episode had two important consequences: first it contributed to an excessively low stabilization level for the franc, which was reflected in expectations of a revaluation that lasted up until the devaluation of the pound. Second, the myth of the franc Poincaré saving France from a fierce political struggle and from the pain of inflation partly explains the reluctance of all political parties to countenance any devaluation in the 1930s. Given the strong opposition to capital flow restrictions and the contradiction between monetary financing of the budget deficit and explicit deflationary measures, expectations of a devaluation rapidly appeared. They explain the rise in interest rates in France during the depression.

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Appendix

I. Probability of conversion

In the law which permitted issuance of new public debt, the conditions of redemption of the *rentes* were given. Both the 5% *rente* issued in 1915 and the 6% *rente* issued in 1920 could be redeemed after January 1931. We have computed the implied probability of reimbursement by considering that the price of one of these *rentes* was equal to the discounted flow of coupons up to 1931, plus a repayment in 1931 of 100 with probability *q* or a value of capital in 1931 equal to the nominal coupon divided by the long-term interest rate with probability 1-*q*. Before computing the implied probability, one needs a discount rate up to 1931, this rate is computed with the price of the 3% *rente*.

Denoting the length between current year and 1931 n_t, the price of the 3% *rente* which pays a coupon (net of income tax) of *cp*3 francs $P3_t$, the capital tax to be paid each year until 1931 $j3$, and the expected long-term rate for the future after 1931 (net of income tax) r_L, the internal rate of return $r3_t$ on the 3% *rente* for the n_t following years, is defined by:

$$P3_t = \sum_{i=1}^{n_t} \frac{cp3 - j3}{(1+r3_t)^i} + \frac{cp3/r_L}{(1+r3_t)^{n_t}} = \frac{cp3 - j3}{r3_t}\left(1 - \frac{1}{(1+r3_t)^{n_t}}\right) + \frac{cp3/r_L}{(1+r3_t)^{n_t}}$$

The implied probability q_t of redemption of a *rente* which is priced P_t and which pays a coupon *cp* is defined by:

$$P_t = \sum_{i=1}^{n_t} \frac{cp - j}{(1+r3_t)^i} + q_t \frac{100}{(1+r3_t)^{n_t}} + (1-q_t)\frac{cp/r_L}{(1+r3_t)^{n_t}}, \text{ and therefore}$$

$$q_t(100 - cp/r_L) = (1+r3_t)^{n_t}\left(P_t - \frac{cp - j}{r3_t}\left(1 - \frac{1}{(1+r3_t)^{n_t}}\right)\right) - cp/r_L$$

For readers familiar with the literature on the British consols in the nineteenth century, it may be helpful to restate the issue analyzed by Klovland (1994) in our framework. With his notation, $RC1923_t$ is the rate of return on the Goschen 2.75 consol assuming it will be redeemed in 1923, RC_t is the rate of return assuming it will not be redeemed. With C_t being the clean price of the consols, and n_t the length of the period between *t* and 1923, these two rates of return are defined by:

$$C_t = \sum_{i=1}^{n_t} \frac{2.75}{(1+RC1923_t)^i} + \frac{100}{(1+RC1923_t)^{n_t}} \text{ and } C_t = \frac{2.75}{RC_t}$$

Using as a benchmark the return on non redeemable metropolitan stock (which plays a similar benchmark role to our 3% *rente*), Klovland found that the spread over the consol yield, assuming no redemption, makes more sense in the 1895-1899 period than the other spread over the consol yield

when redemption is assumed. Let us denote as $\hat{r}_t$ the fit value of the consol yield over the period 1895-1899 in his econometric equation (estimated outside of the 1895-1899 sample) linking the consol yield to the non-redeemable metropolitan stock, and the probability of redemption in our framework is given by:

$$\frac{2.75}{\hat{r}_t} = q_t\left(\sum_{i=1}^{n_t}\frac{2.75}{(1+RC1923_t)^i} + \frac{100}{(1+RC1923_t)^{n_t}}\right) + (1-q_t)\frac{2.75}{RC_t}$$

Klovland's set up is simpler than ours because he does not have to deal with one rate up to the redemption date, and a different rate afterwards, and because he did not look for a conversion probability, since the non-conversion hypothesis (null probability) is enough to fit the data.

