

Currency hedging in Norwegian non-financial firms

Øystein G. Børsum and Bernt Arne Ødegaard¹

Fluctuations in global foreign exchange markets in recent years have again shown that many Norwegian enterprises are sensitive to changes in exchange rates, in both a positive and negative sense. The question naturally arises as to how companies can best hedge against such fluctuations and what hedging techniques that are actually used by Norwegian enterprises. This article summarises the results of a survey conducted by Norges Bank in summer 2004. The survey focused on the use of currency derivatives, but also posed more general questions regarding hedging.

The article starts with a brief description of exchange rate risk and the most relevant risk management instruments, followed by some comments regarding the theory of companies' derivatives usage and an overview of international empirical studies in the field, before presenting the most important results of the Norwegian survey.

1 Exchange rate risk

This article looks at exchange rate risk and currency exposure. A company is exposed to exchange rate risk if the company's value is affected by fluctuations in one or more exchange rates. The effect may be direct or indirect. The most obvious sources of direct impact are import and export prices. A Norwegian exporter selling in USD will immediately experience a fall in Norwegian income if the USD exchange rate depreciates, whereas a Norwegian importer buying in USD will register a reduction in purchasing costs. These examples show the direct effect of a depreciation of the USD exchange rate on the bottom line. However, it is not only such direct effects that are relevant. Changes in the exchange rate can just as often have an effect through indirect channels. For example, take a Norwegian cooker manufacturer: the company uses Norwegian labour, its most important commodities are Norwegian and it sells all its products in Norway. At first glance, the manufacturer may appear to be insulated from the effects of exchange rate variations. But what if the company's most important competitor is Swedish, and the Swedish krone falls in relation to the Norwegian krone? Swedish cookers will then become cheaper in Norway and the Norwegian manufacturer's competitive situation will deteriorate. This is a typical example of an indirect effect. Another is electricity production. Norwegian hydroelectric power plants compete with oil-fuelled power plants in continental Europe. Even if the oil price is constant, as oil is quoted in USD, foreign electricity prices tend to be cheaper as a result of a fall in the USD exchange rate. On the basis of these observations, we can conclude that most companies in Norway are potentially sensitive to exchange rate variations, with the exception of some sheltered sectors.

The 'exposure' concept was introduced in order to measure the extent to which a company is affected by exchange rate risk. A company's exposure is equal to how much the company's value will be affected by a change in the exchange rate.

Change in company's value = Exposure x Change in exchange rate

As the company's value is, in principle, the present value of future cash flows, exposure can be operationalised by looking at changes in cash flows.

Change in cash flows = Exposure x Change in exchange rate

Empirical estimation of exposure is difficult. There are two commonly used approaches.² One method involves breaking down the company's cash flow into its various components, calculating the exposure of each component and then aggregating this as an expression of the company's exposure. For given quantities, exposure can be easily estimated by multiplying the given quantity by the change in the exchange rate. Unfortunately, quantities normally change as a result of exchange rate fluctuations, for example, if there is a change in competitors' prices.

The other method is more indirect. By looking at the company's market capitalisation and using historical market price data and historical exchange rate movements, it is possible to estimate the extent to which market capitalisation changes as a result of exchange rate fluctuations. The advantage of this method is that it is less demanding in terms of available data, but the problem is that there is greater uncertainty involved as estimations are based on market data that may have been affected by many other factors in addition to currency.

¹ Øystein Børsum was employed as a consultant in Norges Bank Financial Stability when this article was written, but is currently employed at the Ministry of Finance. Bernt Arne Ødegaard is an associate professor at the Norwegian School of Management BI. He holds a part-time post in the Research Department of Norges Bank. We are grateful to Sindre Weme and Gunnvald Grønvik for their useful comments.

² The estimation of company exposure is a standard problem in textbooks on international finance, such as Korsvold (2000), Seruc & Uppal (1995) and Stulz (2003).

