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MEASURING THE INTEREST RATE AND EXCHANGE RATE RISK OF A COMMERCIAL BANK'S PORTFOLIO

SUOMEN PANKIN KESKUSTELUALOITTEITA • FINLANDS BANKS DISKUSSIONSUNDERLAG

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CONTENTS

1 Introduction

The Bank of Finland, in accordance with its regulations, is responsible for the stability of the financial markets. The main actors in the Finnish financial markets are fourteen authorized foreign exchange banks. The Bank of Finland has therefore set up a risk monitoring system to measure the risk exposures taken by these banks.

Monitoring by the Bank of Finland covers the main areas of risk in asset and liability management in banking. The main areas of risk are liquidity risk, interest rate risk and exchange rate risk. In this paper I will briefly decribe the monitoring of the different types of risks and then discuss how the overall risk profile of a bank can be measured.

2 Main areas of risk in banking

The Bank of Finland's risk monitoring system has been developed step-by-step, starting from the beginning of 1985 with figures for foreign exchange exposures. Appendix I shows the frequency and coverage of the different types of risk reporting.

Although **credit risk** has been the major source of concern for Finnish banks in recent years, the reporting to the Bank of Finland only covers country risk as part of the BIS reporting. The main indicator for credit risk is the degree of diversification of loans by customer and sector and also the sufficiency of the collateral for such loans. These figures can only be found in banks' books. Since the central bank does not visit the banks to inspect their books at the spot, the resposibility for monitoring this aspect of credit risk lies with the inspectors of the Banking Supervision Office.

Banks are required to report their foreign exchange exposures on a daily basis. **Foreign exchange risk** is the only area of risk that is officially limited by the Bank of Finland. A limit is set on a bank's overall open foreign exchange position against the Finnish markka. This limit is set as a percentage of the bank's equity capital measured according to the recommendations issued by the BIS. The same limit is also applied to net short or long positions in individual currencies. The first limit is not a pure risk limit. Rather it is a limit on capital movements designed to ensure the short-term efficiency of the monetary and foreign exchange policy conducted by the central bank. The second limit however is a risk limit since the exposures at risk are the positions in individual currencies.

Liquidity risk is measured on a monthly basis. In measuring liquidity risk we analyze the degree of securitization of assets and the degree of diversification between different funding instruments on the liability side. However, the main emphasis is laid on funding gaps, that is mismatches between inflows and outflows in the maturity breakdown of on- and off-balance sheet items.

The main components of **interest rate risk** are: economic risk, income risk and investment risk. By economic risk we mean the sensitivity of the equity capital, or present value of a bank, to changes in interest rates. To be able to measure this kind of risk the duration measure has to be used. It is not possible for the central bank to calculate duration on the basis of the present value of banks since it cannot require banks to report all details of every single item. From the point of view of the regulator this is not a major shortcoming as duration is only relevant if the bank is in a crisis and has to be liquidated.

In measuring interest rate risk the Bank of Finland concentrates on investment risk and income risk. Income risk is the interest rate sensitivity of net interest income to changes in interest rates. Investment risk is the sensitivity of the market values of bonds calculated separately for the trading and investment portfolios.

The interest rate reporting figures also makes it possible to roughly calculate the **price risk** of a bank, that is potential changes in the market value of traded stocks in the trading portfolio.

In all the reporting systems the banks also have to report their off-balance sheet items. We measure whether these items have been used for hedging or speculation purposes.

All these risks have to be dealt with and measured separately but since there are correlations and overlapping between different areas of risk the interaction between the risks should also be taken into account so as to obtain the overall risk profile of a bank.

There is overlapping between credit risk and liquidity risk and also between liquidity risk and interest rate risk. In efficient markets funding is always available but the risk is in the price. Thus liquidity risk becomes interest rate risk.

As there is correlation between domestic interest rates and foreign interest rates there is also a correlation between the interest rate risk of items denominated in the domestic currency and that of items in foreign currencies. Since movements in interest rates and exchange rates are correlated, at least in theoretical international equilibrium conditions such as prevail under uncovered interest parity, there should also be a correlation between interest rate risk and exchange rate risk.

In the following this paper describes the methods applied at the central bank of Finland for measuring interest rate risk, exchange rate risk and the interaction between them in the portfolios of the international commercial banks which are required to report to the central bank. The basic idea is derived from a paper by Grammatikos, Saunders and Swary (1986). The application presented here, is however made more operational, especially as far as the measures used for exposures are concerned, so as to ensure that the methods match the level of data that the banks have to report.

3 The two components of risk

Risk is measured in terms of two components. One is the exposure, usually referred to as "dollar at risk" and in our case "markka at risk". The other is the variability of the stochastic variable the uncertainty of which is the ultimate source of risk. In this framework the stochastic variables are interest rates and exchange rates. The exposure is then multiplied by the variability to obtain the risk measure. A basic solution used by banks in measuring their interest income risk is to assume a one percentage point change in all interest rates. This assumption of complete correlation between interest rates is in contradiction with market behaviour. In this study this basic assumption is replaced by volatility estimated from historical data. Changes in exchange rates and interest rates are impossible to forecast accurately and hence the best estimate of future developments is the behaviour in the recent past.

In the following I will first consider how to measure the variability of the stochastic variables and then how to measure exposures.

4 The distribution of changes in exchange rates and interest rates

The risk attaching to an international banks's portfolio is a function of changes in exchange rates and interest rates; the more volatile rates are the bigger the risk. This means not only changes in volatility in time for one single rate but also differences in the degree of volatility between rates. In portfolio theory volatility is measured as the variance of changes in returns. Here we measure the volatility of daily changes in exchange rates and interest rates. Variance can be calculated for any time series without any assumption concerning the distribution of the underlying generating process, but to allow probability statements and parameter tests the probability function must be known. The assumption frequently made is that of normality.

