# HEDGING EXPOSURE TO FOREIGN EXCHANGE RISK IN THE PRESENCE OF RUDIMENTARY FORWARD MARKET

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## Abstract :

*Four hedging decisions are evaluated when the KD is the base currency using historical data involving five foreign currencies. Using the mean-variance cri - terion as applied to the domestic currency value of foreign currency payables, it is found that staying unhedged, direct forward hedging, cross forward hedging, and money market hedging produce similar results. This finding, which is confirmed by results based on the Phillips-Hansen fully-modified OLS, is attributed to the validity of the unbiasedness hypothesis and the cyclical movements of exchange rates, which cause the extreme domestic currency values of the payables to cancel out over a long period of time. The finding that cross forward hedging and money market hedging lead to similar results as those obtained from direct forward hedging is due to the high correlation of the KD exchange rates and to the fact that covered interest par - ity holds precisely. The results suggest that if hedging is felt to be necessary on cer - tain occasions then the unavailability of forward contracts should not be considered a problem.*

**Keywords:** Rudimentary forward market, domestic currency value, Market hedging

## Introduction

Firms whose activities give rise to exposure to foreign exchange risk use a wide range of instruments and techniques to hedge this exposure (see, for example, Stanley and Block, 1980; Khoury and Chan, 1988). Some firms may not hedge or may partially hedge depending on their perception about exchange rate behaviour (see, for example, Dolde, 1993). Furthermore, the hedging decision may be adjusted to reflect expectations of changes in exchange rates. For example, if the forward rate is a biased predictor of the spot rate expected to prevail in the future, hedgers may choose to alter their hedging strategies to accommodate this effect (see, for example, Berg and Moore, 1991; Schooley and White, 1995). Finally, the literature shows that firms tend to place more emphasis on transaction exposure than on economic and translation exposure (see, for example, Khoury and Chan, 1988; Joseph and Hewins, 1991). Joseph (2000) and Marshall (2000) provide survey evidence on these issues. The general conclusion arising out of these studies is that foreign exchange risk management has become one of the key factors in overall financial management, and that there is a need to measure the extent of exposure and manage it to an acceptable level (see, for example, Rawls and Smithson, 1990).

This paper investigates the issue of hedging transaction exposure to foreign exchange risk when the forward market is rudimentary, using the Kuwaiti dinar (KD) as the base currency of the hedger. The term "rudimentary", as it is used in this paper, implies that the forward market has one or more of the following characteristics: (i) forward contracts are not available except for some major currencies; (ii) the maturities of the forward contracts are limited and typically short; and (iii) there is no free access to this market as banks are selective in granting forward contracts.[1] If this is the case then we have to consider the options available to hedgers having the KD as a base currency. In particular, the following options will be examined and compared: (i) staying unhedged, (ii) using a direct forward hedge, (iii) using a cross forward hedge, and (iv) using a money market hedge.

[1] More information on the structure of the Kuwaiti financial system and markets can be found in various issues of the annual economic report of the Central Bank of Kuwait.

The objective of hedging transaction exposure to foreign exchange risk is to lock in the domestic currency value of foreign currency payables or receivables irrespective of what happens to the spot exchange rate between the points in time when a transaction is concluded and when the payables or receivables arising from the transaction become due. If forward contracts are used as the hedging instrument then the foreign currency is bought forward in the case of payables and sold forward in the case of receivables. By doing this, the hedger knows in advance the domestic currency value of the payables and receivables, which will be independent of the spot exchange rate prevailing on the future date. Naturally, the maturity date of the forward contract should be identical to the date on which the payables or receivables become due.

If a forward contract is available on the foreign currency in which the payables or receivables are denominated then the operation described above may be called direct forward hedging. If, on the other hand, there is no forward contract on the foreign currency then cross forward hedging may be an alternative worth considering. In the case of payables another foreign currency is bought forward against the domestic currency, then when the payables become due the proceeds are converted spot to the currency denominating the payables. The problem here is that there is no guarantee that the amount of the foreign currency denominating the payables that is obtained from the spot transaction will turn out to be exactly equal to the payables. If so, a supplementary spot market operation is needed to fill the gap or otherwise dispose of the excess foreign currency balances. This also means that it is not possible to lock in the domestic currency value of the payables. Hence, a question arises as to whether cross forward hedging has any benefit over being unhedged, and whether or not it leads to similar results (in terms of the domestic currency value of the payables) as those obtained from direct forward hedging.

