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International Portfolio Holdings and Swiss Franc Asset Returns

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1. Introduction

Swiss Franc assets carry much lower returns than comparable assets in other currencies. This fact has been called the puzzle of the "Swiss Interest Rate Island" and a number of explanations have been advanced, all of which continue to be controversial. Broadly speaking, the explanations can be grouped into three categories. The first category emphasises the role of real factors that set Switzerland somewhat apart from many other countries such as a high savings rate or the high level of foreign assets. According to this explanation low real returns are the natural consequence of a high income level and capital intensive production at decreasing marginal returns. Although this explanation applies mainly to the closed economy it may hold even in an open economy under certain circumstances.[1] An alternative "real" explanation for low real returns is based on a failure of relative purchasing power parity leading to a continuous real exchange rate appreciation of the Swiss Franc. A real exchange appreciation could be due to protectionism that reduces productivity in the non tradable

[1] CUNAT (2003) provides an overview of the theoretical models on growth that predict differences in real rates of return even among open economies.

sector (the so called "Swiss Price Island"), or it could be due to very high productivity growth in the tradable sector (Balassa-Samuelson effect). Both would lead to a faster growth in Swiss prices of non tradable goods and thus to a real exchange rate appreciation, which could compensate investors for low real returns.

The second category of explanations focuses on monetary and exchange rate anomalies of the Swiss Franc. Investors may be prepared to accept lower returns in nominal (exchange rate corrected terms) if they expect that the Swiss Franc appreciates in times of distress or catastrophic events. According to this line of argument low returns on Swiss Francs could be observed in tranquil times, even over long periods if no catastrophic event occurs. If this explanation holds, the return puzzle would only constitute a short run phenomenon and would be resolved eventually. In the meantime one faces a so called peso problem. Some indirect evidence for this explanation was presented in KUGLER and WEDER (2000).

A third and very widespread explanation links political and regulatory factors of Switzerland with low returns. The proposition is: Switzerland has a high level of political stability and a very secure banking system, which also offers shelter from the tax man. Therefore, there is a high foreign demand for deposits in Swiss Banks and this foreign demand drives down returns on Swiss assets. One of the problems of this proposition is that it should only apply to assets which are held at Swiss banks. However, as shown in KUGLER and WEDER (2002) the interest rate puzzle is also present in Euro deposits, i.e. short term deposits in Swiss Francs, which are held outside Switzerland. One of the main contributions of this paper is to study the possible role of foreign demand for Swiss Franc securities deposited at Swiss banks, which is possible for the first time thanks to a new data set on portfolio holdings

The Swiss National Bank collects data on portfolio holdings of residents and non-residents on a monthly basis since end of 1998.[2] The original reason for collecting this data was that the Swiss National Bank was concerned that large portfolio shifts might take place after the introduction of the Euro and wanted to monitor these flows. The data comprises all securities deposited at the monthly reporting Swiss banks (henceforth called deposits) and is very detailed: it includes a detailed break down by type of security (i.e. money market papers, bonds, stocks or equity) the currency composition, the location of the issuer and a break down by residence. The only drawback is that non

[2] We thank the Department of Statistics of the SNB for providing this data.

residents are combined into one group so it is not possible to locate the origin of non residents' asset stocks and flows.

The innovations of this paper are fourfold: First we study return differentials more comprehensively than in the previous literature by comparing three asset classes : money market instruments, bonds and equities across countries. Second, we document the structure of international portfolio holdings in Switzerland. Third, we examine the merit of one of the most commonly held believes about the nature of the puzzle: the role of foreign demand for Swiss Francs, possibly motivated by banking secrecy. Fourth, we propose a new explanation for the puzzle based on a portfolio perspective.

The main findings are as follows. We find that returns are only lower for fixed income assets and not for equity. Moreover, it is mostly due to a long run deviation from uncovered interest rate parity, not a deviation from purchasing power parity. These findings cast some doubt on two of the most wide spread explanations for the interest rate island. If the puzzle was mainly due to real or structural forces such as high capital intensity or a productivity differential between non tradables and tradables it should manifest through a deviation from purchasing power parity. If the puzzle could be explained by a peso problem it should apply also to equity.

Turning to the role of foreign demand for Swiss assets (possibly due to banking secrecy) we find that this demand is quantitatively small since non residents hold their deposits mostly in other currencies. Furthermore, non residents hold Swiss Franc deposits mostly in equity, where we did not find a return differential. We find little evidence for a role of banking secrecy since non residents have a very limited preference for fixed income instruments issued by foreign debtors, which should be the prime instruments for tax evasion since they are exempt of withholding taxes that apply to resident issues. We conduct a dynamic factor analysis to examine whether the portfolio shift of residents and non residents can explain the returns on Swiss assets and find that foreign demand had almost no impact on Swiss Franc asset prices.

Finally, we propose a new explanation for low returns on Swiss fixed income assets, namely the diversification benefits offered by these instruments. We use reversed portfolio optimization to back out the implied returns when taking into account observed depositors choices and the covariance between assets. This exercise shows that the estimated pattern of returns conforms very well with the actually observed pattern. In other words, the puzzle of low returns on Swiss fixed income assets can be resolved in a portfolio perspective.

The paper is organized as follows. Section 2 analyses the real and nominal (exchange rate corrected) return differentials between money market, bonds and equities assets in Swiss Francs and three major currencies. Section 3 presents some descriptive statistics on the structure of deposits of non residents at Swiss banks. Section 4 studies the role of foreign demand more formally using a dynamic factor analysis. Section 5 analyses the pattern of returns implied in de facto choices of investors. Section 6 concludes.