Several papers show that the distributions of exchange rates differ from the theoretical normal distribution in having "fatter" tails and being "peaky", that is having some degree of leptokurtosis. These features can be explained in two ways; either this is the true empirical distribution where big jumps occur more often than in the theoretical distribution or the variance of the distribution is not constant but time-dependent. Papers have reported evidence for both hypotheses. In a number of studies the Autoregressive Conditional Heteroscedastic (ARCH) model of Engle (1982) has been used to model the non-constancy of the variance of exchange rates. In this model the conditional variance is a function of past disturbances.

Results supporting both theories, constancy and non-constancy, have been obtained which can be explained by the fact that exchange rate series are characterized by alternating periods of stability and instability. If the estimation period happens to be selected to cover a stable period then support for constancy can be found. By contrast, the ARCH model provides a way to model the process over longer sample periods in which large changes are followed by large changes and small by small (Diebold and Nerlove 1986).

As regards interest rates, much effort has been made to explain the term structure. The assumption of random walk has been applied but fitting against the theoretical distribution has received less attention.

Most international studies - though not all - have dealt with dollar rates. In this study (and in M. Ahlstedt, 1989) we examine daily movements in the markka (FIM) against 12 major currencies. The 3-month eurorates corresponding to the exchange rates and the domestic market rate are also included in the study. It was impossible to include all short-term rates. Therefore a correlation matrix was calculated for the 1-month, 3-month, 6-month and 12-month rates. The 3-month rate was tested so as to have the highest correlation with the other short-term rates and was selected to represent the interest rates in the calculations.

The currencies and corresponding 3-month interest rates were USD, GBP, SEK, NOK, DKK, DEM, NLG, BEC, CHF, FRF, ITL and JPY. The daily changes in exchange rates were expressed as log differences and those in interest rates as differences proportional to the levels.

The same features were found in the empirical distribution of markka rates as were found in the dollar rates, that is leptokurtosis. In figures 1 - 4 the empirical distributions of the FIM/USD and FIM/SEK rate are shown. The FIM/USD rate was selected as an example of a freely floating rate and the SEK/FIM rate to represent the same kind of currency basket index exchange rate as the markka index. The distributions of the 3-month eurorates for USD and SEK are shown. As can be seen the deviation from the theoretical distribution is more apparent for interest rates than for exchange rates.

Since international studies indicate that, depending on the sample period, there is evidence for both constant and time-dependent parameters of the random walk process, both hypotheses were tested.

A generalized ARCH model (GARCH) after Bollerslev (1986) was tested on the data giving the models presented in table 1.

The estimation period was November 1, 1986 - December 31, 1988. For all currencies except ITL a GARCH model of order (1,1) was specified. As regards interest rates, GARCH was not applicable for GBP, DEM, NLG, BEC, CHF and JPY.

In addition to the GARCH-model we tried to specify a normal distribution with constant variance. The problem was to select a sample period long enough to allow efficient estimation of variance but short enough to allow constancy of the parameter. A variety of sample sizes of daily changes was tested, starting with the 50 most recent ex post observations going up to 552, which was the longest available common period of data for all rates, including the domestic interest rate.

Tests showed that 50 was too small a sample to produce a stable estimate of the variances and the sample of 140 observations too large to allow constancy of the estimates.

FIGURE 1: FIM/USD distribution of daily changes.

