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## Article

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*Suggested Citation:* Kugler, Peter; Weder, Beatrice (2002) : The Puzzle of the Swiss Interest Rate Island: Stylized Facts and a New Interpretation, Aussenwirtschaft, ISSN 0004-8216, Universität St.Gallen, Schweizerisches Institut für Aussenwirtschaft und Angewandte Wirtschaftsforschung (SIAW-HSG), St.Gallen, Vol. 57, Iss. 1, pp. 49-64

This Version is available at:

<https://hdl.handle.net/10419/230995>

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# **The Puzzle of the Swiss Interest Rate Island: Stylized Facts and a New Interpretation\***

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Diese Arbeit zeigt stilisierte Fakten über die «Zinsinsel Schweiz». Als erstes dokumentieren wir, dass die langfristigen realen Erträge auf Schweizer Euro-Einlagen deutlich niedriger waren als in anderen Hauptwährungen. Eine Zerlegung der Ertragsunterschiede in Abweichungen von der ungedeckten Zinsparität und Abweichungen von der Kaufkraftparität zeigt, dass erstere einen größeren Anteil zur durchschnittlichen Zinsdifferenz beiträgt. Wir weisen die Zinsdifferenz in Euro-Einlagen nach und folgern, dass sie nicht von nationalen Gegebenheiten, wie etwa dem Bankgeheimnis, verursacht wird. Ferner sollten Erklärungen für das Zinsinsel Phänomen beim langfristigen Versagen der ungedeckten Zinsparität und nicht bei der realen Wertsteigerung oder bei strukturellen Problemen ansetzen. Wir untersuchen die historische Entwicklung der Zinsdifferenz und schließen auf ein «Peso Problem». Schließlich diskutieren wir die Konsequenzen für die schweizerische Geld- und Wechselkurspolitik.

*Keywords:* Interest Rate Puzzle, Swiss Interest Rate Island, Peso Problem

*JEL Classification:* E43, E44, G15

## **1 Introduction**

Over the past 25 years nominal and real interest rates on Swiss assets have been lower than returns on comparable assets in other major currencies. In Switzerland this fact is widely known by the name of “Swiss Interest Rate Island” and there are a number of popular explanations for the phenomenon. Some observers maintain that the lower yield of Swiss assets is due to structural idiosyncrasies of Switzerland such as tax haven effects and/or regulations. According to this explanation investors are prepared to accept lower yields in return for some locational benefits available in Switzerland, say the banking secrecy. Others have suggested that the puzzle is linked to real appreciation of the Swiss Franc following differential productivity performance between the tradable and the non-tradable sector. Yet, others suggest that the puzzle is due to the high savings and

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\* For helpful comments we thank MICHAEL BORDO, ANTU PANINI MURSHID, ANNE KLEINWEFERS LEHNER and the participants of a seminar at the Meeting of the European Economic Association 2001 in Lausanne. We thank ANTU PANINI MURSHID for sharing data. Financial support from the WWZ Förderverein is gratefully acknowledged.

net creditor position of Switzerland and finally there have been suggestions that it may be due to exchange rate targeting of the central bank. So far the debate has been inconclusive. This paper aims at clarifying the debate by establishing some empirical facts about the nature of the puzzle and then by offering a new interpretation.

In order to identify the puzzle we start out by computing the ex post real interest rate differential between assets in Swiss Francs and comparable assets in other currencies. We use 1 Month Euro deposits in Swiss Francs (SFR) and in nine major currencies and find that long run real returns on Swiss Euro Deposits have, indeed, been significantly lower than in any other major currency. We then proceed to decompose the average real interest rate differentials in two components: deviations from purchasing power parity (PPP) and deviations from uncovered interest rate parity (UIP). This reveals that the puzzle quantitatively is mostly due to deviations from UIP rather than deviations from PPP. From this it follows that solutions to the puzzle should provide an explanation for a long run failure of the uncovered interest rate parity rather than for real appreciation. It also follows that the solution cannot be sought in structural idiosyncrasies of Switzerland since the puzzle is present in Euro Deposit Rates.

We offer another interpretation which could explain a long run deviation from uncovered interest rate parity: By examining historical data from the pre-war and inter-war period we find evidence that suggests the interest rate island could be due to a reverse peso effect.