2. Real and Nominal Return Differentials between Swiss and Foreign Assets

We start by analyzing differences in real returns on money market (3 month Euro deposits), bonds (10 year government bonds) and equities for three currencies. We compare Swiss Franc assets with Euro (Deutsche Mark before 1999), British Pound and US Dollar assets using quarterly end of period return data from 1980-2003.[3] Yields are calculated based on return indices, which incorporate coupons and dividends as well as price changes. To obtain real ex post returns we deflate the nominal returns with the consumer price index. It is worth mentioning that this procedure correctly measures the ex post return of longer term fixed income instruments, for instance 10 year bonds. The common practice of measuring real returns on such instruments based on the yield to maturity has important statistical problems since it would involve the inflation rate over the next 10 years. This problem is usually circumvented by using actual or past average realized inflation rates, which may lead to substantial biases. Using quarterly return indices, the returns will not suffer from this bias.

Table 1 shows the return differences between Swiss Franc assets and the corresponding assets in three major currencies. We are interested in the long run pattern, therefore, we show the mean over the period 1980 to 2003

[3] The data source for money market rates, bond returns (10 year government bond) and the MSCI-stock market indices is Datastream. Consumer prices are from IFS (IMF).

Table 1: Mean real ex post return differences (percent per annum)

Swiss Franc DM, Pound and Dollar, Money Market, Bonds, Equity, 1980-2003

	DM(Euro)	Pound	Dollar
Money Market (3 M)	1.49***	2.69***	1.56***
Bonds (10J)	2.21***	4.23***	3.08**
Equity	-0.81	-0.60	-0.43

*, ** and *** indicates statistically significantly different from zero (one-sided test), respectively.

The upshot of table 1 is that there are positive return differences between Swiss Franc fixed income instruments, i.e. money market and bonds. Swiss franc fixed income instruments have yielded less than the corresponding instruments in any other currency. The difference is largest for bonds, which yielded between 2.2 and 4.2 percent less in DM and Pound respectively. But even short-term Swiss Franc money market instruments have yielded clearly lower returns than money market investment in DM, Pound or Dollars

The other notable result in table 1 is that the return differential is minimal and even slightly negative in the case of equity. Furthermore, the return differentials are statistically significant for fixed income instruments, but not for equity. [4]

Graphs 1 to 3 show the real return indices for money market, bonds and equities. The advantage of this presentation is that it illustrates the cumulative effect of annual return differentials over time.

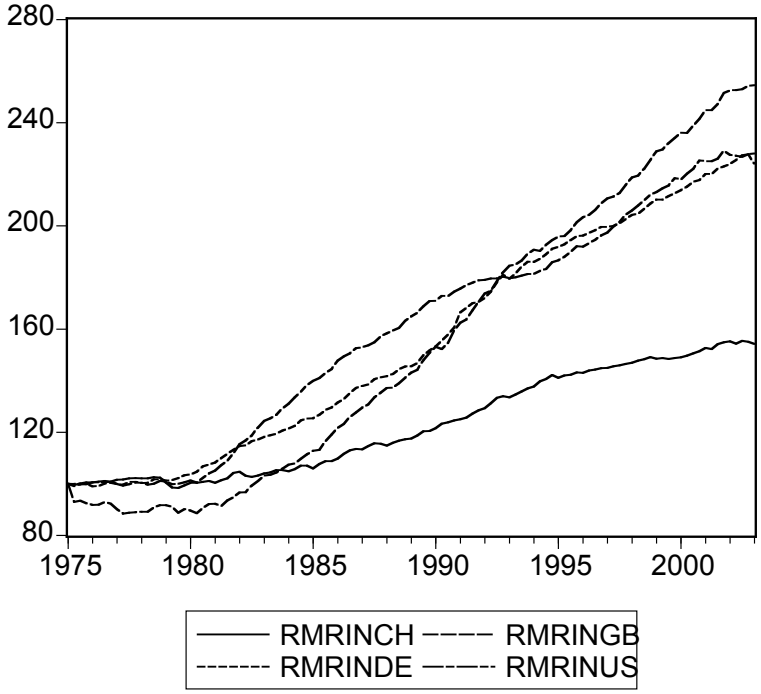
These graphs show that the "wealth malus" of an investment in Swiss Franc (fixed income) assets has been substantial. Over the last 20 years, an investment in money market paper doubled its value in other currencies, while in Swiss Francs it increased only by 50 percent in real terms. The difference is even more pronounced for bonds: In DM the investment increased threefold, in British

[4] In addition KUGLER and WEDER (2003) estimates VAR based mean returns and also finds significant differences for fixed income but not for equity.

Pounds is increased fourfold, while in Swiss Franks it only doubled. Again, the situation is different for equities, where we find no systematic differences in the long run real returns.

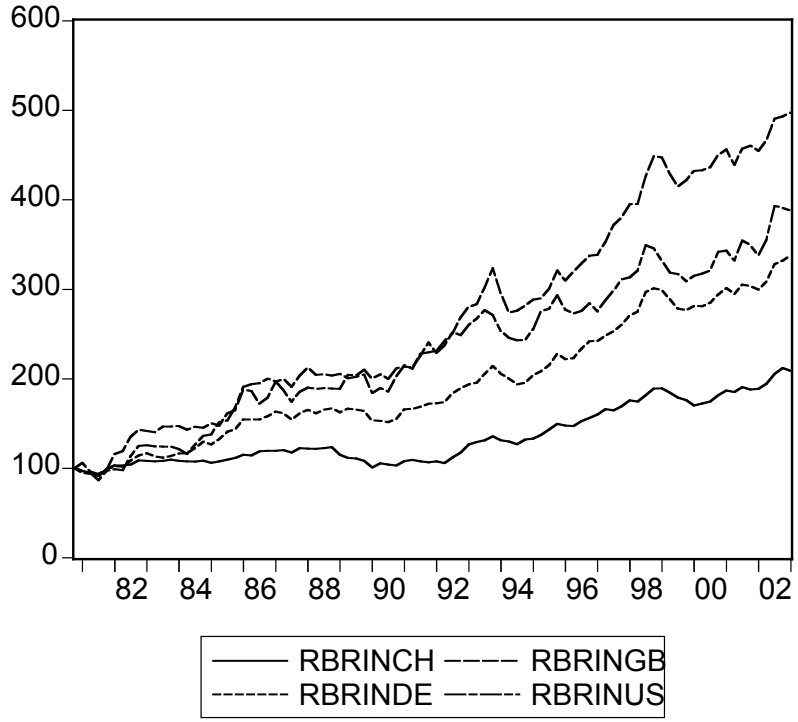
Graph 1:Real return indices for money market paper

in Swiss Francs (RMINCH), DM (RMINDE), Pound (RMINGB) and Dollar (RMINUS)