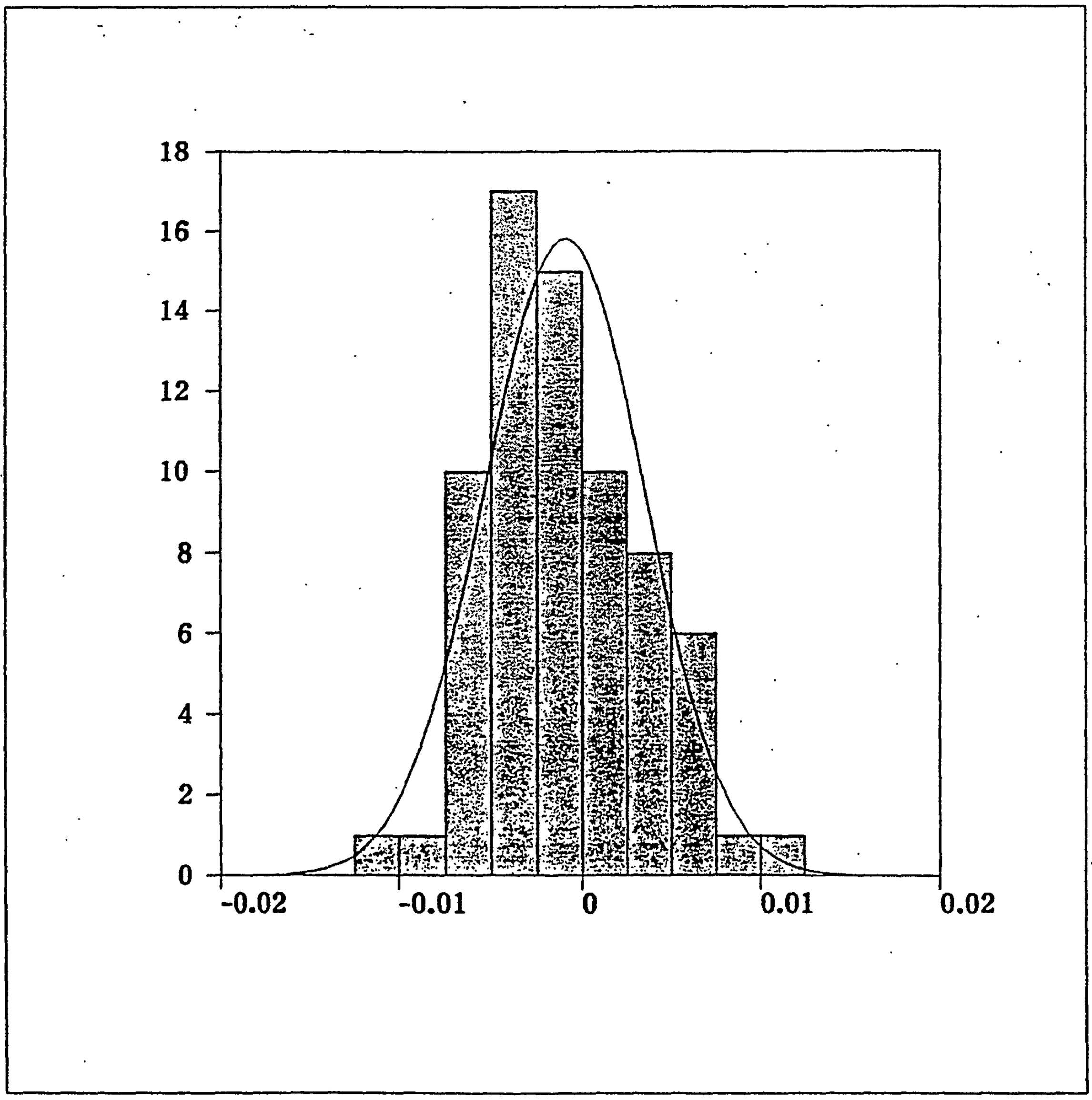


FIGURE 2: FIM/SEK distribution of daily changes.

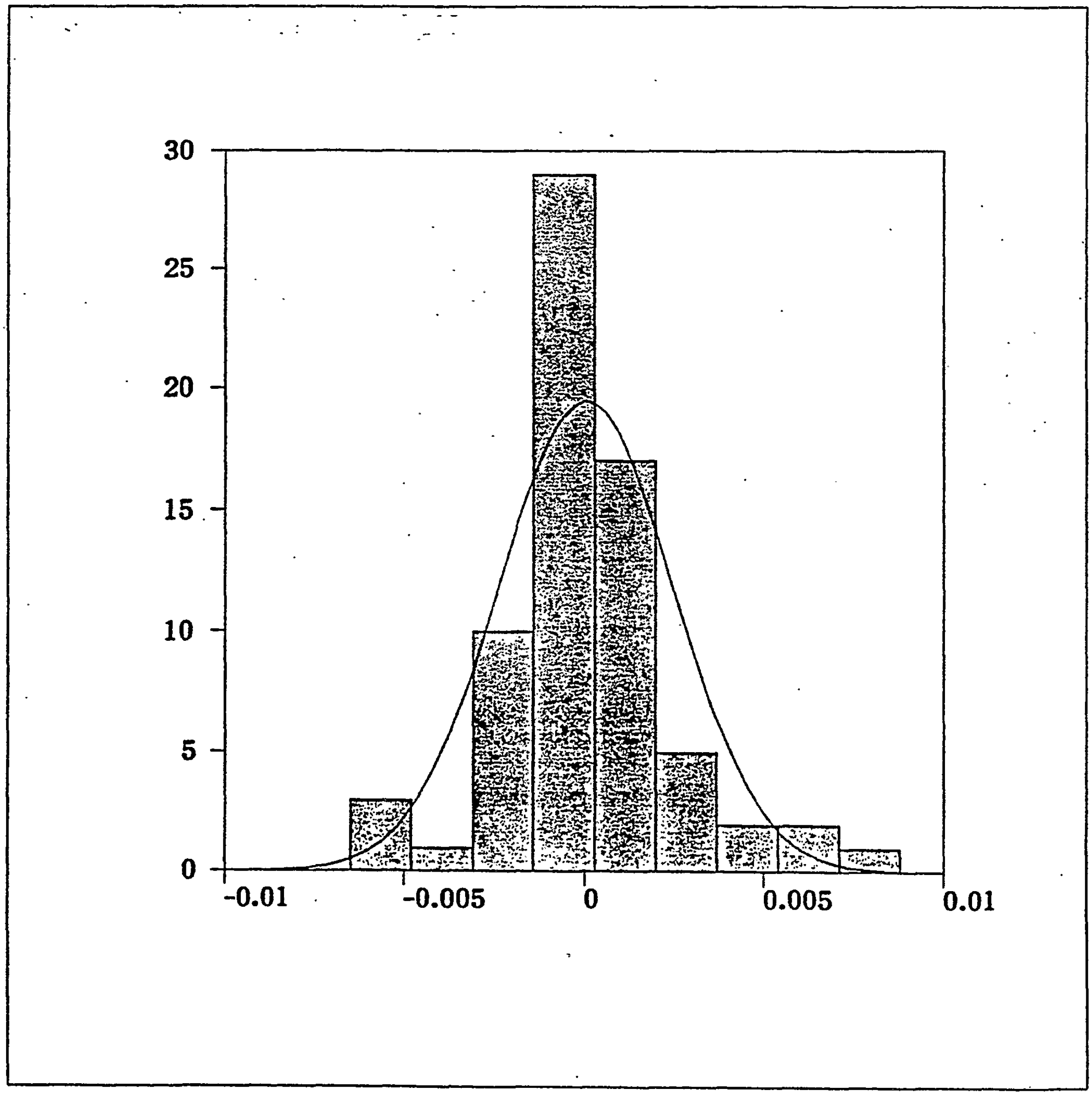


FIGURE 3: USD 3-month interest rate; distribution of daily changes.