The paper is organized as follows. *Section 2* presents stylized facts about the interest rate puzzle. *Section 3* discusses existing explanations and *section 4* presents evidence suggestive that it may be due to a reverse peso problem. *Section 5* draws the policy conclusions.

## **2 Stylized Facts on the Interest rate Island**

The existence of a Swiss interest rate island is usually documented by showing that there was a real return differential between assets in Swiss Francs and comparable assets in other currencies. Thus we start our analysis by computing the ex post real interest rate differential between 1 Month Euro deposits in Swiss Francs (SFR) and in nine major currencies: Belgian Franc (BEF), Canadian Dollar (CAD), Deutschmark (DEM), French Franc (FFR), Italian Lira (ITL), Japanese Yen (JAP), Dutch Guil-

der (NLG), Pound (UKP) and Dollar (USD). We use a monthly data set from 1980–98. This period was selected as international capital movements were completely liberalized in these countries at the end of the seventies.

The (ex post) real interest rate differential can be calculated as follows:

$$r^*_{t-1} - r_{t-1} = i^*_{t-1} - \pi^*_{t-1} - (i_{t-1} - \pi_t) \tag{1}$$

Where (r) denotes the real interest rates, (i) stands for the Euro 1 Month interest rate and the CPI Inflation rate is ( $\pi$ )<sup>1</sup>. The Swiss Franc is considered as the home currency and the foreign variables are denoted by\*.

**Figure 1:** Mean Real Interest Rate Differentials between Swiss Francs and 9 other Currencies; Monthly Data 1980–1998  
Positive values indicate higher interest rates abroad

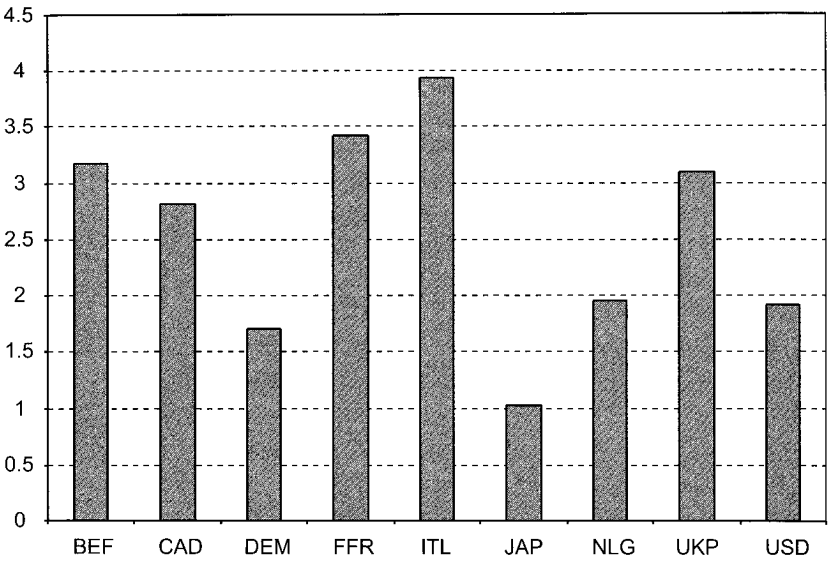


Figure 1 shows the results: the interest rate differentials have been positive in every instance implying that real interest rates have been significantly lower in Switzerland than in all countries considered. For example

1 The data source is Datastream for the Euro interest rates and for exchange rates. Data on CPI inflation was obtained from IFS. The exchange rates are Dollar rates or cross rates, respectively.

the real interest rate differential vis-à-vis the US was 3.1 percent and vis-à-vis Germany it was 1.7 percent. The differentials range from 1 percent (vis-à-vis Japan) to almost 4 percent (vis-à-vis Italy). In other words, as a rule the real interest rate differential is relatively large and, moreover, it is statistically different from zero as shown in *Table 1*, first column.

In order to identify the source of this differential we proceed to decompose the real interest rate differential into two components:

$$r^*_{t-1} - r_{t-1} = (i^*_{t-1} - i_{t-1} + \Delta s_t) - (\Delta s_t + \pi^*_t - \pi_t) \tag{2}$$

where ( $\Delta s$ ) is the change in the log of the nominal exchange rate defined as the home currency price of the foreign currency.