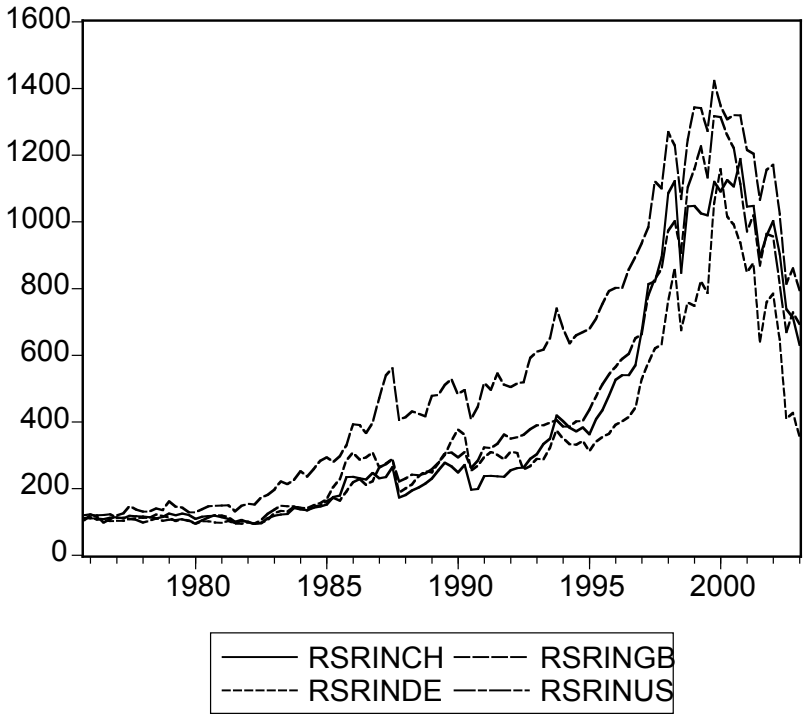
Graph 2:Real return indices for 10-year bonds

in Swiss Francs (RMINCH), DM (RMINDE), Pound (RMINGB) and Dollar (RMINUS)



Graph 3:Real return indices for equities

in Swiss Francs (RMINCH), DM (RMINDE), Pound (RMINGB) and Dollar (RMINUS)



How can such large differences in real returns of fixed income assets be sustained over a period of 20 years? This question is particularly pertinent since capital movements have been free over this period and the issue cannot be one of market segmentation. In other words, why have informed investors not profited from this arbitrage opportunity to take short positions in Swiss Franc assets?

One reason why this may not have been a profitable proposition for say a German investor is that her primary interest is the real value of the investment expressed in Euros. In other words, she cares for the nominal return of the investment deflated by the German, rather than the Swiss consumer price index. This real return will be equal to the one calculated above, if and only if the Swiss Franc / Euro exchange rate obeys relative purchasing power parity. Thus, one straightforward source of real return differences could be compensatory movements in the real exchange rate. There would be no profit opportunity for a foreign investor if the return differential was compensated by a Swiss Franc appreciation in real terms.

In theory there could be two sources of lower real returns of Swiss Franc. First a real appreciation, which implies that the nominal exchange rate did not move to compensate the inflation differential and therefore relative purchasing power parity failed. Second a failure of uncovered interest rate parity, which implies that the nominal exchange rate did not compensate the mean nominal return differential.

To gain evidence about the source of real return differentials we calculate the nominal return differences corrected for exchange rate changes. The results are shown in table 2

Table 2: Nominal return differences (percent, per annum) in Swiss Francs

Swiss Franc DM, Pound and Dollar, Money Market, Bonds, Equity, 1980-2003

	DM(Euro)	**Pound**	**Dollar**
Money Market (3 M)	0.48	2.45	2.15
Bonds (10J)	1.30	3.55	4.46
Equities	-1.43	-1.03	0.74

The most salient feature of table 2 is the similarity of returns with those in table 1. The pattern across currencies and assets is similar. Moreover, real and nominal return differentials (after correcting for exchange rate changes) appear to be of a similar magnitude. This means that real return differentials can be attributed mostly to a failure of uncovered interest rate parity, rather than a failure of relative purchasing power parity.

The only exception to this rule is the return differential between fixed income instruments in Swiss Francs and in Euro: real return differentials are markedly higher than nominal differentials (corrected for exchange rate changes). This suggests, that real appreciation – a failure of relative purchasing power parity – also played a role in this case.

Overall these results are surprising along two dimensions. First, they suggest that real interest rate parity fails for the Swiss Franc even in the long run[5]. Although the short run failure of RIP is widely accepted today there are many studies published in the last 15 years (for example, MODJTAHEDI, 1988; KUGLER and NEUSSER, 1993; Wu and CHEN 1998; FOUNTAS and WU, 1999; DREGER and SCHUMACHER 2003) providing more favorable results for the RIP hypothesis in the sense that real rates move together and are equalized for many pairs of countries in the long run. Second, and prima facie even more surprising is the finding of a long run failure of uncovered interest rate parity in Swiss fixed income instruments. Again, it is well known that uncovered interest rate parity fails in the short run for most currencies and this is considered one of the puzzles in international finance. However, this failure of UIP refers to an anomalous short run reaction of the exchange rate to changes in the interest rate. Here we are finding that UIP does not hold over a 22 year period, something that is unique to the Swiss Franc and is not found for any other major currency.[6]

This largely descriptive section already allows a first assessment of the validity of common explanations of the return puzzle. The findings so far do lend little support to approaches that try to explain low returns by appealing to real factors such as high saving rates or low productivity of the non-tradable sector. These imply that the return should be due to a failure of PPP not UIP. But also the peso story receives a negative assessment in the light of these findings: if an expected appreciation

[5] The hypothesis that real interest rates are equalized across countries was analyzed empirically in numerous studies. The first generation of these studies (for example, CUMBY and OBSTFELD 1984; MISHKIN, 1984; FRANKEL and MCARTHUR, 1988) focused on the short run validity of this proposition. These studies typically rejected the hypothesis. These finding are not surprising given the fact that we know today that the two ingredients of the real interest rate parity (RIP), namely uncovered interest rate parity (UIP) and purchasing power parity (PPP) are violated in the short run.