Yet another alternative would be the use of money market hedging, which consists of buying, selling, borrowing and lending. In the case of payables the starting point is to borrow an amount of the domestic

currency that is equivalent, at the current spot rate, to the present value of the foreign currency payables. This amount is then converted at the spot exchange rate and then invested at the foreign interest rate, so that when they are due the amount invested will be exactly equal to the payables. The domestic currency value of the assets would, therefore, be equal to the amount borrowed compounded at the domestic interest rate. Again, the question here is whether or not this technique would lead to results that are different from what would be obtained by staying unhedged and from direct forward hedging.

This paper is structured as follows. The starting point is the derivation of expressions for the domestic currency value of the payables under the no-hedging, direct forward hedging, cross hedging, and money market hedging decisions. This is followed by a presentation of the hypotheses to be tested and a description of the tests used for testing the hypotheses. Then the empirical results are presented and discussed. The paper ends with some concluding remarks.

## A Description of the Hedging Techniques

In this description of the hedging techniques we concentrate on the hedging of payables, that is the hedging of a short position in a foreign currency (the hedging of receivables works in a similar manner). Let *x* and *y* respectively be the domestic currency and the foreign currency in which payables are denominated. If the amount of payables is *K* units of *y* due at *t+n*, where *t* is the time at which the transaction is concluded, then the domestic currency value of the payables under the no-hedging decision, $V_N$ , is

$$V_N = KS_{t+n}\,(x / y) \qquad (1)$$

where $S_{t+n}\,(x / y)$ is the spot exchange rate between *x* and *y* that will prevail at time *t+n*. Since this exchange rate is unknown at time *t*, foreign exchange risk arises from the fluctuations of the spot exchange rate between *t* and *t+n*.

Assuming the availability of a forward contract on currency *y* that matures at time *t+n*, the domestic currency value of the payables that can be locked in using forward hedging, , is

$$V_D = KF_t\,(x / y) \qquad (2)$$

where $F_t\,(x / y)$ is the forward rate between *x* and *y* implicit in a forward contract initiated at *t* and matures at *t+n*. In this case what we have on our hands is direct forward hedging.

Let us now assume that a forward contract is not available on currency *y* but a contract on another foreign currency, *z*, is available. Cross forward hedging boils down to buying forward an amount of *z* that is equivalent to the payables at the current spot rate between *y* and *z*. At this exchange rate the amount of *z* equivalent to *K* units of *y* is $K/S_t\,(y / z)$. The domestic currency value of this amount when it is bought forward is

$$V_c = \frac{KFt\,(x / z)}{S_t\,(y/ z)} \qquad (3)$$

where $V_c$ is the domestic currency value of the payables under cross hedging. At time *t+n*, the amount *z* bought forward, $K/S_t\,(y / z)$, is converted spot into *y* and the proceeds are used to meet the payables in *y*. The amount of *y* obtained is

$$A= \frac{KS_{t+n}\,(y/ z)}{S_t\,(y/ z)} \qquad (4)$$

Notice, however, that this amount may or may not be equal to the amount of the payables, *K*. The two amounts are equal (i.e., A = K ) only if the spot exchange rate between *y* and *z* is stable such that $S_{t+n}\,(y/ z) = S_t\,(y/ z)$ . This will be the case if the two foreign currencies, *y* and *z*, are perfectly correlated against the domestic currency such that their cross rate is stable. If this is not the case then the deficit is met by buying currency *y* against *x* spot at *t+n*, while the surplus can be con-

verted back into *x* at the same rate. Hence, the domestic currency value of the payables under cross hedging is

$$Vc = \frac{KF_t\,(x / y)}{S_t\,(y / z)} - (A\text{-}K)S_{t+n}(x / y) \qquad (5)$$

Notice that if A - K = 0 , then equation (5) will be identical to equation (3).

Finally, we consider money market hedging. To meet the payables the hedger would need the present value of *K*, which is K/(1+i*), where is the foreign interest rate. If this amount is invested for the period between the present time and the point in time when the payables are due, then the hedger will get the amount *K* that is used to meet the payables. The domestic currency value of the present value of the payables is KS/(1+i*) . The amount is initially borrowed, and when it is repaid at time *t+n* the value of the principal and interest will be equal to KS(1+i)/(1+i*) , where *i* is the domestic interest rate covering the period between *t* and *t+n*. This amount is, therefore, the domestic currency value of the payables that is locked in via a money market hedge. Hence

$$V_M = K\overline{F}_t \qquad (6)$$

where $\overline{F}$ is the interest parity forward rate, which is the forward rate compatible with covered interest parity. Hence

$$\overline{F}_t = S_t\left[\frac{1 + i_t}{1 + i_t^*}\right] \qquad (7)$$

Notice that if covered interest parity holds then $F_t = \underline{F}_t$ , in which case there is no difference between direct forward hedging and money market hedging.