The first component equals the ex post nominal return differential between Swiss and foreign assets adjusted for the change in the exchange rate. This term will be equal to zero if uncovered interest rate parity holds. The second term is the differential between Swiss and foreign inflation and the change in the nominal exchange rate, that is the change in the real exchange rate. This term will be equal to zero if relative purchasing power parity holds. In other words, the real interest rate differential can result from a violation of uncovered interest rate parity or a violation of relative purchasing power parity or a combination of both:

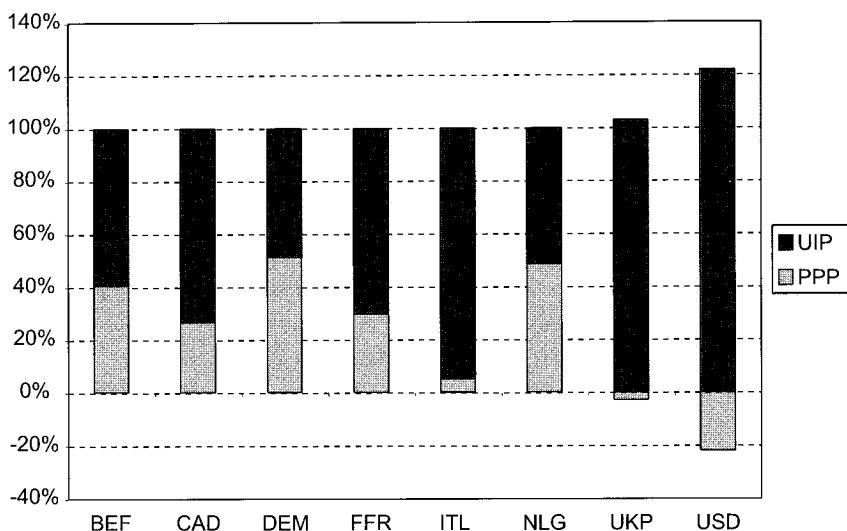
<i>Real Interest Rate Differential</i>	=	<i>Nominal return rate differential –</i>	<i>appreciation</i>
		<i>(adjusted for changes in the</i>	<i>(of the real</i>
		<i>nominal exchange rate)</i>	<i>exchange rate)</i>
<i>Real Interest Rate Differential</i>	=	<i>Deviations from UIP–</i>	<i>Deviations</i>
			<i>from PPP</i>

In order to gain some information on the relative importance of these components in the long run we calculated the sample means of these variables for the Swiss Franc. *Figure 2* is drawn from *Table 1* and shows the departures from UIP and departures from PPP expressed as percent of the real interest rate differential.

*Figure 2* shows that the real interest rate differential is mostly due to the nominal return differentials (or deviations from uncovered interest rate parity). Real exchange rate appreciation (or deviations from purchasing power parity) contribute most vis-à-vis the Deutschmark and vis-à-vis the

Dutch Guilder (in the order of 50 percent). Their contributions are minor vis-à-vis the Italian Lira or the French Franc, and vis-à-vis the UK pound, the US Dollar and the Japanese Yen they are even negative. This means that vis-à-vis the latter currencies the Swiss Franc has depreciated in real terms. (The Japanese Yen is not shown in the graph since the depreciation was so large that it would affect the proportions of the figure). Therefore deviations from uncovered interest rate parity contribute the lions share to the real interest rate differential.

**Figure 2:** Decomposition of Real Interest Rate Differentials into Deviations from UIP and PPP



Two stylized facts follow from this analysis:

- (i) real returns in Swiss Franc have been significantly lower than in any other currency and
- (ii) the puzzle is mainly due to a long run departure from uncovered interest rate parity.

In KUGLER and WEDER (2001) we analyze the nominal return differentials in more depth and establish the following additional stylized facts:

- (iii) The Swiss Franc is not special with respect to the well known short run violations of uncovered interest rate parity (forward premium puzzle), but

- (iv) the long run violation of uncovered interest rate parity is unique to the Swiss Franc, that is, it is not found in any other major currency.
- (v) The puzzle applies equally to all currencies under considerations. We cannot reject the hypothesis that the nominal return differentials of the Swiss Franc are the same vis-à-vis all 9 currencies.
- (vi) The return differentials have been quite stable and have not diminished over time. The only structural breaks that we identify are relative to the Italian Lira and the US Dollar during periods of currency turmoil.