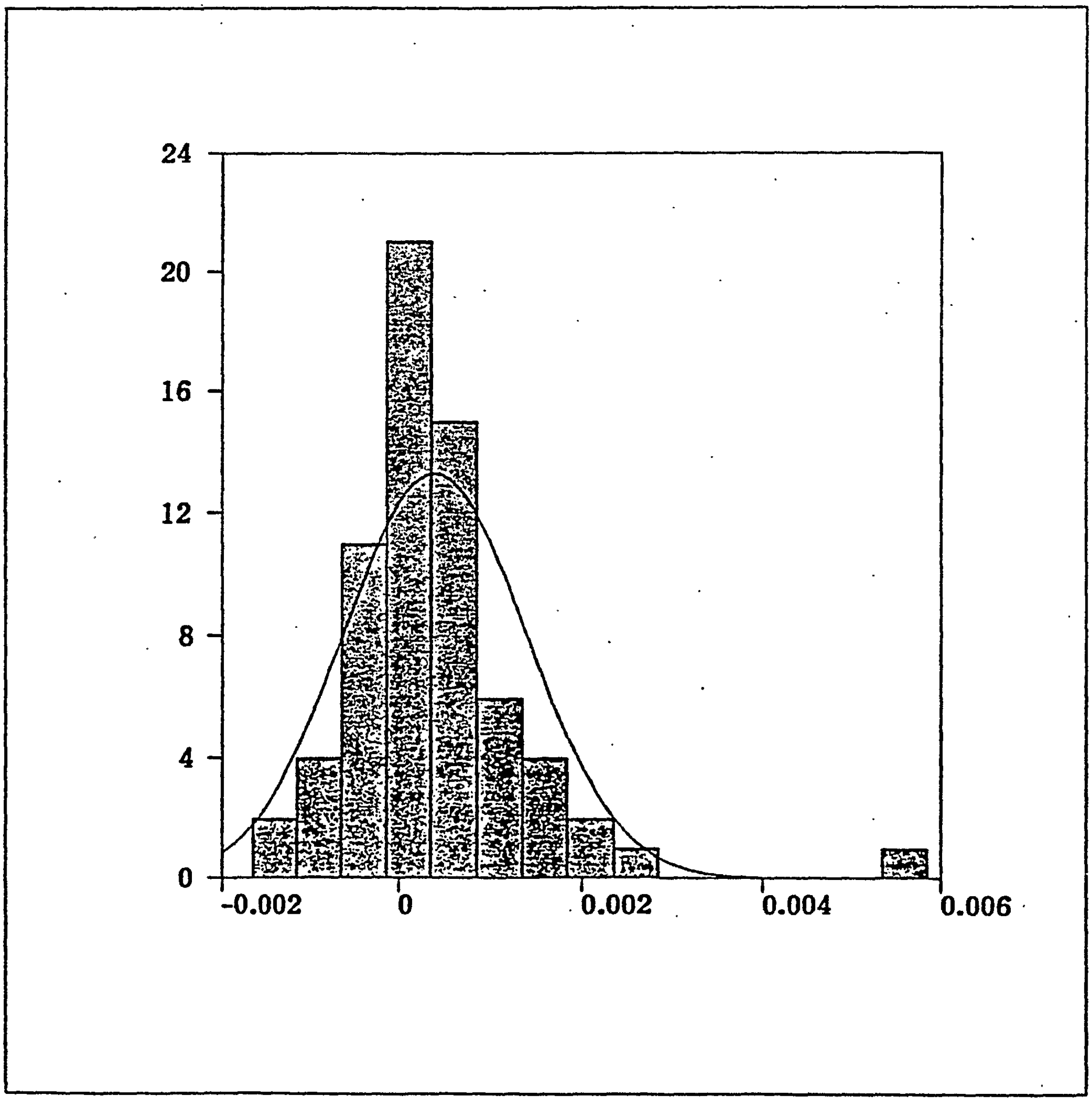
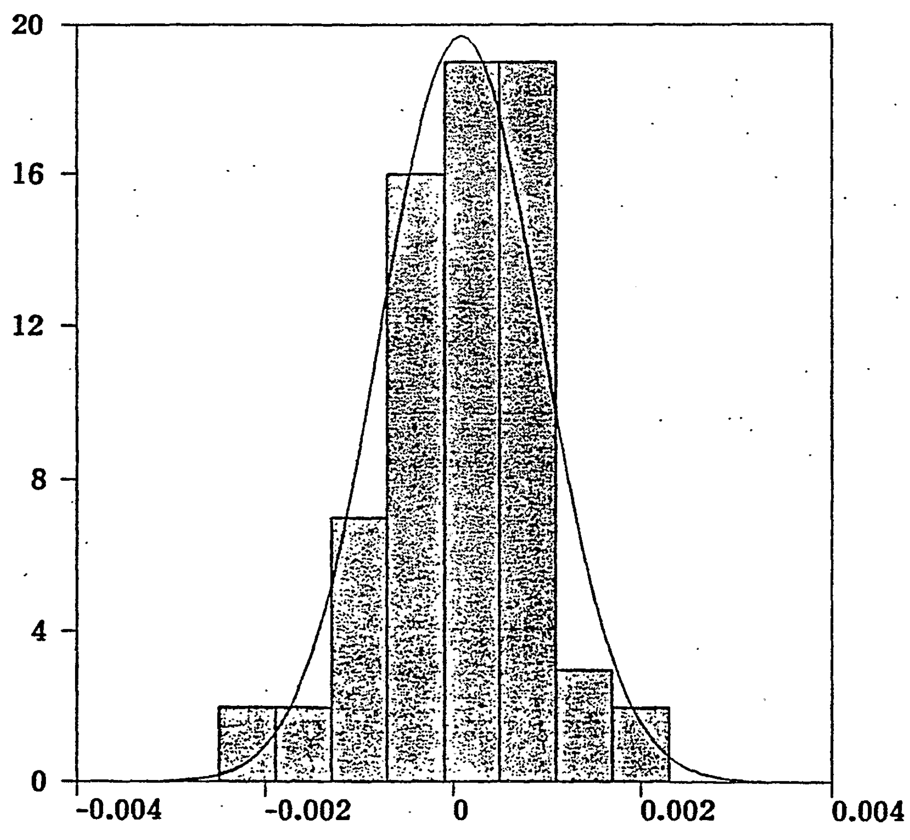