## The Hypotheses and Testing Procedures

The empirical work is based on the derivation of time series for the domestic currency value of the payables under the various hedging strategies (that is $V_N$ ,$V_D$ , $V_C$ and $V_M$ ) from which we calculate the means and standard deviations. Two hedging strategies are deemed to be equivalent if there is no significant difference between the means and variances of the domestic currency values of the payables. For the purpose of the following illustration we will use the domestic currency value of the payables under the no-hedging and direct forward hedging strategies.

The first hypothesis to be tested is the equality of the means of the domestic currency values of the payables under various strategies. Let $\mu_N$ and $\mu_B$ be the population means of the domestic currency values of the payables under no-hedging and direct forward hedging respectively. The null hypothesis is written as

$$H_0 : \mu_D = \mu_N \tag{8}$$

where as the alternative hypothesis is written as

$$H_0 : \mu_D \neq \mu_N \tag{9}$$

The null hypothesis of the equality of the two means is rejected if

$$\frac{\bar{V}_D - \bar{V}_N}{\hat{\sigma}} \sqrt{\frac{n_D n_N}{n_D + n_N}} > t(n_D + n_N - 2) \tag{10}$$

where $\overline{V}_D$ and $\overline{V}_N$ are respectively the sample means of the domestic currency values of the payables under no-hedging and direct forward hedging decisions, $n_D$ and $n_N$ are the corresponding sample sizes, $t(n_D + n_N - 2)$ is the critical value of the t distribution with $n_D + n_N - 2$ degrees of freedom, and

$$\hat{\sigma} = \sqrt{\frac{n_D s_D^2 + n_N s_N^2}{n_D + n_N - 2}} \tag{11}$$

where $s^2$ is the estimated sample variance.

The second hypothesis is the equality of the estimated sample variances of the domestic currency values of the payables. If $\sigma^2$ is the population variance then the null hypothesis is written as

$$H_0 : \sigma^2_D = \sigma^2_N \tag{12}$$

while the alternative hypothesis is written as

$$H_0 : \sigma^2_D \neq \sigma^2_N \tag{13}$$

If $S^2_D > S^2_N$ then the null is rejected if

$$\frac{s_D^2}{s_N^2} > F(n_D - 1, n_N - 1) \tag{14}$$

where $F(n_D - 1, n_N - 1)$ is the critical value of the F distribution with the degrees of freedom given in parentheses. If $S^2_N > S^2_D$ , then the ratio of the estimated sample variances and the ordering of the degrees of freedom have to be inverted.

The results of testing for the equality of the means and variances will be supplemented by the results of further empirical work based on the Phillips-Hansen (1990) fully-modified OLS. Consider a linear model relating the domestic currency value under the hedge decision to the domestic currency value under the no-hedge decision. This model can be written as

$$V_{H,t} = \alpha + \beta V_{N,t} + u_t \tag{15}$$

where $V_{H,t} \sim I(1)$ and $V_{N,t} \sim I(1)$ . Assume further that $V_{N,t}$ has the following first-difference stationary process

$$\Delta V_{N,t} = \mu + v_t \tag{16}$$

The OLS estimators of $\alpha$ and $\beta$ in equation (15) are consistent even if $V_{N,t}$ and $u_t$ are contemporaneously correlated. However, the asymptotic distribution of the OLS estimator involves the unit root distribution, which makes it non-standard. Hence, deriving inference on the

values of the estimated coefficients on the basis of standard *t*, *F* and $X^2$ tests is invalid. To overcome this problem, Phillips and Hensen (1990) suggest a semi-parametric procedure to correct for possible correlation between $V_{N,t}$ and $u_t$ (or equivalently between $v_t$ and $u_t$). Once the estimation is done, t tests can be applied to the nulls $\alpha = 0$ and $\beta = 1$, whereas a Wald test with a distribution can be used for the joint restriction $(\alpha,\beta) = (0,1)$ .