II. Expected long-term interest rates (in the United States).

If one knows the medium (5-year) and long (15-year) market interest rates i_M and i_L, one can compute the expected long-term rate (expected to prevail for ten years in 5 years from now), which is the forward rate *f*, by using i_M and *f* as discount rates to compute the present value of a flow of coupons i_L, which is by definition equal to 1. Therefore:

$$1 = \sum_{j=1}^{M}\frac{i_L}{(1+i_M)^j} + \sum_{j=1}^{L-M}\frac{i_L}{(1+i_M)^M(1+f)^j} + \frac{1}{(1+i_M)^M(1+f)^{L-M}},$$

or $1 = \frac{i_L}{i_M}\left(1-\frac{1}{(1+i_M)^M}\right) + \frac{i_L}{f(1+i_M)^M}\left(1-\frac{1}{(1+f)^{L-M}}\right) + \frac{1}{(1+i_M)^M(1+f)^{L-M}}$, hence f.

i_M and i_L are taken in Baum and Thies (1992) and Cecchetti (1988, pp. 1131 sq.).

III. Implied medium-term market rate

The rate of return on perpetual government bonds (*rentes perpétuelles*) is usually computed as the ratio of the coupon to the price. This rate is a very long rate. It is possible to compute a medium-term interest rate r_t by assuming that we know the expected price of the *rente*, or the infinite interest rate, that will prevail in some years. Denoting this rate (net of tax) r_L, the price of the bond P_t, and the coupon received (net of income tax) *cp*, the medium-term interest rate r_t (net of tax) for the following five years is such that:

$$P_t = \sum_{i=1}^{5}\frac{cp}{(1+r_t)^i} + \sum_{i=1}^{\infty}\frac{cp}{(1+r_t)^5(1+r_L)^i} = \frac{cp}{r_t}\left(1-\frac{1}{(1+r_t)^5}\right) + \frac{cp/r_L}{(1+r_t)^5}.$$

If a *rente* holder has to pay a tax of φ francs per *rente* (because of a capital levy) in the following five years, the equation between price and internal rate of return will be:

$P_t = \frac{cp - j}{r_t}\left(1 - \frac{1}{(1+r_t)^5}\right) + \frac{cp / r_L}{(1+r_t)^5}$. Observing P_t, and making an hypothesis concerning r_L, one can compute r_t.

IV. Rate of return on private bonds:

The issue of private bonds was designed to induce a constant total debt charge, including payment of interest and principal. So, with *cp* as the nominal (coupon) interest rate, the amortization of the capital in each period should follow: $Am_j + cp\left(K - \sum_{i=1}^{j-1} Am_i\right) = Am_{j-1} + cp\left(K - \sum_{i=1}^{j-2} Am_i\right)$. And therefore, $Am_j = (1+cp)Am_{j-1}$.

If the capital *K* is to be paid back in *N* periods, $K = \sum_{i=1}^{N} Am_i = Am_1\left(\frac{(1+cp)^N - 1}{r}\right)$, and $Am_j = \frac{(1+cp)^{j-1}}{(1+cp)^N - 1} cpK$, for *j* from 1 to *N*.

If a bond is going to be paid back with a constant charge from T_1 to T_2, which means it has been issued at $T_1 - 1$, and $N = T_2 - T_1 + 1$ with a nominal interest rate of *cp*, the share of the borrowed capital to be reimbursed at *t* (between T_1 and T_2), is: $k_t = \frac{(1+cp)^{t-T_1}}{(1+cp)^N - 1} cp$. Between *t* (excluded) and T_2 the share of capital that will be paid back is:

$$k_t^{T_2} = \sum_{i=1}^{T_2 - t} k_{t+i} = \sum_{i=1}^{T_2 - t} \frac{(1+cp)^{t+i-T_1}}{(1+cp)^N - 1} cp = (1+cp)^{t-T_1+1} \frac{(1+cp)^{T_2 - t} - 1}{(1+cp)^N - 1}.$$

In the *Annuaires des valeurs*, the numbers of bonds that had already been reimbursed is reported. We have checked for each of the bonds that the share of reimbursed bonds is close to $1 - k_t^{T_2}$ for *t*=1926.