FIGURE 4: SEK 3-month interest rate; distribution of daily changes.



The estimates of the means did not differ significantly from zero at any sample size. This means that the expected change cannot be forecast. Changes in both directions around the mean appear with the same probability.

Table 1

Model specification for exchange rates and 3-month interest rates.

Estimation period October 1, 1986 - December 31, 1988, daily changes.

	Exchange rates	Interest rates
USD	GARCH(1,1)	GARCH(1,1)
GBP	GARCH(1,1)	
SEK	GARCH(1,1)	GARCH(1,1)
NOK	GARCH(1,1)	GARCH(1,1)
DKK	GARCH(1,1)	GARCH(1,1)
DEM	GARCH(1,1)	
NLG	GARCH(1,1)	
BEC	GARCH(1,1)	
CHF	GARCH(1,1)	
FRF	GARCH(1,1)	GARCH(1,1)
ITL		GARCH(1,1)
JPY	GARCH(1,1)	

The practical use of a GARCH model for exchange and interest rate movements involves the use of time-varying variances and confidence intervals. In unstable periods the intervals will be large and in stable periods smaller. In GARCH modelling the inclusion of correlation between rates requires the use of a simultaneous estimation method, and the correlation between exchange rates and interest rates is not easily captured, if at all.

Although the true underlying stochastic process turned out to be a random walk with time-dependent variance for most of the exchange rates and some of the interest rates, the use of this model was for the present postponed. One reason was its complexity in continuous use. An other was that we wanted the assumption of the same generating function for all rates. Therefore a constant-parameter normal distribution with a moving variance estimated from the 70 most recent ex post observations was selected to represent the probability distribution of the changes in interest rates and exchange rates. The sample period is short enough to allow a constant variance while the use of a moving estimation period is reflected in the confidence intervals, which grow with growing variance and thus serve as a good enough approximation of the true distribution.

The standard deviation from this distribution was used as a volatility measure in calculating the exchange and interest rate risks in a banks's international portfolio. For a normal distribution with zero mean and variance s^2 approximately 64 % of the observations lie within the interval +/- s and 95 % within the interval +/- 2s. Since the calculations were based on the assumption of normality we can make probability statements using these intervals.

5 Interest rate risk exposure

Interest rate risk means basically that changes in interest rates affect the value of assets differently than the value of liabilities. Since the difference between assets and liabilities is shareholders' equity, changes in interest rates also affect the value of equity capital. This is called the "economic risk".

The effect of changes in interest rates can also be measured as "income risk" and "investment risk". Income risk is the risk of running losses in net interest income when repricing dates of assets and liabilities are not perfectly synchronized. Investment risk is the risk of changes in the market values of fixed rate bonds. A rise in interest rates will immediately cause losses in respect of bonds in the trading portfolio, which are traded daily at market prices. Investment risk will not be realized in the investment portfolio unless the bonds are sold before maturity. For fixed rate bonds in the investment portfolio there is, however, the aspect of losing an opportunity to invest funds at higher rates.

Appendix II shows the interest rate risk reporting form. Banks have to report the maturity breakdown of both on-balance sheet items and interest rate risk affecting off-balance sheet items.

From the mismatches between assets and liabilities in the seven maturities, we form two kinds of gaps. One consists of the maturity gaps between asset and liabilities on the balance sheet, gap 1. The other, gap 2, consists of overall gaps, that is mismatches between assets and liabilities covering both on-balance sheet and off-balance sheet items. If gap 2 turns out to be bigger than gap 1, then the bank has used its off-balance sheet instruments for speculation.

If gap 2 is smaller than gap 1 then the bank has used its off-blance sheet items for hedging the interest rate exposures of balance sheet items. In this way it can be determined whether the item-by-item hedging carried on by a bank also decreases the risk as regards the bank's activity as a whole. It is possible that this kind of micro hedging actually increases the total interest rate risk. This may happen if an off-balance sheet instrument is used to hedge an item for which there is alredy an offsetting item on the bank's books.

Table 2 gives the figures for the maturity breakdown of assets and liabilities, gaps, for a hypothetical bank. The figures are given separately for every currency, including the domestic currency, in which the bank has an exposure. The net positions cover the spot exposure, the forward exposure and the off-balance sheet items. This kind of maturity breakdown serves as the basis for all calculations of interest rate risk. Different approaches differ from each other in how these gaps are used to calculate exposures.