## Data and Empirical Results

The empirical results are based on monthly data covering the period July 1991-June 1999. The variables include spot exchange rates, forward exchange rates and interest rates. The spot exchange rates are the KD rates against five currencies: U.S. dollar (USD), Japanese yen (JPY), German mark (DMK), British pound (GBP) and Swiss franc (CHF). The forward rates are the one-month KD rates against the same five currencies. The interest rates are the one-month interbank rates of the KD and the other five currencies. The data were obtained from the Dealing Room of the National Bank of Kuwait.

A situation will be assumed in which foreign currency payables (resulting from imports, for example) arise each month to be settled by the following month. By making this assumption, the KD value of the payables can be calculated under the four options stated above for each foreign currency. Because the results of cross forward hedging depend on the choice of the intermediate currency (*z*), we will calculate when the intermediate currency is the U.S. dollar and when it is the German mark.

We consider the matter from a Kuwaiti perspective by taking the domestic currency (*x*) to be the Kuwaiti dinar. In all cases it is assumed that the foreign currency value of the payables, *K*, is 100 units of currency *y*. The mean-variance criterion is used to evaluate the hedging decisions, such that the lower the mean and variance of the domestic currency value of the payables the better is the hedging decision.

Table 1 reports the basic statistics of the domestic currency values

of the payables under various hedging strategies. These statistics include the mean and the standard deviation as well as the minimum and maximum values. The figures look remarkably close. In fact, they are identical for direct forward hedging and money market hedging, which simply indicates that covered interest parity holds almost precisely. Table 2 shows the results of testing for the equality of means and variances of the domestic currency values of the payables resulting from the various hedging strategies against the results obtained from the no-hedging decision. In no case is the null hypothesis of equality rejected. This again is a result that may sound strange: hedging or no hedging does not make any difference, irrespective of what is used for hedging. Indirectly, this also means that there is no difference between the results obtained from the various hedging strategies. To make sure that this is indeed the case we test for the equality of means and variances resulting from direct and cross forward hedging using the dollar and the German mark as two intermediate currencies. As expected, the nulls of equality of the means and variances are not rejected in any case, implying that direct and cross forward hedging lead to the same results.

The Phillips-Hansen procedure is used to test the equality of the domestic currency values under the hedge and no-hedge decisions based on coefficient restriction tests. To start with, the order of integration of the domestic currency value was checked to make sure that it is I(1), which turned out to be the case for all possibilities.[2] These results are reported in Table 4. For all methods of hedging and all currencies the coefficient restrictions cannot be rejected, implying that the domestic currency values under the hedge and no-hedge decisions are equal.

How do we interpret these findings? Consider first the finding that direct forward hedging and staying unhedged produce the same results. This finding should not be taken to mean that hedging exposure to foreign exchange risk is a useless operation in which no one should indulge. One must remember that this result is obtained only on aver-

[2] This was confirmed by applying the ADF test to the levels and first differences of the variables. The results are not reported here to save space.

age and in the long run. The no-hedging decision produces, on average or in the long run, the same outcome as direct forward hedging because, on average or in the long run, the forward rate is an unbiased predictor of the spot rate. This means that the forward rate is as likely to overestimate as to underestimate the future spot rate, and on average they are equal. If this is the case then the value of the payables converted at the current forward rate will fluctuate around the value of the payables converted at the future spot rate, and on average they will be equal. This explains why direct forward hedging and staying unhedged produce the same results.

Hedging, therefore, is not necessarily a useless operation just because staying unhedged produces the same results from this exercise. But one has to bear in mind some features of that these results: (i) they are only valid "on average" and "in the long run"; (ii) the assumption of the constancy of *K*; and (iii) the assumption that the payables arise and the operation has to be repeated frequently (every month). Under these conditions and assumptions, high and low domestic currency values of the payables cancel out to give the same result on average. But at certain points in time the outcomes could be completely different. If, for example, the amount of foreign currency payables is extremely large, then an adverse exchange rate movement may bring about a total collapse of the company if the position has not been hedged. Thus, hedging is sometimes necessary to lock in the domestic currency value of the payables.