We suggest that explanations for the interest rate island should conform with these stylized facts.

**Table 1:** Nominal Return Differentials, Real Interest Rate Differentials and Change in the log Real Exchange Rate, Swiss Franc vis-à-vis 9 Currencies, Monthly Data 1980–98, Means, Standard Errors in Parentheses

	Real Interest Rate Differential	Deviations from UIP (Nominal Return Differential)	Deviation from PPP (Negative Values Denote: Real Exchange Rate Appreciation)
BEF	3.17 (0.36)	1.88 (1.22)	-1.29 (1.18)
CAD	2.81 (0.35)	2.06 (3.01)	-0.75 (2.97)
DEM	1.71 (0.32)	0.83 (1.09)	-0.88 (1.08)
FFR	3.42 (0.35)	2.41 (1.21)	-1.01 (1.21)
ITL	3.94 (0.33)	3.64 (1.85)	-0.20 (1.79)
JAP	1.02 (0.51)	3.10 (2.49)	2.08 (2.53)
NLG	1.95 (0.39)	1.00 (1.08)	-0.95 (1.07)
UKP	3.10 (0.46)	3.01 (2.27)	0.09 (2.33)
USD	1.92 (0.34)	2.36 (2.93)	0.42 (2.90)

### 3 Existing Explanations for the Interest Rate Puzzle

In this section we discuss several existing explanations for the interest rate puzzle and examine how they conform with the stylized facts. In particular we discuss arguments based on structural and safe haven arguments, on real appreciation, and monetary policy response to exchange rate pressure.

#### Structural, “safe haven” arguments

The point of departure of all structural or safe haven arguments are some peculiarities of Switzerland. They include banking secrecy laws, good quality of banking services, high stability of the financial system, or more generally, regulations that are friendly to investors. According to these arguments investors are prepared to accept lower yields in return for some special benefits available only in Switzerland. The tax haven is a close relative of the more general safe haven arguments. The argument is that high capital inflows lower interest rates since foreign investors are willing to pay a premium for holding assets in Switzerland.

All safe haven arguments imply that the lower returns are related to the location of assets rather than to the currency. They suggest that there is a locational component to the puzzle, since only deposits located in Switzerland enjoy the benefits of Swiss regulations, banking services etc. In the analysis above we used Euro deposit rates (that is deposits which are located outside of Switzerland) and found a significant return differential. It follows that the true puzzle is related to the currency rather than the location of assets, it is a phenomenon of the Swiss Franc, not of any structural feature of the Swiss banking system.<sup>2</sup>

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2 It is possible, however, that structural effects play a role in the sense that Swiss domestic deposits might carry an even greater discount than Euro-deposits. This question is not investigated in this study, since there is no data on domestic asset returns that would be readily comparable to assets in other countries. However, MAURO (1995, p. 27) presents some evidence that suggest that there is no such additional domestic structural effect. He compares the deposit rate of Swiss commercial banks with Swiss Francs on Euro markets, and concludes that the discrepancy is not unusually large by international standards and might simply relate to transaction costs. Moreover, the SNB data on Swiss Franc inter-bank bid rates in Zuerich (available since 1998) show that the difference of these interest rates and the corresponding LIBOR rates is in the range of the bid ask spread (10 to 15 basis points).



## Real Appreciation

Another explanation has focused on real appreciation caused by the inflation in non traded goods prices. There has been a lively debate on the causes of the real appreciation, mostly focusing on the real appreciation of the Swiss Franc vis-a-vis the Deutschmark. For instance, BRUNETTI and HEFEKER (1999) attribute it to structural inefficiencies in the Swiss non-tradable sector and assert that Swiss export competitiveness has been hurt by the real appreciation. In contrast, BALTENSPERGER, FISCHER and JORDAN (1999) argue that the real appreciation is due to a higher productivity growth in the export sector and therefore does not represent a threat to export competitiveness.

Regardless of the true causes of the real appreciation, stylized fact number (ii) shows that real appreciation contributes only a small part to the interest rate puzzle.