Exposure can be broken down in different ways. For the purposes of this article, it is sufficient to divide exposure broadly into two categories according to time horizon: short-term or long-term.³ Obviously, it is easier to estimate exposure in the short term than it is in the long term. Short-term risk is usually easy to identify, as it is linked to transactions that have already been initiated. For given prices and quantities, exposure is proportional to the change in the exchange rate. In the longer term, there are more variables that may change over which one has varying degrees of control. Price and quantity can vary on both the input and the sales side. Thus it is more difficult to estimate long-term exposure, but possibly more important to do so. This type of long-term exposure is often called strategic exposure.

One key concept in any discussion about exposure measurement is natural hedging. This term is used for situations where income and expenses are denominated in the same currency. A Norwegian shipping firm operating in an international market will usually have both income and expenses in USD, which would only involve currency exposure if the profit is taken out in NOK. It is important to take account of natural hedges when measuring exposure as it is the net value of income and expenses in the same currency that is relevant for exposure. In a number of instances, the company can influence the degree of natural hedging, for example, by buying input factors in foreign currency rather than NOK.

In cases where there is no such natural hedge, it is possible to change exposure by buying financial derivatives. We will now give a brief overview of the relevant instruments.

2 Instruments for exchange rate risk management

Currency derivatives markets are some of the most active financial derivatives markets and have a long history. The most important instruments for risk management in the derivatives markets are forward agreements, swaps and options. An outright forward fixes the future exchange rate at a given value (the forward exchange rate) and a given future transaction date (the contract expiry date). Currency swaps also fall under this umbrella. A swap is closely related to a forward agreement. In both cases, future cash flows are fixed, but with a swap, both parties formally 'swap' cash flows. The easiest way to show the similarity with outright forwards is to say that a swap is equivalent to a portfolio of forward agreements. Options are the most advanced risk management instrument. An option is also an agreement that guarantees a set exchange rate at a set future date for a set amount of currency, but the holder may choose to use the option or not. Options are thus asymmetrical instruments in that they can be used to hedge against negative results, but also give the holder the opportu-

ity to benefit from positive results. This flexibility is reflected in option premiums.

The most recent study on derivatives by the Bank for International Settlements (BIS, 2004) shows that traditional instruments are the most widely used instruments. Table 1 summarises figures for daily turnover in global foreign exchange markets by transaction type.

Table 1 Global foreign exchange market turnover by transaction type. Daily average. In USD billions

	World		Norway	
	April 1995	April 2004	April 1995	April 2004
Spot transactions	494	621	3.4	2.7
Currency derivatives				
- Forwards	647	1173	4.2	11.7
- Options	41	117	46*	49*
- Other	2	1		

* Figures in USD millions.

The table shows global foreign exchange market turnover. The figures are based on average daily turnover in April in USD billions as stated in the BIS study, "Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity in April 2004". The figures for Norway are from Norges Bank.

As the table shows, forward exchange agreements have the highest turnover. The umbrella term includes different types of agreement, outright forwards and swaps. Globally, there has been a marked increase in the use of currency options. This is not reflected in the figures for Norway for technical reasons, as options agreements are signed with counterparties that do not report to Norges Bank. In addition to these instruments, other derivatives are also traded and are included in the group "other" in Table 1.⁴

A common feature of most financial foreign exchange agreements is that they are not traded as an organised exchange. They are bilateral agreements between two parties that generally involve large banks as either a broker or one of the parties to the agreement.

For the purposes of this article, it is not necessary to know how derivative instruments are priced. It is sufficient to note that active markets such as global foreign exchange markets will involve more or less free competition so that the price of a hedging transaction will be very close to the transaction's "fair value."