5.1 Duration

The exposure to economic risk is measured by duration (see for ex. Macaulay, 1938, Bierwag & Kaufman & Toevs, 1983). Duration is expressed as a single figure, indicating the interest rate sensitivity of the present value of a bank. This measure covers both income risk and investment risk, though these can be measured separately as well.

To calculate duration gaps are discounted at a market rate to arrive at the net present value of the bank. The first derivative of this figure will then give the sensitivity of the present value of a bank to small changes in interest rates. This is the Macaulay one factor duration which is based on very stong assumptions about the behaviour of the term structure of interest rates. Duration is an interesting concept and useful in many senses. It is, however, very sensitive to the assumptions made and also to the data. Correct application of duration as a tool for interest rate management requires sepatate data for every single item and also a much finer maturity breakdown than the one presented in table 2.

The standard way of calculating one factor duration is not necessarily an adequate measure. In most cases a two factor model would be more appropriate. Two factor duration could be calculated for the items in foreign currencies because the term structure of eurorates can be estimated. For the domestic items, however, the estimation causes difficulties. Duration is also developed purely to cope with the interest rate risk of fixed rate items. The calculation of duration for floating rate instruments is more complicated and the current way of using the repricing date as maturity is only approximative. The value of duration for options and futures is rather high and can thus easily alter the duration of the whole portfolio. It is therefore important that the calculations are correct and based on sufficient information. The banks themselves have all the necessary information at their disposal and

TABLE 2. **MATURITY BREAKDOWN OF NET ASSET AND NET LIABILITY EXPOSURES FOR A HYPOTHETICAL BANK; T = TIME TO MATURITY OR REPRICING, MONTHS.**

	T < 1	1 ≤ T < 3	3 ≤ T < 6	6 ≤ T < 12	12 ≤ T < 24	24 ≤ T ≤ 60	T > 60
USD	-770	-560	-70	-10	0	0	0
GBP	1 210	410	500	800	210	200	30
SEK	-130	-120	-60	0	10	0	0
DEM	-30	20	140	130	80	80	80
CHF	230	-60	-150	-240	0	0	0
JPY	-70	-40	-80	-40	-40	-40	-20
FIM	320	180	-90	70	2 050	1 900	700

should therefore use duration. The main use of duration would be partial analysis for hedging purposes. Continuous hedging of the trading portfolio, for example with futures, is possible only through duration calculations. Duration is thus a method that banks need for their active interest rate management as a complementary method to maturity gap analysis.

The present value of a bank is, from an operational and supervisory point of view, useful only if the bank is in a crisis and has to liquidate all its assets to cover its liabilities. In normal circumstances the income risk and the investment risk calculated separately are more important. Because of the shortcomings and difficulties in duration analysis and the lack of sufficient data, interest rate exposure is calculated at the central bank in order to capture the income risk. The lack of sufficient, that is detailed, data prevents the central bank from using duration analysis properly. We have chosen to apply duration only to calculate the investment risk of bonds in the trading and investment portfolios. This calculation is based on estimates of the average maturity for the portfolio given separately by the banks. To calculate the investment risk inherent in securities in the trading and the investment portfolios a measure of the average maturity given separately by the banks is used as a proxy for duration. The average maturity for bonds turned out to be 5 years and the average maturity for short-term money market instruments 3 months. Thus the interest rate sensitivity of the market values of bonds was 5 times the change in interest rates and the sensitivity of the short-term instruments 0.25 times the change in interest rates. In this calculation we have to assume that the bonds are zero-cupon bonds and that the figures are very sensitive to the accuracy of the estimate of average maturity.

Banks also have to report the market value of the traded shares in their trading portfolios. To measure the **price risk** of these shares we have to assume that the portfolio is well diversified having a beta-value equal to one. That means that there is a one-to-one linear dependency between the market value of the portfolio of shares and the change in the stock market index.

5.2 Income risk exposure

Calculations of income risk are based on the net asset or net liability exposures, gaps, in the maturity breakdown. In the income risk context a net liability exposure is sensitive to a rise in interest rates. A net asset exposure is sensitive to a fall in interest rates.

The exposure to income risk is calculated from the gaps by weighting them with the time over which a net liability exposure has to be funded or a net asset exposure has to be invested.

Only the gaps for items up to one year are included. Gaps in longer maturities are irrelevant in this kind of exposure since it is not realistic to assume that a change in rates will remain the same for more than one year. Calculations for longer maturities have to be made in the form of partial analyses.

The weights used for the gaps are (1/12, 2/12, 3/12, 6/12). These are the lengths of the funding period. If we look at the figures for the dollar gaps presented in the table the net liability position in the shortest maturity has to be funded for one month. The exposure in the next maturity range has to be funded for 2 months and so on.

6 Risk measures

So far the volatility of interest rates and the exposures have been calculated showing the amounts exposed to changes in interest rates. To obtain the risk the time-weighted gaps should be multiplied by the expected change in interest rates. For the expected change, estimated values of variances of the daily changes in interest rates are used. For the shortest maturity gap, we assume that there is an immediate change in interest rates. The time-weighted maturity gap is therefore multiplied by the standard deviation of daily changes. The second time-weighted gap is multiplied by the standard deviation of daily changes times the square root of 22, the third by the standard deviation of daily changes times the square root of 66 and so on. The vector of weights for the maturities up to one year is

$$(s,\ s\sqrt{22},\ s\sqrt{66},\ s\sqrt{132})$$

where s is the standard deviation of daily changes. The simplifying assumption behind this method is that the annual volatility is 264 times the volatility of daily observations. It is found empirically that rates follow a mean reverting process, but this is not taken into account in this reasoning. The approximation used here leads to overestimation of expected changes in rates.