[6] See KUGLER and WEDER (2002)

in the event of a catastrophe was causing low returns in fixed income assets, this should also apply to equities.

3. Structure of International Portfolio Holdings in Switzerland

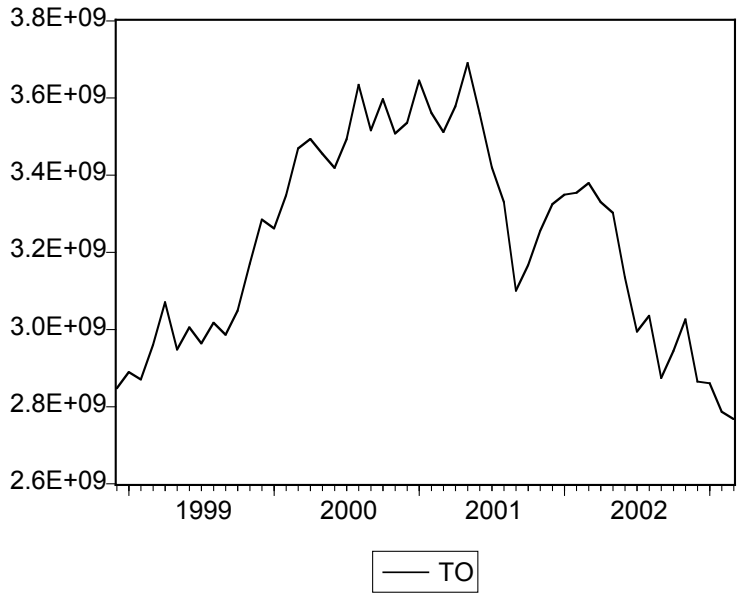
A very common proposition for explaining low yields is the high demand from non-residents for Swiss Franc assets. Recall from above the argument: non-residents deposit their wealth in Switzerland because of advantages such as the banking secrecy, which allows them to evade the scrutiny of their tax authorities. They are prepared to accept low returns since these still exceed what they would have received after taxes. Hence, the foreign demand for Swiss Franc assets might be driving down returns.

In this section we discuss the plausibility of this claim by examining the structure of international deposits of non-residents in Switzerland. Before turning to this analysis it is worth pointing out that there are a few stylised facts that do not conform with the claim. First, there is the fact that Switzerland has persistent current account surpluses and is therefore a net exporter - not an importer - of capital. Second, the return differential is present even on Swiss Franc assets that are not deposited in Switzerland and are therefore not subject to banking secrecy. In the analysis above, we showed a significant return differential in 3 month Euro market deposits. Third, the fact that return differentials exist only for fix income assets is at odds with the claim that foreign demand is at the root of lower yields, since this demand would presumably affect all assets.

The Swiss National Bank collects data on portfolio holdings of residents and non-residents on a monthly basis since end of 1998. Graph 4 shows the monthly evolution of the total value of all deposits in Switzerland. Clearly these are large numbers: at the peak of the stock market the value of all deposits was about nine times the size of GDP and even after the stock market correction it is still seven times GDP.

Graph 4. : Value of all Deposits at Swiss Banks

in 1000SFr, monthly 1998/12-2003/3



Next we examine the share of deposits held by residents or non-residents and the currency composition. Table 3 shows that on average 45 percent of deposits were held by residents and non-residents held about 55 percent. The share of non-residents has increased over time from about 53 percent to about 57 percent.

Turning to the currency composition of non-residents' portfolios, table 3 shows that they hold about one third of their deposits in Swiss Francs. This foreign demand for Swiss Francs amounts, however, to only about 20 percent of total deposits. To evaluate the possible impact of banking secrecy the demand for Swiss Franc assets issued by a non-resident is particularly relevant: These assets are not subject to the Swiss withholding tax and should therefore constitute the first investment choice for non-residents seeking to avoid taxes. Table 3 shows that this demand constitutes a minor part of non-residents holdings: they are only about 8 percent of non-residents holdings and only about 4 percent of total deposits at Swiss banks. Together, these numbers suggest that foreign demand and the banking secrecy is unlikely to be a cause of low yields, since non-residents hold the bulk of their deposits in foreign currencies and have no particular preference for tax-exempt instruments.

Table 3: Deposits at Swiss Banks

Average 1998/12- 2003/3

	in billions of SFr.	in percent of total deposits
Total deposits in Switzerland	3230	100%
Deposits of residents	1462	45%
Deposits of non-residents	1768	55%
of which held in Swiss Francs	622	19%
of which by a foreign issuer	144	4%

Next we examine how non-residents allocate the Swiss Franc portion of their portfolio. Table 4 shows that non-residents hold most of their portfolio in equity. Over 70 percent of Swiss Franc assets are equity and mutual funds add another 10 percent. By contrast, bonds and money market instruments are of minor importance. These finding is particularly interesting, if we recall from above that the return discount was found only in fixed income instruments not in equity. In other words, foreigners appear to be aware of the return differences and allocate their portfolio accordingly. Below we show that their actual holdings can be explained well by a portfolio optimisation model. However, this behaviour seems to contradict the claim that large foreign demand is causing low yields.