Suppose that a bond had been issued with different series to be reimbursed by random drawing of lots in order for the issuer to have a constant charge to pay each year, the probability that a holder in *t* of a bond (which has not yet been reimbursed) would see the capital paid back at *t*+*i* is $\frac{k_{t+i}}{k_t^{T_2}} = \frac{(1+cp)^{i-1}}{(1+cp)^{T_2 - t} - 1} cp$. If the price of this bond is P_t, the internal rate of return between *t* and *t*+5 denoted *r*, assuming that the rate of return after *t*+5 will be r_L, is such that,

$P_t = \sum_{i=1}^{5} \frac{(1-t)cp - dtrans + k_{t+i} / k_t^{T_2}}{(1+r)^i} + \sum_{i=6}^{T_2 - t} \frac{(1-t)cp - dtrans + k_{t+i} / k_t^{T_2}}{(1+r)^5 (1+r_L)^{i-5}}$, where τ is the tax rate on received interest, and *dtrans* is the transmission duty proportional to the previous year's price.

V. Capital levy and exchange rate.

The influence of taxation on the prices of domestic assets is different under flexible or fixed exchange rates. The basic mechanism is an arbitrage between a taxed domestic asset and an untaxed foreign asset, assuming that there are no capital controls and that domestic arbitrageurs can hold untaxed foreign assets. The return on both assets net of taxation and expressed in the same currency should be the same. The pound value of a perpetual taxed French *rente* equals the discounted value of the flow of coupons paid in francs and converted into pounds, at each period, with the relevant expected exchange rate. The discount factor should be an international one and we assumed for the sake of simplicity that the expected exchange rate would have been constant from the next year onwards.

The arbitrage equation is therefore: $\frac{P}{e} = \sum_{i=1}^{N} \frac{cp - j_i}{e^a \left(1 + r^*\right)^i} + \frac{cp / r^*}{e^a \left(1 + r^*\right)^{N+1}}$, where cp is the coupon gross of any capital levy, r^* is the rate of return on the untaxed asset in the foreign country, e is the exchange rate (one pound equals e francs), and e^a is the expected exchange rate. In the above formula, a capital tax is imposed in the next N years. A pure capital levy corresponds to a tax to be paid only once (say next year, so that N=1), whose amount φ_1 is proportional to the price P of the asset before the taxation was announced (P is the tax base of the capital levy).

If the exchange rate is flexible, the price of the domestic asset in domestic currency does not have to move when the tax rate moves, as the exchange rate could adjust below the expected longer term exchange rate ($\frac{e^a}{e}$ goes down) when the tax becomes expected. If the exchange rate is fixed, or if there is no room for expected appreciation, or in other words the actual and expected exchange rates move by the same amount, the price P has to adjust. This simple model has no implications for the expected exchange rate, which will be used to convert the coupon payments, independently of the actual exchange rate.

These basic principles show that a change in the taxation of domestic assets does not necessarily lead to a movement in the exchange rate. Conversely, a capital flight which immediately depreciates the exchange rate, permitting a further expected appreciation, allows the domestic price to move less than the tax rate.

VI. Rate of return on the Caillaux bonds

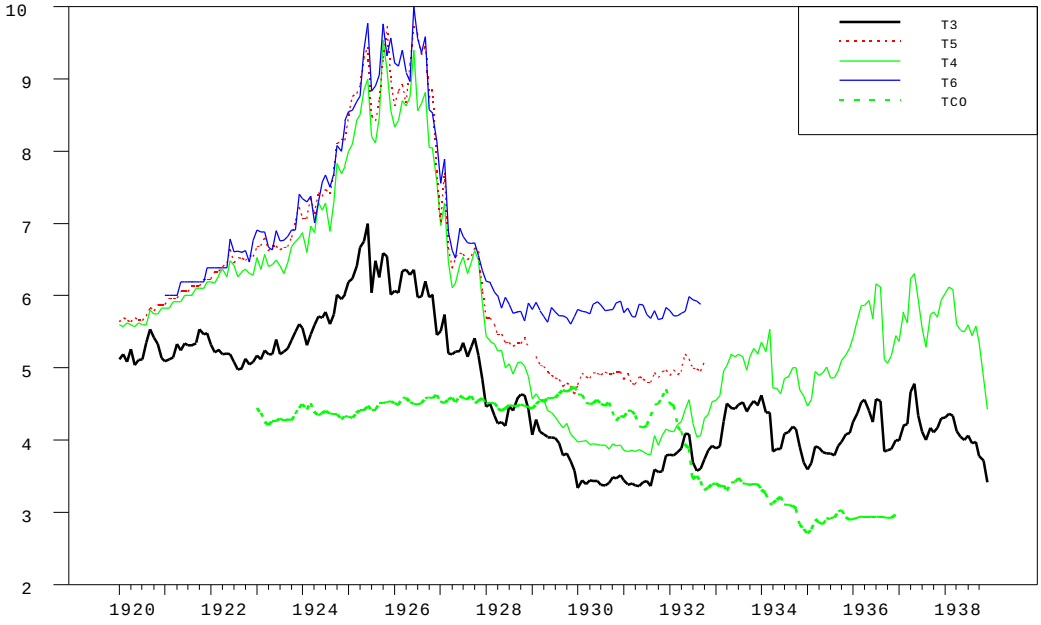
For the internal rate of return on the Caillaux 4% *rente* with an exchange-rate guarantee, we assume that there were always expectations that the capital would be paid back eventually. We also assume that this reimbursement would occur in 10 years from the current period. We have computed the internal rate of return with a price and a coupon defined in constant francs (the quoted price of