3 Companies' exchange rate risk management

We will now look at the possibilities and motives companies may have for hedging exchange rate risk. Loderer & Pichler (2000) provide a useful classification into four possible strategies for corporate exchange rate risk management:

- Avoid risk, for example by invoicing in domestic currency or avoiding transactions that expose the company to exchange rate risk. The latter is difficult

³ Accounting exposure, transaction exposure or strategic/long-term exposure are alternative categories that focus more on the source of exposure. Accounting exposure includes all the items on the profit and loss account or balance sheet that are affected by changes in the exchange rate. Transaction exposure involves incoming and outgoing payments, i.e. cash flows that are affected by changes in the exchange rate.

⁴ For more details about derivatives markets, see Norges Bank *Occasional Papers* No. 34: Norske finansmarkeder - pengepolitikk og finansiell stabilitet (Norwegian only). The study on the foreign exchange and derivatives markets is summarised in Wettre & Borgersen (2005).

- in an economy as open as the Norwegian economy.
- Reduce the risk of loss. A Norwegian exporter exporting to the EU can, for example, move production to the euro area. This is not the same as avoiding risk, as profits are exposed to risk when they are transferred back to Norway.
 - Pass on risk to others. In this case there are three possible strategies:
 - Hedge, e.g. by means of forward agreements.
 - Insure, e.g. by means of currency options.
 - Diversify, e.g. by spreading exchange rate risk over several currencies.
 - Choose to bear the risk. Choosing to assume risk is a rational decision as long as the risk is deemed to be acceptable.

This list shows the possibilities a company has to change its risk exposure, but not the motives a company may have for making such choices. Many people think that the term hedging is synonymous with the elimination of all risk or uncertainty. But that is not the case. Financial theory teaches the important lesson that in order to achieve a return that exceeds risk-free interest, one has to assume risk. Hedging is thus a matter of choosing what risk one is willing to assume.

From a theoretical point of view, let us look at motives for companies' risk management in general. It may seem surprising, but financial theory argues that a company's risk management strategy fundamentally has no effect on the company's value. One argument for this is that a company's owners may not be willing to pay for something they can do themselves. If the company shareholders want to hedge against exchange rate risk, they can do so themselves and will not pay the company to do so. Another way of looking at the same argument is that when a hedging transaction is initiated, the transaction has a present value of zero for both parties. Entering into a contract with zero present value does not change the value of the company.

Within a theoretical framework, if risk management is to have any value it is necessary to take into account imperfections in the capital markets. One standard argument is linked to insolvency costs and more generally, the costs of financial crises. If there is a real danger of a company going bankrupt, it will incur increased costs. Suppliers' terms and conditions will not be as favourable, banks will demand higher funding rates, etc. Hedging can be used to avoid negative results that would lead to insolvency. Saga Petroleum's forward sales of oil a number of years ago is a well known Norwegian example of this. At a time when the oil price was falling towards USD 10, Saga entered into forward agreements that fixed their selling price. The oil price then picked up shortly afterwards and has subsequently never been anywhere near USD 10, so in retrospect, the transaction gave rise to losses. But this must be seen in

the context of the company's situation at the time. When the forward sale was agreed, the oil price was so low that if it had fallen by only an additional half dollar, Saga would in all likelihood have gone bankrupt. By fixing the oil price, they were protected against such a negative outcome. The fact that the forward agreement also precluded the possibility of any gains if the oil price were to rise again was of less importance given the company's critical situation.

Hedging may also be linked to tax considerations. Progressive company taxes may mean that a company prefers its profits to vary as little as possible, which can be achieved with hedging. However, this effect is not particularly important.

Of more importance are the potential costs for a company in connection with acquiring new investment capital. It is always cheaper for a company to finance investment by means of retained earnings than by acquiring new capital or new debt. The use of financial instruments to hedge cash flows allows companies to enhance budgeting and reduces the likelihood of having to procure new expensive capital.

The arguments above apply to large companies with well-diversified ownership, where each stakeholder's position in the company is a small part of the owner's total portfolio, as is often the case for listed companies. This approach is less effective for small, non-listed companies. In companies where the manager and owner are often the same person, the owner is by no means sufficiently diversified. In such cases, the owner's risk aversion will mean that he or she would rather that the company manage the risk, including non-systematic risk.