Table 4: Swiss Franc portfolio of non-residents

Average 1998/12- 2003/3

	in billions of SFr.	**in percent of Swiss Franc portfolio of non-residents**	**in percent of total deposits of non-residents**
Equity	446	72%	25%
Mutual Funds	66	11%	4%
Money Market	3	0%	0%
Bonds	108	17%	6%
Total	623	100%	35%

Table 5 shows the composition of non-resident investors who hold Swiss Francs. The upshot of this table is that the vast majority of non-residents' deposits in Swiss Francs come from institutional investors. Private clients, who are more likely to seek the protection of banking secrecy make only a third of all Swiss Franc deposits of foreigners. The table also illustrates that private clients hold only a minor part of their deposits in Swiss Francs. Together these figures again suggest that banking secrecy does not seem to induce a large demand for Swiss Franc assets.

Table 5: Composition of non-resident investors in Swiss Francs

Average 1998/12- 2003/3

	in billions of SFr.	in percent of Swiss Franc deposits of non-residents	in percent of total deposits of non residents
Commercial Clients	29	5%	2%
Institutional Investors	420	68%	24%
Private Clients	170	27%	10%
Total Swiss Franc deposits of non-residents	622	100%	35%

On the contrary, we find that foreigners have no particular preference for Swiss Franc assets and they hold most of their Swiss Franc assets in equity and not fixed income instruments. Moreover, institutional investors hold most of Swiss Franc assets and the Swiss Franc bonds of foreign issuer (which are withholding tax exempt) are held only in marginal quantities. This does not imply that banking secrecy is irrelevant for the income of banking sector and its market share in global wealth management. However, it seems to indicate that it is irrelevant in explaining low returns on Swiss assets.

We now present systematic evidence on the impact of foreign demand on asset returns and exchange rates by applying factor analysis.

4. Impact of foreign demand on Swiss Franc Returns and Exchange Rates - Results from a Factor Analysis

In this section we examine whether the changes in portfolios holdings of non-residents at Swiss banks may be able to explain the patterns of returns on Swiss Franc assets. We do this by comparing the influence of shifts in the portfolios of non residents with those of residents.

As before we consider assets in three currencies, namely the Swiss Franc, Euro and US-Dollar, which account for over 90 percent of all deposits. The data set consists of monthly data from 1998/12 to 2003/3 and covers 11 financial market prices: rate of change in the exchange rate of the Franc against the Euro and the Dollar, rate of returns in the three money, bond and stock markets) as well as the the value of 88 different deposits. The latter are disaggregated with respect to instruments, issuer, depositor and currency. As a rule seven instruments are considered: money market papers, commercial bonds, government bonds, stocks, mutual funds, money market funds as well other securities[7]. Moreover, we have data for resident and non-resident depositors and issuers, the latter distinction being important for tax reasons.

In order to determine the influence of foreign demand we consider two data sets[8]. The first one comprises holdings of both residents and non-residents (all available 99 series) and the second one contains only the holdings of residents (and has only 55 series). The basic idea is to compare the systematic or common component of Swiss Franc asset returns obtained with and without the demand of non-residents.

[7] For Swiss Franc assets issued by Swiss debtors we have the additional split into federal bonds and special bonds issued by Swiss banks (Kassenobligationen).
[8] First differences of the log stocks of securities were taken in order to get stationary data series.

Given our aim and the wealth of our data we apply factor analysis. This approach decomposes the vector of the observable series (x_t with dimension N times 1) into a systematic component caused by a small number of K common factors ($\square_t$) and an idiosyncratic component which is specific to each single series ($\square_t$):

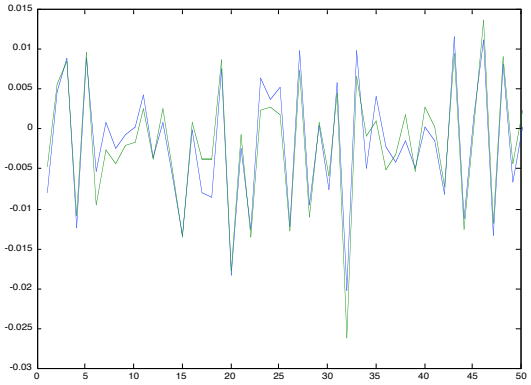
$$x_t = \square_t + \square_t = Af_t + \square_t, \qquad t = 1,.....T$$

Classical factor analysis proceeds by Maximum Likelihood estimation and testing based on the assumption of independent and normal distribution of factors and idiosyncratic components. Of course these assumptions are doubtful in our application given the time series data used in our application. Moreover, there is a more basic problem, namely that we are in the case of a so called large cross section with $N > T$. This means that the sample covariance matrix of x is not of full rank and Maximum Likelihood analysis is not applicable. However, the case of a large cross section is not only a complication of classical factor analysis but offers attractive simple solutions for the extraction of the common component. CHAMBERLAIN and ROTHSCHILD (1983) show that the problem reduces to a standard principal component analysis of the data and that the above result holds even when the specific components are weakly contemporaneously correlated (the so called generalized factor model). This result was extended by FORNI, HALLIN, LIPPI and REICHLIN (2000) to autocorrelated data sets. These authors show that the common component in the so called generalized dynamic factor model can be approximated by projecting the x vector on the first q dynamical principal components of x which are obtained by a frequency-wise decomposition of the spectral matrix of x. There is even a simpler way to extract the common component in this framework: more recently STOCK and WATSON (2002) show that the common component in the generalized dynamic factor model can be approximated by projecting the x vector on the largest first r static principal components of x.