this *rente* has been multiplied by 1.15 after July 1935 to correct for the drop in the quoted price of this *rente* after the repeal of its tax exemption).

$$\frac{P_t}{e_t/95} = \sum_{i=1}^{5} \frac{4}{(1+r_t)^i} + \sum_{i=1}^{5} \frac{4}{(1+r_t)^5(1+r_L)^i} + \frac{100}{(1+r_t)^5(1+r_L)^5} \text{ or,}$$

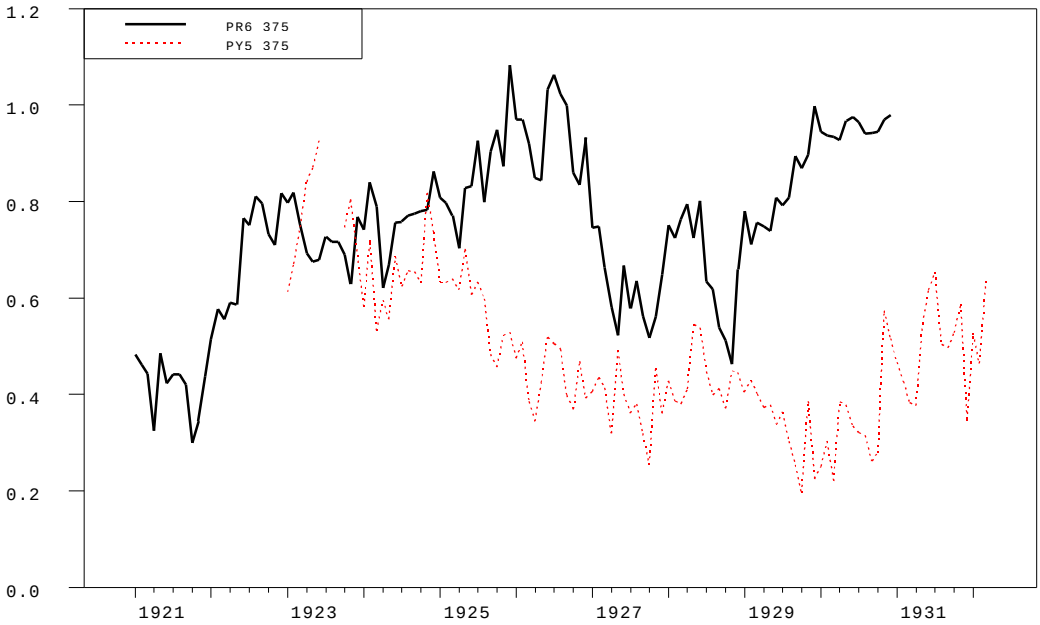
$$\frac{P_t}{e_t/95} = \frac{4}{r_t}\left(1-\frac{1}{(1+r_t)^5}\right) + \frac{4}{r_L(1+r_t)^5}\left(1-\frac{1}{(1+r_L)^5}\right) + \frac{100}{(1+r_t)^5(1+r_L)^5}.$$