The main conclusion is that risk management itself does not boost a company's value, as long as the risks against which the company is covered are non-systematic. Foreign exchange fluctuations are, however, a rather special source of risk, as a currency is linked to a country's macroeconomy. The effects of changes in the exchange rate will therefore be more wide-reaching and are more likely to be systematic. In order to understand what is meant by systematic risk, it may be useful to consider how capital markets price companies, for example, using the capital asset pricing model (CAPM). The only risk that is relevant to prices is the covariation between a company's cash flow and the market. If the exchange rate affects a company's capital flows and the macroeconomy (i.e. the market) at the same time, the change in the exchange rate will be reflected in the company's beta value. Exchange rate fluctuations are a source of systematic risk and therefore relevant to how a company is priced. Company owners should therefore be more open to the idea that exchange rate risk management is important.

4 International empirical studies of non-financial firms' currency derivatives usage

Our knowledge of companies' derivatives usage is primarily derived from academic studies. These can be divided into two types, depending on the method used.

The first type is based on available official data for companies' derivatives usage, i.e. from annual reports. These studies look at a large selection of companies and collect data for the whole sample. Thus there are no biases in the sample. The problem is the lack of relevant information in annual reports. Until fairly recently, accounting standards required little information about hedging transactions. Reporting was therefore, at best, in the form of notes to the accounts. The data are therefore summarised fairly crudely, for example, whether companies use derivatives and what type of risk is hedged (primarily exchange rate risk, interest rate risk and commodity price risk). The most interesting foreign exchange survey of this type is by Géczy et al. (1997).

This sort of empirical study is complemented by surveys based on various types of questionnaire. The advantage of this method is that it is possible to ask more qualitative questions about the motives for hedging. It is also possible to gather more detailed data from other sources and combine them with questionnaire results. However, questionnaires rely on participants' good will, which can lead to systematic biases in the sample. The most quoted survey of this type is Bodnar et al. (1996, 1998).

The surveys mentioned look at US or multinational companies, but similar surveys have also been carried out in other countries. The most interesting ones are, of course, those that were carried out in countries with which it is natural to compare Norway, such as Sweden (Alkeböck & Hagelin, 1999), Finland (Hakkarainen et al. 1998), Belgium (DeCeuster et al. 2000), the Netherlands (Bodnar et al. 2002) and Germany (Bodnar & Gebhart 1999). An international comparison of such surveys is presented in Bartram et al. (2003).

In summary, the surveys show that derivatives usage in non-financial firms is high. The share of companies using derivatives ranges between 40 per cent and 60 per cent, with minor variations across countries. Exchange rate risk is the most frequently hedged risk, followed by interest rate risk. Exchange rate risk is hedged less in the US than in other countries, which reflects the relatively smaller role that imports and exports play in the US economy. Another observation is that the largest companies hedge the most. The most common explanation for this is economies of scale. As hedging instruments are relatively sophisticated, companies must have the necessary expertise to make the use of such instruments viable. Only management in companies over a certain size will be able to acquire knowledge about relevant hedging techniques.

Loderer & Pichler (2000) should also be mentioned. This questionnaire is more directly focused on companies' assessment of exchange rate risk and not more generally on the use of derivatives. The survey was conducted among Swiss multinational companies. The main conclusion is that companies are not particularly active in assessing their exchange rate risk exposure and to a large extent rely on the natural hedging of exchange rate risk through pricing in domestic currency, etc.

It must be emphasised that the surveys discussed look at this from the user side, i.e. why companies use hedging instruments and derivatives. Statistics from derivatives markets for turnover, distribution by instrument and total volume are also available. The BIS survey (2004) mentioned earlier is a good example of this kind of survey. However, such data provide little indication of the end-user's individual hedging motives and practices.