## Monetary policy responses to exchange rate pressure

Monetary policy could be responsible for lower returns on domestic assets if it reacted systematically to changes in the exchange rate. MCCALLUM (1994) showed that the uncovered interest rate parity fails to hold if the central bank systematically reacts with interest rate changes to changes in the exchange rate<sup>3</sup>. A good case can be made that this describes the policy of the Swiss monetary authority. It is common knowledge that the central bank is alert to appreciation pressure on the Swiss Franc and the exchange rate of the Swiss Franc vis-à-vis the Deutschmark (and now the Euro) is considered a sensitive issue, since a large majority of Swiss export goes to the Euro-Area.

In 1978 large capital inflows led to a sharp appreciation of the Swiss Franc and the central bank announced a floor on appreciation: they would intervene if the exchange rate dropped below 0.8 Swiss Francs per Deutschmark. This announcement was subsequently never retracted and some market participants believed this floor to be still in effect. Furthermore, before the introduction of the Euro the central bank announced that the Swiss Franc would float against the Euro but that “excessive” ap-

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3 KUGLER (2000) extends this model to the case where the central bank reacts to the exchange rate and to the term spread of interest rates.

preciation and “damaging” volatility of the exchange rate would not be tolerated<sup>4</sup>.

If, indeed monetary policy responds to certain states of the world (e.g. a state of high volatility or of strong appreciation pressure) this could be an explanation for deviations from UIP. However, it is unlikely that monetary policy responses would explain long run deviations, since markets should learn to anticipate the response pattern of the central bank. At any rate, if the response of monetary policy was responsible for either short run or long run deviations from UIP, they should only exist for currencies that the central bank is targeting. This suggests a simple test for the contribution of monetary policy to the Swiss interest rate puzzle: Deviations from UIP should be present only with the Deutschmark (and currencies that have been pegged to the Deutschmark) since the Swiss central bank only responded to these exchange rates. This is contradicted by stylized fact number (v), which says that the return differentials were not different for the Deutschmark (and other EMS currencies) from other currencies that were never informally targeted.

The conclusion from this section is that the existing explanations do not seem to fit the stylized facts of the interest rate puzzle and this calls for an alternative interpretation.

## **4 Another Interpretation of the Puzzle**

Investors may be prepared to accept lower returns over long periods if they expected the Swiss Franc to appreciate in times of unexpected political turmoil in other countries. Thus, the observed departure from UIP could be interpreted as an insurance premium (or a currency risk bonus) against certain events, which did not happen to occur during the observation period. In this view, the interest rate puzzle is nothing but a reverse peso problem.

The term peso problem derives from the 1955–75 period when the Mexican peso was fixed to the US dollar, yet all the time sold at a forward discount, reflecting constant expectations of depreciation. The depreciation did eventually occur, but it was not observable in this sample of 20 years. In the Swiss case, investors might have had constant expectations that the

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4 RICH (1999 section 2)

Swiss Franc would appreciate if some event occurred, which did not happen to occur over the past 25 years. The peso effect is not easily testable since, by definition, it only exists if the event that investors are expecting does not occur during the observation period.

However, we may be able to gather some evidence by looking beyond the observation period and in particular at times of great political turmoil in other countries. Without doubt the two most catastrophic events in Europe during the course of the last century were the World Wars. In both cases Switzerland was not directly involved and we may speculate that this experience led investors to expect that assets in Swiss Franc would be a better store of value and motivated them to pay a small insurance premium for holding them. The evidence presented below is consistent with this hypothesis<sup>5</sup>.

We consider historical interest rate differentials between interest rates in Switzerland and seven major currencies. We use a data set of yearly average short term (3 months) interest rates from 1880–1992. Of course the underlying assets are not as homogenous in the previous analysis with Euro Deposits and differences in interest rates may also reflect difference in creditor quality. However, care was taken in compiling this data set that underlying assets be close substitutes<sup>6</sup>.

We start by considering the period of the classical gold standard which is usually dated from 1880 until the first World war in 1914. By 1880 most countries which previously had been on bimetal or silver standards had adopted the gold standard and exchange rates for the core countries remained fixed<sup>7</sup>. For the core countries, therefore, the return differentials can be directly calculated as the difference in interest rates<sup>8</sup>.