If hedging is needed then the unavailability of a forward contract on the underlying foreign currency should not represent an insurmountable problem. This is because the hedger may resort to cross forward hedging or money market hedging. The finding that these hedging techniques lead to the same results as direct forward hedging can be rationalised on the basis of the following two explanations:

1. The fact that the KD exchange rates are highly correlated, most likely because the KD is pegged to a basket with a dominant dollar component. Given that the exchange rates of other currencies against

the dollar are correlated, it follows that the exchange rates of the KD against these currencies should also be highly correlated. This explains why direct forward hedging and cross forward hedging lead to the same results.

2. Covered interest parity holds almost precisely, in which case there is no difference between converting from one currency to another at the actual forward rate or at the interest parity forward rate. This explains why direct forward hedging and money market hedging give the same results.

## Concluding Remarks

This paper has considered a comparison among four hedging decisions when the base currency is the KD: (i) staying unhedged, (ii) using direct forward hedging, (iii) using cross forward hedging; and (iv) using money market hedging.[3] By assuming a fixed foreign currency value for the payables arising each month over the sample period, two main findings were obtained.

The first finding was that using direct forward hedging and staying unhedged lead to the same results in terms of the domestic currency value of the payables. This finding can be attributed to the apparent validity of the unbiased efficiency hypothesis and the cyclical behaviour of exchange rates, giving rise to similar outcomes in the long run and on average. This finding, however, cannot be interpreted to mean that hedging is a useless operation, as different results may be obtained on certain occasions. If, for example, the exposure is massive and the decision not to hedge is taken when there is an adverse exchange rate movement, the outcome could be catastrophic, and there would be no long run to count on. Recent financial history tells us that adverse exchange rate movements can wipe out whole companies. In the 1970s the failure of the Beecham's Group, a British company, to cover its short Swiss franc exposure against the pound led to its bankruptcy. Another British company, Laker Airlines, experienced the same fate

[3] It is unfortunate that there is no survey evidence available on the practice of Kuwaiti companies with respect to hedging exposure to foreign exchange risk.

when it failed to cover its U.S. dollar exposure.

The second finding is the equivalence of the results obtained from all hedging strategies. The equivalence of the results obtained from direct forward hedging and cross forward hedging can be attributed to the high correlation of the KD exchange rates. The equivalence of the results obtained from direct forward hedging and money market hedging can be attributed to the fact that covered interest parity holds precisely (otherwise, there would be an opportunity for riskless covered arbitrage). This is a sign of market efficiency.

What the results presented in this study tell us is the following. If foreign currency payables are not huge compared to the company's total assets, and if they arise frequently then, over a long period of time, hedging will not produce superior results over a decision to leave the exposure uncovered. If these conditions are not met such that it is felt that hedging is the preferred course of action, and if there are no forward contracts on the foreign currency, then the hedger may resort to cross forward hedging or money market hedging. This course of action will produce similar results to those obtained by resorting to direct forward hedging. Hence, there does not seem to be a problem when forward contracts are not available.

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**Table 1: Basic Statistics of the KD Values of 100 Units of the Foreign Currency**

| Strategy/ Currency | Mean | Standard Deviation | Maximum | Minimum |
|---|---|---|---|---|
| No-Hedging | | | | |
| USD | 30.101 | 0.317 | 30.668 | 29.322 |
| JPY | 0.274 | 0.031 | 0.357 | 0.215 |
| DMK | 18.610 | 1.495 | 21.715 | 16.198 |
| GBP | 47.895 | 2.136 | 51.867 | 44.236 |
| CHF | 22.297 | 1.995 | 26.386 | 19.793 |
| Direct Forward Hedging | | | | |
| USD | 30.151 | 0.312 | 30.697 | 29.360 |
| JPY | 0.275 | 0.031 | 0.359 | 0.217 |
| DMK | 18.645 | 1.490 | 21.768 | 16.233 |
| GBP | 47.891 | 2.124 | 51.854 | 44.279 |
| CHF | 22.352 | 2.005 | 26.502 | 19.861 |
| Cross Forward Hedging (USD) | | | | |
| USD | — | — | — | — |
| JPY | 0.274 | 0.031 | 0.353 | 0.216 |
| DMK | 18.626 | 1.502 | 21.689 | 16.192 |
| GBP | 47.596 | 2.122 | 52.307 | 44.329 |
| CHF | 22.326 | 1.999 | 26.325 | 19.785 |
| Cross Forward Hedging (DMK) | | | | |
| USD | 30.221 | 0.353 | 31.996 | 28.001 |
| JPY | 0.275 | 0.031 | 0.354 | 0.212 |
| DMK | — | — | — | — |
| GBP | 48.095 | 2.458 | 52.572 | 43.218 |
| CHF | 22.389 | 1.969 | 26.509 | 19.766 |
| Money Market Hedging | | | | |
| USD | 30.151 | 0.312 | 30.697 | 29.360 |
| JPY | 0.275 | 0.031 | 0.359 | 0.217 |
| DMK | 18.646 | 1.490 | 21.769 | 16.234 |
| GBP | 47.891 | 2.124 | 51.853 | 44.279 |
| CHF | 22.353 | 2.005 | 26.503 | 19.861 |