Figures 5 to 9 contain the estimate of the common component of the changes in the log Franc/Euro and Franc/Dollar exchange rate as well as that of the money market, bond and stock market return for Swiss Francs using the FORNI, HALLIN, LIPPI and REICHLIN (2000) approach. Details

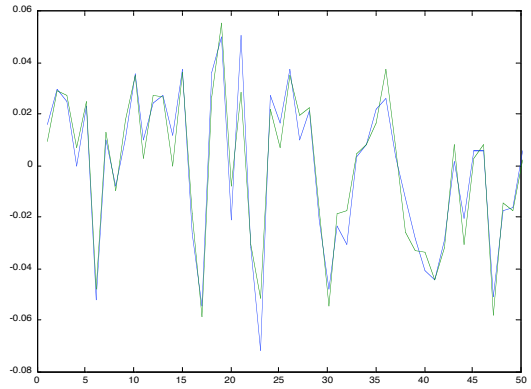
on these estimations and more results obtained in the factor analytic framework are given in KUGLER and WEDER (2004)[9].

Figure 5: Common Component of Change in log Fr/Euro Exchange Rate: blue line full data set, green line resident, 1999/2-2003/3



1999/1 2000/1 2001/1 2002/1 2003/1

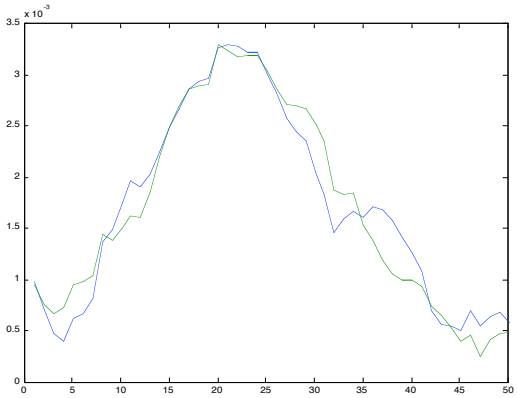
Figure 6: Common Component of Change in log Fr/Dollar Exchange Rate blue line full data set, green line resident, 1999/2-2003/3



1999/1 2000/1 2001/1 2002/1 2003/1

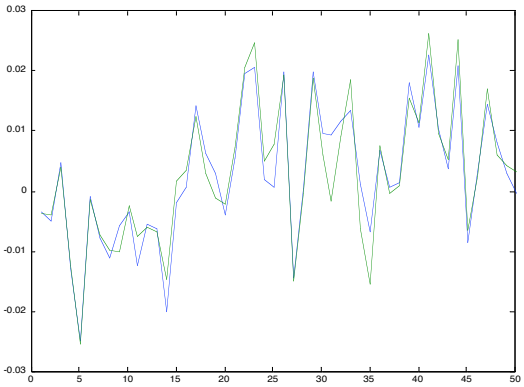
[9] Briefly, q=3 dynamic factors seem to be appropriate for both data sets using a Bartlett (time domain) window with 7 lags for spectral estimation. Moreover, we should mention that the application of the Stock and Watson r=6 static principal components, which is not presented here, resulted in essentially the same pattern of results. The dynamic common components were calculated using the MATLAB procedure KESTIMATE provided on www.dynfactors.org

Figure 7: Common Component of Swiss Franc Money Market Return
blue line full data set, green line resident, monthly (non annualized) returns 1999/2-2003/3



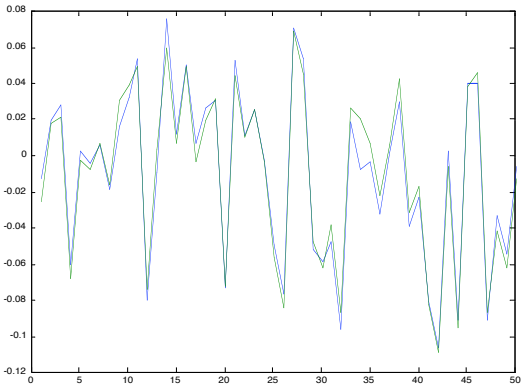
1999/1 2000/1 2001/1 2002/1 2003/1

Figure 8: Common Component of Swiss Franc Bond Market Return
blue line full data set, green line resident, monthly (non annualized) returns 1999/2-2003/3



1999/1 2000/1 2001/1 2002/1 2003/1

Figure 9: Common Component of Swiss Franc Stock Market Return
blue line full data set, green line resident, monthly (non annualized) returns 1999/2-2003/3



1999/1 2000/1 2001/1 2002/1 2003/1

These figures show that the inclusion of non-residents securities deposited with Swiss banks hardly has an effect on the systematic component of returns. Indeed, the correlation of the two estimates of the common components are in the range from 0.953 (for the SFr/Euro exchange rate) to 0.985 (for the stock market return). Therefore, our factor analysis supports the view that the changes in the securities deposited by non-residents have no influence on the exchange rate of the Swiss franc or on the rate of return on Swiss franc denominated assets and confirms our expectations given the simple descriptive statistics outlined in section 2.

5. Return Differentials from a Portfolio Perspective - Results of Reversed Portfolio Optimization

From the viewpoint of portfolio theory return differences are to be explained by the variances and covariances of assets. In this section we will follow this line of argument to see whether the low returns of Swiss Franc fixed income instruments can be accounted for by a diversification advantage of Swiss Franc fixed income assets in a portfolio of Franc, Euro and Dollar money market assets, bonds and stocks. Investors might accept a low rate of return on a specific asset because it offers diversification benefits in the context of the full portfolio, i.e. a low or even negative correlation of an asset with other assets in the portfolio may compensate for a low rate of return of the former.

In this exercise we consider the issue from the view point of a Swiss resident who is interested in returns expressed in Swiss Francs. This approach is taken for reasons of data limitations: for Swiss residents we have all the information on their securities holding for the period 1978/12 to 2003/3. However, for non-residents we have only aggregated data and we do not know how these securities holding are split up into Euro and Dollar based non-residents. Nevertheless, the data available for residents should provide interesting information on the issue at hand. In a first step we examine the correlation matrix of the eight risky assets (Swiss money market paper is the risk free investment) under consideration reported in table 6.