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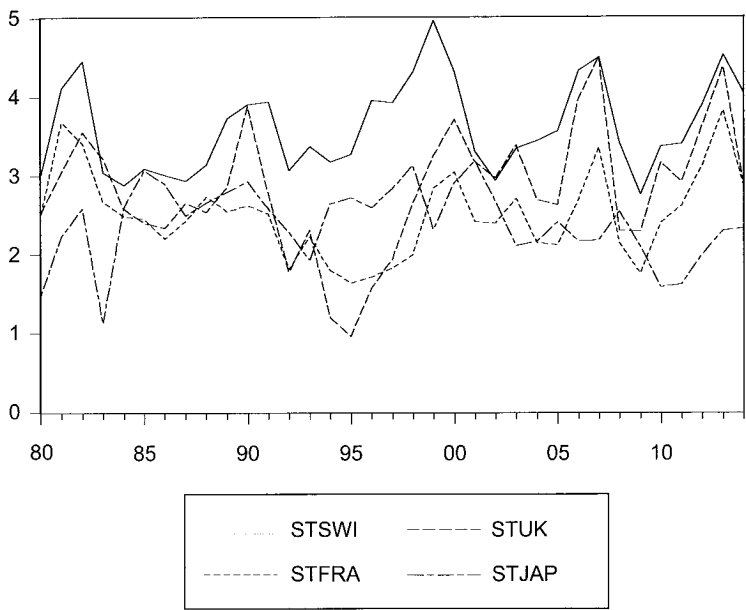
5 There is a close analogue between this solution to the interest rate puzzle and the solution to the equity price premium puzzle offered by JORION and GOETZMANN (1999). Using historical data they show that the equity price premium disappears for countries that suffered catastrophic events, in particular the interruption of the stock exchange during wars.

6 We thank MICHAEL BORDO for kindly sharing this data set.

7 There is a large literature about the workings of the gold standard. In the simple textbook case it works as rule that links the money supply to the balance of payments, leaving no room for discretionary monetary policy. But, as pointed out already by KEYNES (1930), monetary authorities did enjoy a limited amount of control over interest rates within the limits set by the gold export and import points. In modern terms, the gold standard can be interpreted as a target zone with the gold points marking the boundaries. BORDO and SCHWARZ (1997) interpret the gold standard as a contingent rule, by which the monetary authorities commit to binding their hands with the contingency of a war. They judge the credibility of this contingent rule by the willingness of countries to revert back to the old gold parity after a war. They also point out that the classical gold standard did not work as the simple textbook model suggests. A number of countries (Italy, Portugal, Spain, Greece, Bulgaria, Argentina, Chile and Mexico) experienced sizable devaluations of their currencies. However, for the purposes of our analysis

Figure 3 shows short term interest rates (3 months) for the period of the Gold Standard and for 4 countries: United Kingdom (STUK), France (STFRA), Switzerland (STSWI) and Japan (STJAP). Clearly, Swiss interest rates were the highest. A formal analysis for 7 other currencies (reported in KUGLER and WEDER [2001]) confirms that Swiss interest rates were significantly higher than all other currencies with the exception of the United States.

**Figure 3:** Interest Rates During the Gold Standard



Next we look at the period after the first World War. Exchange rates were fixed again during the interwar period in the restored gold standard that lasted between 1923/26 and 1931/36, depending on the country. During this period the rules of the gold standard were less rigidly followed than in the period before. Some countries had to undergo severe deflation in order to revert to the pre-war gold parity. Most countries did not fix at

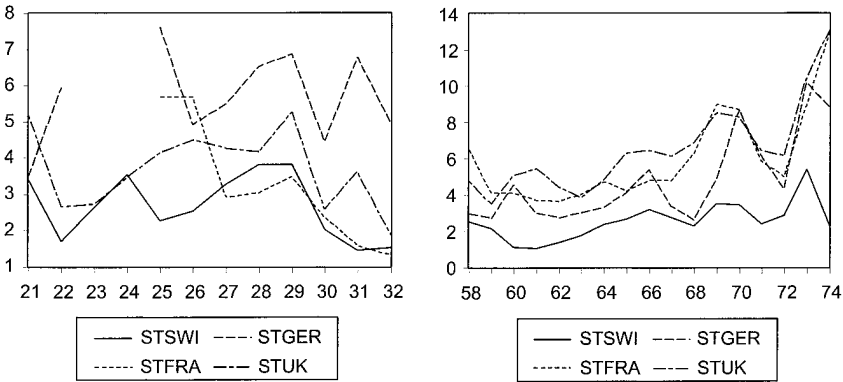
these deviations from the rules are not relevant since we concentrate on the seven core countries of the gold standard and they did play by the rules, and none of them were affected by a devaluation.