7 Foreign exchange risk exposure

One aspect which is usually neglected in standard calculations of foreign exchange exposures is that the maturity structure is as important as in calculating the interest rate exposure. An item which falls due after one month is riskier, measured in terms of the volatility of the exchange rate, than an overnight item. Thus we end up measuring the foreign exchange exposure using the same maturity mismatch gaps for the individual currencies as are used to measure the interest rate exposure. Consequently, daily standard deviations were used as weights for the shortest maturity gap, monthly for the next, three months for the following and so on.

8 Profits or losses from exchange rate movements

So far, we have described how to calculate the variability of rates and the exposures from the maturity gaps. Now the exposures must be multiplied by the variability to give the expected profit or loss from on- and off-balance sheet structure. We look first at the profit or loss generated from exchange rate movements.

First, the covariance matrix of daily changes in the 12 major foreign exchange rates is calculated. The matrix consists of variances of and covariances between the exchange rates. To obtain the covariance matrix we first form a matrix X of order (12 x 70) consisting of 70 observations on daily changes of 12 exchange rates. Then we construct through multipication the covariance matrix

$$EXCOV = (X \times X')/ 70$$

where X' is the transpose of matrix X. The matrix EXCOV is of order (12 x 12).

Then the vector of interest rate exposures calculated from the maturity breakdown per currency is formed and stored as a vector V of order (1 x 12).

The next step is to multiply the covariance matrix of the 12 foreign currencies EXCOV by the vector of foreign exchange exposures

$$V \times EXCOV \times V'$$

The square root of this product of matrices gives the figure of 221.5. Since the figures in the exposure vector were given in millions of FIM this figure is also in millions of FIM. The result shows that if exchange rates move in the near future in the same way as they did in the near past the exchange rate profit or loss on the bank's assets and liabilities will, with a probability of 64 %, be in the interval +/- FIM 221.5 million. Profits and losses arise with the same probability since the mean of the distribution was estimated to be zero (M. Ahlstedt, 1989). If we want to use the probability of 95 % the range for the risk would be 2s that is +/- FIM 443 million.

In this calculation not only the expected changes in the different exchange rates are used but also the covariances between the rates.

9 Profits and losses from changes in interest rates

The same kind of calculation in which the exposure is multiplied by the variability of rates is then performed to measure the profit or loss arising from interest rate movements. 70 observations of daily changes in 12 3-month eurorates and the domestic 3-month interest rate form the matrix Y of order (13 x 70). This matrix was multiplied by its transpose Y'

$$RCOV = (Y \times Y')/70$$

giving the covariance matrix of the interest rates. Then the vector W of the interest rate exposures was formed. The matrix operation

$$W \times RCOV \times W'$$

was calculated. The square root of this product gave FIM 41.4 million as a result. This figure tells us that the expected profit or loss arising from interest rate movements will be in the interval +/- FIM 41.2 million if the variances and covariances between interest rates will be the same in the near future as they were during the estimation period of the covariance matrix.

10 Interaction between exchange rates and interest rates

According to the Fisher hypothesis there is correlation between differences in levels of interest rates and expected changes in exchange rates. This hypothesis was empirically tested in the study by forming a covarince matrix EXRCOV of order (25 x 25)

$$EXRCOV = (Z \times Z')/70$$

where Z is the matrix of 70 observations on daily changes in 12 exchange rates, 12 eurorates and the domestic interest rate. The matrices X and Y are partioned matrices of the matrix Z.

The exposures to these 25 stochastic variables were stored in a vector U (consisting of the vectors V and W).

The square root of the matrix product

$$U \times EXRCOV \times U'$$

gives the figure of FIM 233.5 million. This is the amount which the bank can lose or gain if interest rate and exchange rate behavioural pattern is the same ex ante as ex post.

The figures show that inclusion of covariances is relevant for the estimation of the expected profit or loss. The sum of the separately calculated confidence intervals for the exchange rates and the interest rates is bigger than the jointly calculated figure. Thus there is typically a negative correlation of some degree between interest rates and exchange rates giving support to Fisher's uncovered interest rate parity theorem.

11 Relative limits for risk exposures

After obtaining the figures of expected loss (only the potential loss is relevant for the supervisor) we need a statement as to what is a big loss and what is a small one. Losses have to be valued in the context of earnings.

The earnings from interest rate sensitive business are the net interest income. Net interest income includes the realized interest rate margin plus losses or profits from interest rate exposures. Borrowing and lending at a big margin will still be profitable even though there may be a loss from exposure in the future. The impact of changes in interest rates should be compared to the net interest income of the present year. Banks can do this because they know their budgeted figure but since the central bank does not we use the net interest income of the previous year. If a clear trend is descernible in net interest income for some years backwards, then net interest income is corrected with this trend in the ratio.

This way of making the potential loss proportional to earnings rather than to equity capital allows banks which have managed to make profit to take more risks than banks with less profit.

Consequently, the figure for the potential loss from the joint impact of changes in interest rates and exchange rates is calculated in proportion to the sum of net interest income and income from foreign exchange dealing.

An alternative way of limiting risk exposure would be for the central bank to set an overall risk limit. The banks themselves could then allocate their limit between different areas of risk. If a bank wants to increase its foreign exchange risk exposure it has to reduce its interest rate exposure for example. This way would be less conservative, allowing banks to shift their activity from one field to another.