Table 6: Correlation of Returns on Risky Assets from the Viewpoint of a Swiss Resident

(monthly data 1980-2003)

	Euro(DM) Money Market	Dollar Money Market	Franc bonds	Euro(DM) bonds	Dollar bonds	Franc equity	Euro(DM) equity	Dollar equity
Euro(DM) Money M	1.0000	0.3537	-0.0586	0.6243	0.3050	0.1543	0.4193	0.3198
Dollar Money M	0.3537	1.0000	-0.0766	0.0864	0.7937	0.2932	0.3297	0.6855
Franc bonds	-0.0586	-0.0766	1.0000	0.3334	0.1152	0.1191	-0.0627	-0.0594
Euro(DM) bonds	0.6243	0.0864	0.3334	1.0000	0.3537	0.1607	0.3441	0.1694
Dollar bonds	0.3050	0.7937	0.1152	0.3537	1.0000	0.3126	0.2873	0.6496
Franc equity	0.1543	0.2932	0.1191	0.1607	0.3126	1.0000	0.6984	0.6592
Euro(DM) Equitiy	0.4193	0.3297	-0.0627	0.3441	0.2873	0.6984	1.0000	0.6128
Dollar stocks	0.3198	0.6855	-0.0594	0.1694	0.6496	0.6592	0.6128	1.0000

Table 6 generally indicates a positive correlation between returns expressed in Swiss Francs. It is in particular strong among stock returns but it is although quite sizable for many other pairs of returns[10]. An exception are the returns on Swiss franc bonds which have a very low or even negative correlation with the returns of other risky asset. Therefore, Swiss Franc bonds appear interesting from a diversification point of view and this could be a reason for the relative low return on this asset. In order to shed more light on the implications of the covariance structure of returns we use the so called reversed portfolio optimization approach introduced by BLACK and LITTERMAN (1992).

In this framework we calculate implied excess returns which are consistent with portfolio optimization given an observed portfolio allocation of the assets using a model closely related to the CAPM. Basically we assume that investors maximize the utility of wealth using a constant relative risk aversion utility function with coefficient . Under the assumption of normally distributed returns

[10] For rate of returns of assets denominated in the same currency exchange rate changes are an important source for the positive correlation of the returns on these assets expressed in Swiss Francs.

this leads to the following first order condition linking the portfolio shares collected in the column vector w to the expected return vector μ of same dimension

$$\lambda \Sigma w = \mu ,$$

where Σ is the covariance matrix of the returns of the risky assets. This system is usually solved for portfolio shares w given expected returns μ. In the framework of the reversed approach we take the shares w as given (from the actual shares in the portfolio allocation of residents) and calculate the implied expected excess returns.

The implied excess returns for the 8 risky assets are now calculated for the period 1998/12 to 2003/3 given the monthly assets shares of residents reported in the SNB securities statistic introduced in section 2. The covariance matrix Σ is estimated using the full sample from 1980/12 to 2003/3. and λ is set to 3 indicating a "reasonable" degree of risk aversion. However, the results do not change essentially when we use only a reduced sample as 1980-1998 or 1995-2003. Moreover, there is no indication of major ARCH effects in the monthly returns. Therefore, our assumption of a time invariant covariance matrix seems to be adequate for our data set. The calculated time series of excess returns are displayed in Figure 10 to 12.

Figure 10: Implied Excess Returns
Euro (ERIGE) and Dollar Money Market (ERIGD) Returns 1998/12 – 2003/3

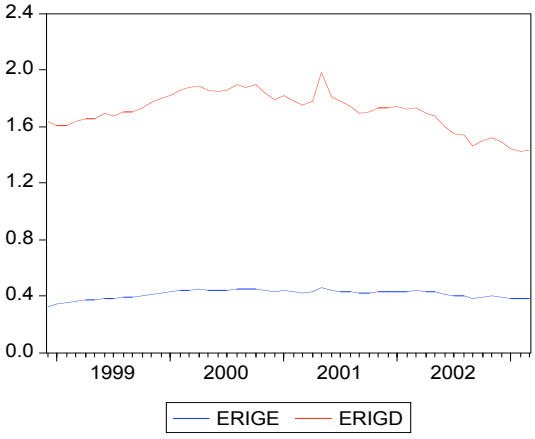


Figure 11: Implied Excess Returns of
Franc (ERIBF), Euro (ERIBE) and Dollar (ERIBD) Bond Market Returns 1998/12 – 2003/3

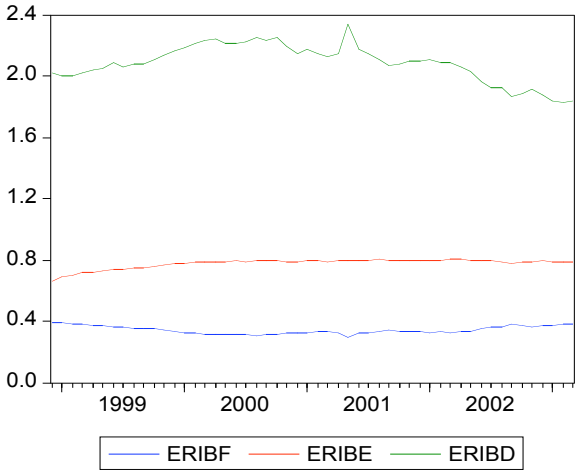
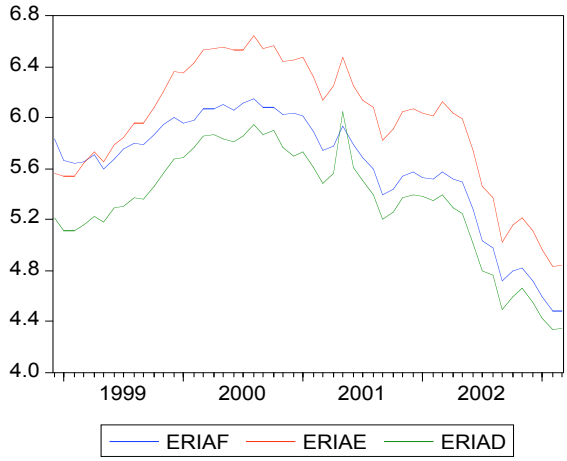


Figure 12: Implied Excess Returns of
Franc (ERIBF), Euro (ERIBE) and Dollar (ERIBD) Stock Market Returns 1998/12 – 2003/3



These figures show a pattern of results which is consistent with findings reported in section 2: first we note that the implied excess return of the Euro and Dollar money market from the Swiss perspective is around 40 bp and between 150 and 200 bp which is surprisingly close to the mean ex post returns. Second, the return difference of implied returns for bonds is around 40 bp for the Euro and between 160 and 200 bp for the Dollar. This pattern of results is qualitatively in line with the ex

post returns although the absolute values are smaller. Finally, the excess returns for stock returns are very similar (they are usually in a band of 50bp) and conform to the pattern we reported for mean ex post returns.