Figure 1: Coupon/price ratios for various government bonds



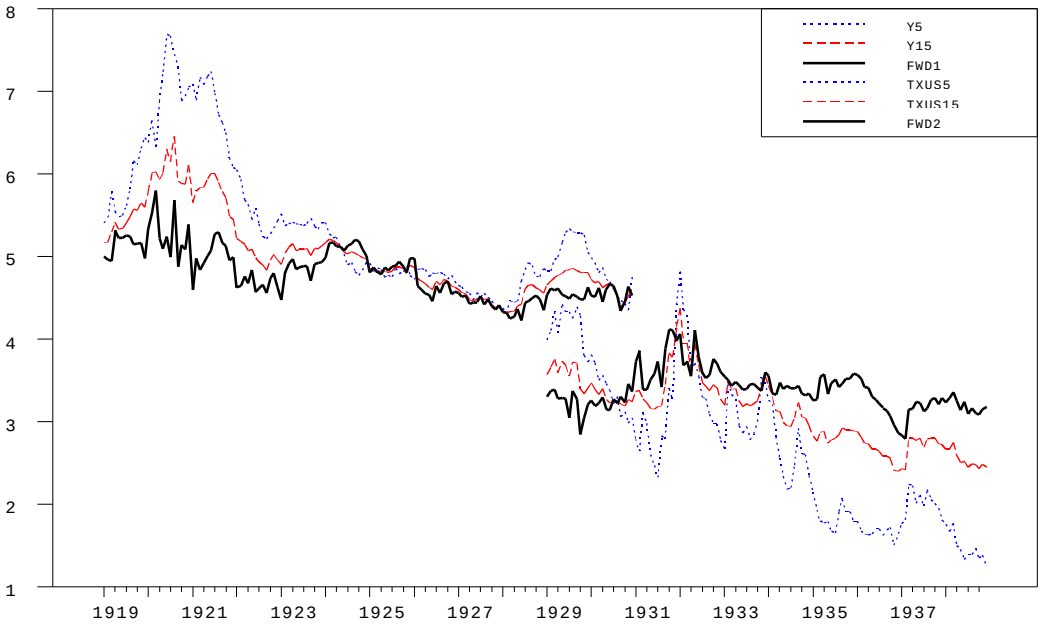
Note: T3, T4, T5 and T6, are the coupon/price ratios of the French 3%, 4%, 5 and 6% *rentes*. TCO is the coupon/price ratios of the 2.5% British consol.

Figure 2: Implied conversion probabilities



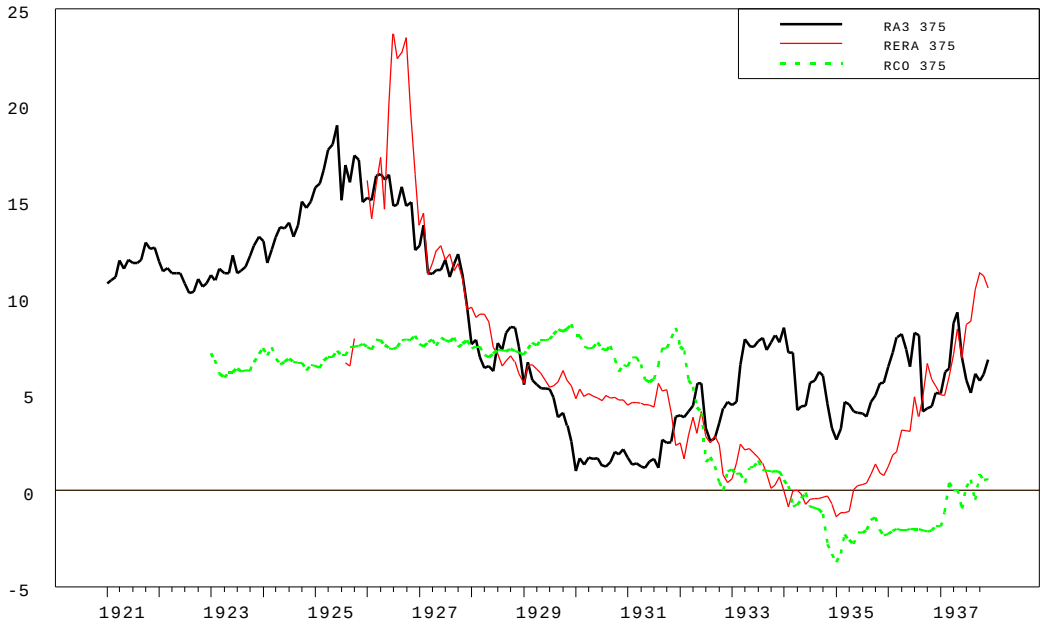
Note: Conversion probabilities (see Appendix I) of the 6% French rente (PR6_375) and of the British 5% War loan (PY5_375), with an expected gross long term rate of 3.75%.