12 Conclusions

The method used at the central bank of Finland for measuring interest rate risk and foreign exchange risk takes into account the fact that volatility differs between rates and that exposures to rates with great volatility are riskier than exposures to more stable rates. It also takes account of the correlation between risks. We have to start by examining different risks one at a time but then they are dealt with within an overall framework. It turns out that there is a negative dependence between interest rates and exchange rates, which means that the total of interest rate risk and foreign exchange risk in the exposure is less than the sum of both risks calculated separately.

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RISK REPORTING SYSTEM OF BANKS

CONTENTS	Reporting banks	Date reporting started
1 FOREIGN EXCHANGE REPORT		
Daily position (FX1)	Parent, branch	18.2.1985
2 COUNTRY RISK REPORT		
Assets per country (CC1 - CC4) quarterly, semiannually on consolidated basis	Parent, branch, subsidiary, consolidated	31.12.1985
Liabilities per country (CL1 - CL3), quarterly	Parent, branch, subsidiary	31.12.1985
Assets and liabilities per currency (CU1), quarterly	Parent	31.12.1985
3 BALANCE SHEET AND PROFIT AND LOSS ACCOUNT		
Monthly (BCQ1 and BSQ2)	Parent, branch	31.12.1985
Quarterly (BSQ3 ja BSQ4)	Subsidiary, associate	31.3.1986
Three times a year	Consolidated	31.12.1989
Annually (BSA1 - BSA4)	Parent, branch, subsidiary, associate	31.12.1985
4 OFF BALANCE SHEET ITEMS		
Monthly	Parent, branch, subsidiary, associate	31.12.1989
5 LIQUIDITY RISK REPORT		
Maturity transformation analysis of items in foreign currencies (M1 and M2), monthly	Parent, branch	31.12.1987
Maturity transformation analysis of items in domestic currency (M3), monthly	Parent	31.3.1988
6 INTEREST RATE RISK REPORT		
Maturity gap analysis of items in foreign currencies (R1 and R2), quarterly	Parent, branch	31.12.1987
Maturity gap analysis of items in domestic currency (R3), quarterly	Parent	31.3.1988

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QUARTERLY REPORT

Name of reporting bank	
Address	
Contact person Telephone no	

INTEREST RATE EXPOSURE

MARKKA ITEMS

(reporting quarter) (year)

Complete form quarterly as at the end of each quarter unless otherwise requested.

Return form within two weeks of reportings date to:

SUOMEN PANKKI
Riskienseurantaosasto
PL 160

00101 HELSINKI

SP 4582e 10.88

REPORTING BANK

PART 1

R 3 REPORT

In millions of Finnish markkaa

	Nearest interest rate adjustment or roll-over date						
	⩽ 1 month	> 1 month ⩽ 3 months	> 3 months ⩽ 6 months	> 6 months ⩽ 1 year	> 1 year ⩽ 2 years	> 2 years ⩽ 5 years	> 5 years
1 ASSETS							
11 CASH AND MONETARY ASSETS							
111 Deposits with and other claims on banks (incl. the Bank of Finland)							
1111 Fixed-rate							
1112 Base-rate							
1113 Call-rate							
1114 Market-rate							
112 Loans to the public							
1121 Fixed-rate							
1122 Base-rate							
1123 Call-rate							
1124 Market-rate							
113 Other current assets							
1131 Fixed-rate							
1132 Base-rate							
1133 Call-rate							
1134 Market-rate							
12 TRADING ASSETS AND INVESTMENTS							
121 Shares and participations							
122 Bonds and debentures							
1221 Fixed-rate							
1222 Base-rate							
1223 Market-rate							
123 Other securities							
1231 Fixed-rate							
1232 Market-rate							
13 FIXED ASSETS AND OTHER LONG TERM EXPENSES							
131 Shares and participations							
132 Subordinated loans							
1321 Fixed-rate							
1322 Market-rate							
133 Other fixed assets							
14 OTHER BALANCE-SHEET ASSETS							
15 FORWARD MARKKA PURCHASES							
16 OTHER CLAIMS OUTSTANDING							
17 COMMERCIAL PAPER AND OTHER LOAN COMMITMENTS							
19 INTEREST RATE SWAPS							
20 FORWARD RATE AGREEMENTS (FRAS)							
21 OPTION CONTRACTS OUTSTANDING							
22 OTHER AGREEMENTS AFFECTING INTEREST RATE RISK							

3 LIABILITIES	Nearest interest rate adjustment or roll-over date						
31 LIABILITIES	≤ 1 month	> 1 month ≤ 3 months	> 3 months ≤ 6 months	> 6 months ≤ 1 year	> 1 year ≤ 2 years	> 2 years ≤ 5 years	> 5 years
311 Liabilities to banks (incl. the Bank of Finland)							
3111 Fixed-rate							
3112 Base-rates							
3113 Call-rate							
3114 Market-rate							
312 Deposits from and other liabilities to the public							
3121 Fixed-rate							
3122 Base-rate							
3123 Call-rate							
3124 Market-rate							
313 Bonds and debentures							
3131 Fixed-rate							
3132 Base-rate							
3133 Market-rate							
314 Subordinated loans							
3141 Fixed-rate							
3142 Market-rate							
3143 Base-rate							
315 Other liabilities (incl. certificatios of deposit							
3151 Fixed-rate							
3152 Base-rate							
3153 Market-rate							
32 FORWARD MARKKA SALES							
33 OTHER LIABILITIES OUTSTANDING							
34 FIRM CREDIT ARRANGEMENT AGREEMENTS							
36 INTEREST RATE SWAPS							
37 FORWARD RATE AGREEMENTS (FRAS)							
38 OPTION CONTRACTS OUTSTANDING							
39 OTHER AGREEMENTS AFFECTING INTEREST RATE RISK							

In millions of Finnish markkaa

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