8 Prudently one might want to exclude Belgium and France from the analysis on the grounds that they did not fully fulfill the rules of the gold standard: They were on limping standard, that is they reserved the right to revert to a bimetal standard and to reintroduce silver coins. However, WHALE (1937) argues that was not a problem since the exchange rates of these countries did not fall below the gold export points.

the pre-war gold parity but at a devalued one. But by 1923/25 the core countries had restored the gold standard. Japan, Germany and the UK abandoned the gold standard in 1931 at the onset of the great depression. The United States followed suite in 1933, Belgium abandoned in 1935, and Switzerland, Netherlands and France held on until 1936. Virtually all central banks broke the “rules of the game” during this period by attempting to shield the domestic economy from foreign disturbances and offsetting attempting to sterilize changes in international reserves with changes in domestic credit. Overall, the exchange rate peg did not have the same credibility during the period of the restored gold standard as it had enjoyed during the period of the classical gold standard. Thus, interest rate differentials during this time, may also have been due to expected changes in the parity.

The same caveat applies to the period after the second world war, that is during the Bretton Woods system. By 1958 exchange rates were de facto convertible (although most currencies became convertible under the IMF Article VIII only in 1961).<sup>9</sup> Until 1968 exchange rates were fixed and there was only one devaluation of the Pound in 1967.<sup>10</sup> Nevertheless, expectations of changes in the parities were prevalent and eventually materialized with the demise of fixed exchange rates.

**Figures 4 and 5:** Short term Interest Rates during the inter-war period (1921–32) and during the Bretton Woods period (1958–74)



<sup>9</sup> See BORDO (1993).

<sup>10</sup> We ran the same system of equations for the period 1958 to 1968 and excluded the Pound devaluation. The results are not affected.

With all these caveats in mind, *Figures 4 and 5* are nevertheless illustrative. They show that Swiss interest rates were lower than in four other major currencies during the inter-war period and again during the Bretton Woods period, that is the interest rate island emerged after the first world war and was reinforced by the second world war. In KUGLER and WEDER (2001) we present a formal analysis of the interest rate differentials for seven countries using a systems of AR(1) equations and confirm that indeed the differentials are significant and large.

This historical evidence seems consistent with the interpretation of the interest rate island as a reverse peso problem, that is, investors are willing to pay a premium for holding Swiss Franc assets expecting that in a severe crisis the Swiss Franc would appreciate. Apparently (and luckily) during the observation period such a severe crisis did not occur and thus the expectation could not be verified.

## **5 Policy Implications**

The question about the sources of the Swiss interest rate island has an important policy dimension. Switzerland is now surrounded by countries that have adopted the Euro and there has been some debate about future monetary and exchange rate policies and their influence on interest rates. Since the largest part of Switzerland's trade is with the Euro Area, the exchange rate of the Swiss Franc with the Euro is an important policy concern. On the eve of the introduction of the Euro some observers suggested that the Swiss National Bank should peg the Swiss Franc to the Euro in order to avoid excessive appreciation and exchange rate volatility. Proponents of structural explanations of the interest rate island have claimed that the return differential would persist even if the Swiss Franc was permanently pegged to the Euro.

The interpretation given in this paper contradicts this view. According to our finding the interest rate bonus is due to an insurance premium against rare catastrophes and thus hinges on the Swiss Franc floating against other currencies. A second question is whether and how long this differential will persist even with floating rates. Our solution to the puzzle suggests that the differential should eventually disappear if no major catastrophe occurs that confirms exceptions and the investor's long run memories of the past special status of the Swiss Franc slowly erodes. However, the most recent events provide additional evidence in favor of the hypo-

thesis put forward in this paper: the Swiss Franc appreciated strongly in the wake of the terrorist attack on the United States.

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