Figure 3: US Rates



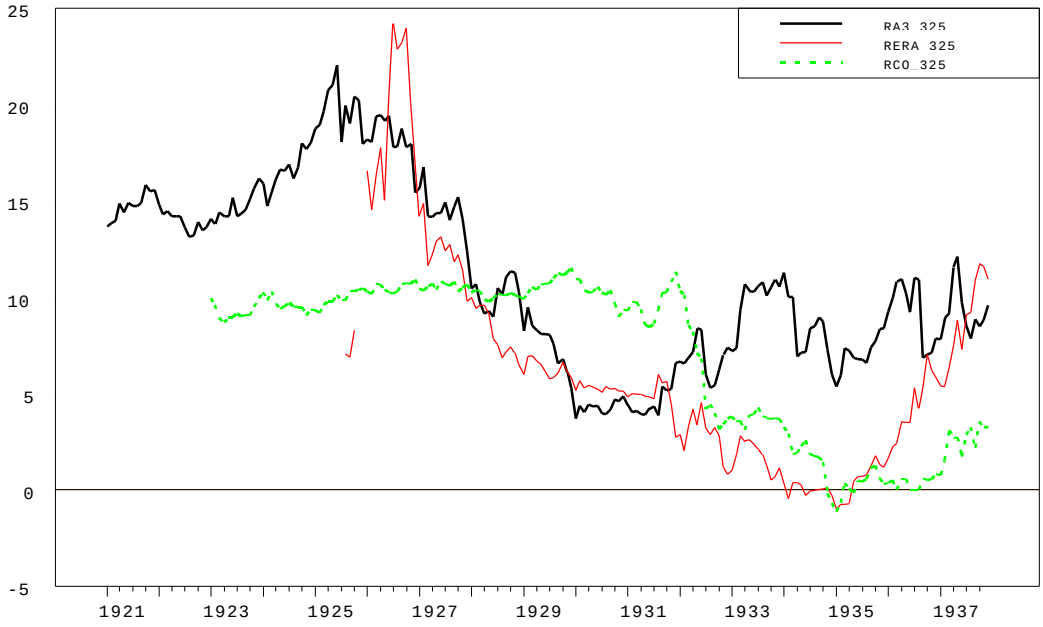
Note: Y5 and Y15 are 5 and 15 years railroad Aaa bond from Baum and Thies (1992). TXUS5 and TXUS15 are 5 and 15 years zero coupon rates derived from US government bond from Cecchetti (1988). FWD1 and FWD2 are the long term expected rates respectively computed from Baum and Thies' and Cechetti's rates. These are the forward rates in 5 years for 10 years (see Appendix II).

Figure 4: Implied net market rates with 3.75% as gross long term rate



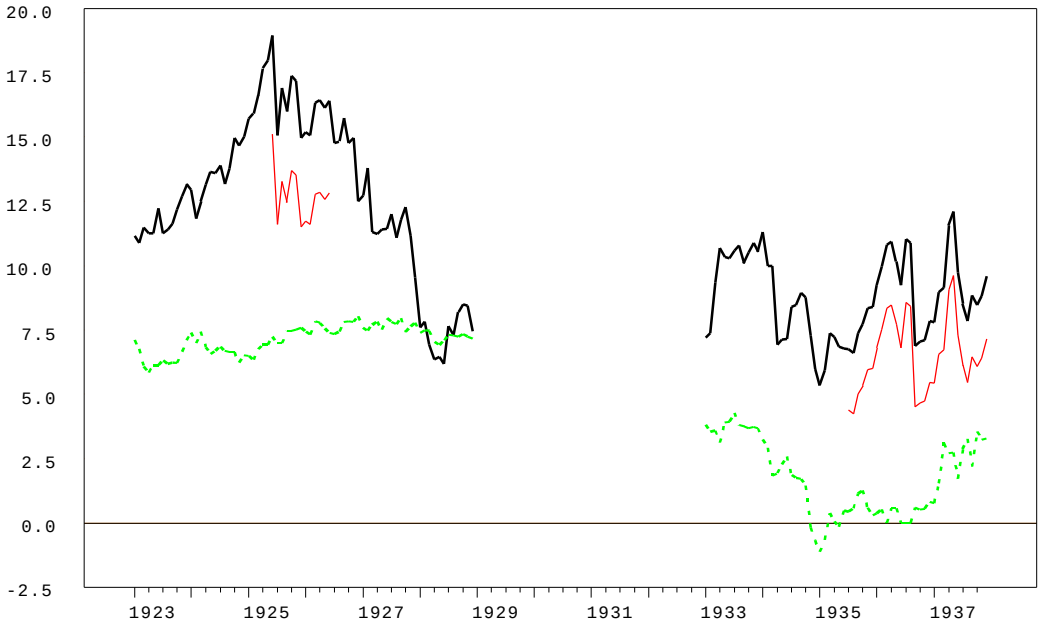
Note: RA_, RERA_, and RCO_ are the implied net market rates derived from the prices of the French 3% rentes, the Caillaux loan, and the British 2.5% consol.