Therefore, we can conclude that the low returns on Swiss fixed income instruments seem to be in line with portfolio optimization of a Swiss resident and are not puzzling from this perspective. It would be interesting if we could do the same exercise from the perspective of a Euro or Dollar based non-resident. Unfortunately the aggregation of the SNB securities data with respect to non-residents does not permit this exercise. However, it should be mentioned that a diversification advantage could even exist from the viewpoint of non-residents if the correlation of the Swiss Franc exchange rate with domestic and foreign interest rates is different. Indeed, this seems to be the case as the replication of the reversed portfolio exercise for a synthetic foreigner consisting to 45% to an Euro and Dollar resident and to 10% to a Pound resident produces the same discount on Swiss Franc fixed income returns even if the differences are smaller than those reported above.

6. Conclusions

This paper does three things: (i) it shows that the puzzle of the Swiss Interest Island is limited to fixed income assets and is due to a deviation from uncovered interest rate parity, (ii) it shows that the impact of foreign demand on Swiss asset returns is very small and (iii) it proposes a new solution to the puzzle based on diversification benefits in a portfolio perspective.

The finding in this paper also sheds some new light on existing explanations for low returns. Real and structural explanations for the puzzle have the problem that they would have to work through a deviation from purchasing power parity. If the reason for low real returns was to be found in the differential growth rates of productivity in non tradables and tradables this should manifest itself as a real appreciation of the Swiss Franc. However, we show that with the exception of the Swiss Franc/ Euro pair, the main source of the real interest rate differential is a deviation of uncovered interest rate parity, which has persisted over more than 20 years. Of course such a long run deviation from UIP constitutes a puzzle in its own right, especially when considering that over this period capital accounts were open and financial markets increasingly sophisticated. The explanation of a peso problem is attractive because it suggests that the puzzle is not a puzzle in the very long run: investors may be prepared to accept lower returns in good times, expecting a higher return in really bad times, through a appreciation of the Swiss Franc. When bad times hit and the appreciation occurs the puzzle disappears.

The problem of this explanation is that it would have to hold for all Swiss assets since it is based on the behaviour of the exchange rate. Thus we would have to observe lower returns for equity as well as for fixed income.

On the role of foreign demand for Swiss assets we find that this demand is quantitatively small since non residents hold their deposits mostly in other currencies and their Swiss Franc deposits are mostly equity. Moreover, we find little evidence for a role of banking secrecy since non residents have a very limited preference for fixed income instruments issued outside Switzerland. More importantly, based on a dynamic factor analysis we show that portfolio shift of non residents have a negligible impact on Swiss asset returns.

In the end we propose a new explanation for low returns on Swiss fixed income assets, namely the diversification benefits offered by these instruments. A reversed portfolio optimization was applied to back out the implied returns in existing portfolio allocations. It turns out that the diversification benefits of Swiss fixed income assets (their low correlation with other assets in other currencies) is sufficient to explain lower returns. Of course, our proposed solution to the puzzle now raises a new question, namely what is the cause of the diversification benefit? This question will be left for future research.

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SUMMARY

This paper revisits the puzzle of low returns on Swiss Franc assets using a new data set of portfolio holdings of residents and non residents at Swiss banks. The main findings are as follows. First, we find that the return anomaly is present only for fixed income assets and not for equity. Second, it is mostly due to a long run deviation from uncovered interest rate parity, not a deviation from purchasing power parity. Third, it is unlikely that foreign demand for Swiss assets (possibly due to banking secrecy) is driving down returns: This demand is quantitatively small especially for Swiss Franc fixed income instruments. A dynamic factor analysis confirms that foreign demand had almost no impact on Swiss Franc asset prices. Finally, we propose a new explanation for low returns on Swiss fixed income assets, namely the diversification benefits offered by these instruments. Applying reversed portfolio optimization to back out the implied returns reveals that the estimated pattern of this returns conforms very well with the observed pattern.

ZUSAMMENFASSUNG

In dieser Arbeit wird die Erklärung der im internationalen Vergleich niedrigen Realzinsen auf Schweizerfrankenanlagen anhand von Daten über die Wertschriftendepots von In- und Ausländern bei Schweizerischen Banken empirisch analisiert. Dabei wurden die folgenden Ergebnisse erhalten: Erstens zeigte diese Anomalie nur bei Geldmarktanlagen und Obligationen und nicht bei Aktien. Zweitens ist das Phänomen auf eine langfristige Abweichung von der ungedeckten Zinsparität und nicht von der relativen Kaufkraftparität zurückzuführen. Drittens ist es unwahrscheinlich, dass die ausländische Nachfrage nach Schweizerfranken Obligationen und Geldmarktanlagen (möglicherweise durch das Bankkundengeheimnis ausgelöst) die Erträge niedrig halten: Diese Nachfrage ist relativ gering und mit einen dynamische Faktoranalyse konnte kein wesentlicher Einfluss der ausländischen Nachfrage auf die Erträge von Schweizerfrankenanlagen festgestellt werden. Schliesslich wird anhand einer “reversed” Portfolio Optimierung der Diversifikationsvorteil von schweizerischen Obligationen und Geldmarktanlagen als neue Erklärung für ihre niedrigen Realzinsen vorgeschlagen.