**Table 2: Testing Hedging Strategies Against the No-Hedging Decision**

| Test/Strategy | USD | JPY | DMK | GBP | CHF |
|---|---|---|---|---|---|
| Difference Between Means (t) | | | | | |
| Direct Forward | 0.55 | 0.03 | 0.18 | -0.02 | 0.24 |
| Cross Forward (USD) | — | 0.00 | 0.08 | -1.25 | 0.13 |
| Cross Forward (DMK) | 1.10 | 0.04 | — | 0.80 | 0.40 |
| Money Market | 0.55 | 0.03 | 0.18 | -0.02 | 0.24 |
| Difference Between Variances (F) | | | | | |
| Direct Forward | 1.03 | 1.00 | 1.01 | 1.01 | 1.01 |
| Cross Forward (USD) | — | 1.00 | 1.01 | 1.01 | 1.00 |
| Cross Forward (DMK) | 1.24 | 1.03 | — | 1.32 | 1.01 |
| Money Market | 1.03 | 1.00 | 1.01 | 1.01 | 1.01 |

**Table 3: Testing Cross Hedging Against Direct Hedging**

| Test/Strategy | USD | JPY | DMK | GBP | CHF |
|---|---|---|---|---|---|
| Difference Between Means (t) | | | | | |
| Cross Forward (USD)— | -0.04 | -0.10 | -1.24 | -0.11 | |
| Cross Forward (DMK) | 0.64 | 0.00 | — | 0.83 | 0.16 |
| Difference Between Variances (F) | | | | | |
| Cross Forward (USD) | 1.01 | 1.02 | 1.00 | 1.01 | |
| Cross Forward (DMK) | 1.28 | 1.00 | 1.34 | 1.04 | |

**Table 4: The Fully-Modified OLS Results**

| Hedging Strategy/ Currency | $\alpha$ | $\beta$ | $t(\alpha=0)$ | $t(\beta=1)$ | $(\alpha,\beta)=(0,1)$ $\chi^2(2)$ |
|---|---|---|---|---|---|
| Direct Forward | | | | | |
| USD | 2.325 | 0.924 | 1.62 | -1.60 | 3.07 |
| JPY | 0.009 | 0.972 | 1.58 | -1.33 | 4.03 |
| DMK | 0.845 | 0.957 | 1.78 | -1.72 | 4.59 |
| GBP | 2.282 | 0.953 | 1.67 | -1.67 | 2.93 |
| CHF | 0.947 | 0.961 | 1.72 | -1.81 | 4.76 |
| Cross Forward (USD) | | | | | |
| USD | | | | | |
| JPY | 0.006 | 0.963 | 1.32 | -1.42 | 3.07 |
| DMK | 0.826 | 0.928 | 1.28 | -1.24 | 4.24 |
| GBP | 2.131 | 0.952 | 1.57 | -1.63 | 3.82 |
| CHF | 0.921 | 0.922 | 1.43 | -1.72 | 3.84 |
| Cross Forward (DMK) | | | | | |
| USD | 2.167 | 0.934 | 1.71 | -1.59 | 4.32 |
| JPY | 0.021 | 0.937 | 1.41 | -1.61 | 4.67 |
| DMK | | | | | |
| GBP | 2.156 | 0.926 | 1.68 | -1.38 | 2.94 |
| CHF | 0.894 | 0.910 | 1.54 | -1.62 | 3.79 |
| Money Market | | | | | |
| USD | 2.246 | 0.942 | 1.69 | -1.54 | 3.24 |
| JPY | 0.007 | 0.965 | 1.45 | -1.30 | 4.10 |
| DMK | 0.862 | 0.958 | 1.71 | -1.68 | 4.32 |
| GBP | 2.184 | 0.961 | 1.63 | -1.70 | 2.90 |
| CHF | 0.938 | 0.957 | 1.68 | -1.74 | 4.54 |