Figure 5: Implied net market rates with 3.25% as gross long term rate



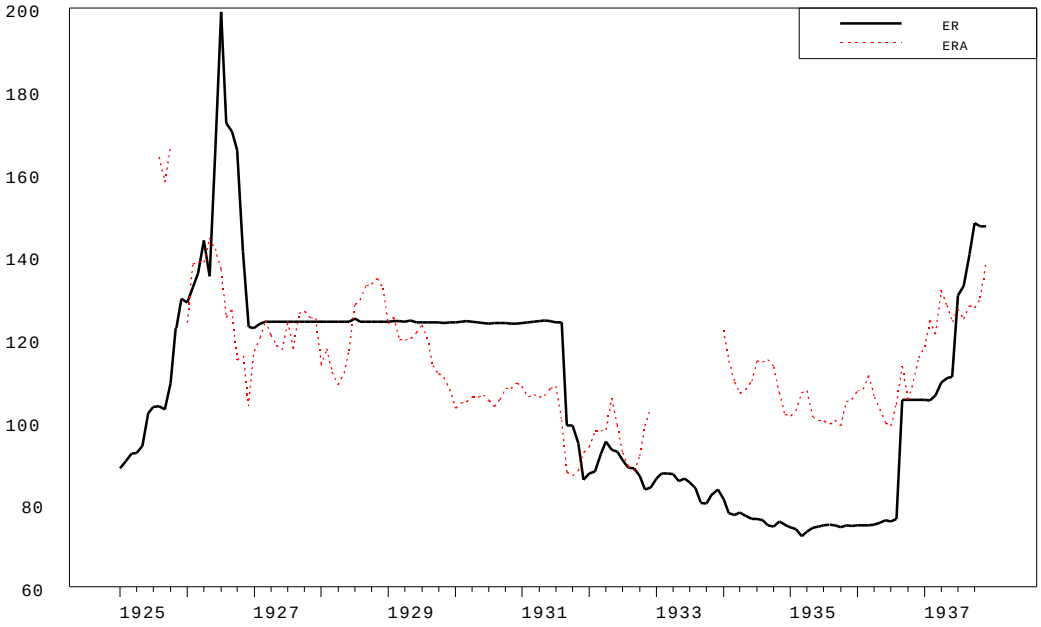
Note: RA_, RERA_, and RCO_ are the implied net market rates derived from the prices of the French 3% rentes, the Caillaux loan, and the British 2.5% consol.

Figure 6: Expectation of capital levy effects and of Laval 10% cut



Note: RA3_375 (thick line) and RCO_375 (dotted line) are the implied net market rates derived from the prices of the French 3% rentes and the British 2.5% consol. RI_375 (thin line) is the implied rate net of a 20% capital levy staggered on 5 years (see Text).
RA3_325 (thick line) and RCO_325 (dotted line) are the implied net market rates derived from the prices of the French 3% rentes and the British 2.5% consol. RLA_375 (thin line) is the implied rate net of the 10% cut on coupon imposed by Laval.

Figure 7: Actual and Expected exchange rates



Note: ER is the observed franc/pound exchange rate. ERA is the 5 years expected exchange rate (see Text).