5 Norwegian survey of Norwegian non-financial firms' currency hedging practices

In summer 2004, Norges Bank conducted a major survey of Norwegian companies' currency hedging practices. The questionnaire was sent to Norwegian non-financial firms, selected from sectors with currency exposure. Financial companies were not included as they are often suppliers as well as users of hedging products. In order to include the largest companies in each sector, the questionnaire was sent to 125 companies listed on the Oslo Stock Exchange. The remaining companies in each category were selected randomly.

Table 2 . Overview of sample

Type of company	Listed company	Random selection	Total
No. forms distributed	125	455	580
Share of total	22%	78%	100%
No. responses received	61	153	214
Response rate	49%	34%	37%
No. respondents without currency exposure	5	41	46
No. responses excluded for other reasons*	5	35	40
No. responses on which analyses are based	51	77	128
Share of total	40%	60%	100%

* Part of group structure, incomplete or inconsistent answers

A summary of the response to the questionnaire is shown in Table 2. Only 37 per cent of the forms were returned. Even though this may seem like a small share, it is in fact a higher response rate than is normal for comparable international surveys, where the response rate is typically around 20 - 25 per cent. It is also worth noting that the response rate was higher among large

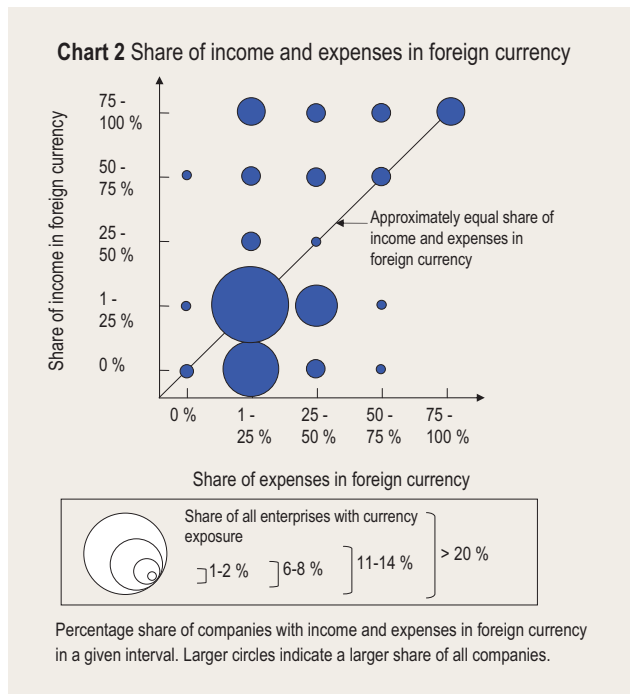
companies than among small companies. If larger companies have a more active policy on exchange rate risk this might result in an imbalance in the sample. Chart 1 shows the distribution of companies that responded by sector. The most important sectors in terms of foreign exchange considerations are well represented.

5.1 How do companies view their exposure?

In the survey, companies were asked to state their shares of income and expenses in foreign currency. The differential between income and expenses in foreign currency (net foreign currency income) constitutes a company's net currency exposure before any currency derivatives are used, providing that the foreign currency income and foreign currency expenses are in the same currency or in currencies with a high correlation. The survey does not specify the currencies to which the companies are exposed and we assume here that net foreign currency income can be used as an estimate of net currency exposure. If a company uses natural hedging techniques extensively, income and expenses in foreign currency should be roughly the same. Chart 2 shows the share of companies with different combinations of income and expenses in foreign currency.

To put the figures into perspective, it is useful to compare them with national accounts figures. In 2003, exports accounted for 43 per cent and imports for 28 per cent of GDP. The majority of the companies in the survey answered that the share of both income and expenses in foreign currency was less than 25 per cent. One possible explanation for this difference is that oil exports are concentrated in only a few of the largest companies, so that the average company in the survey has lower imports/exports figures.

The largest group comprises companies with a relatively low share of both income and expenses in foreign

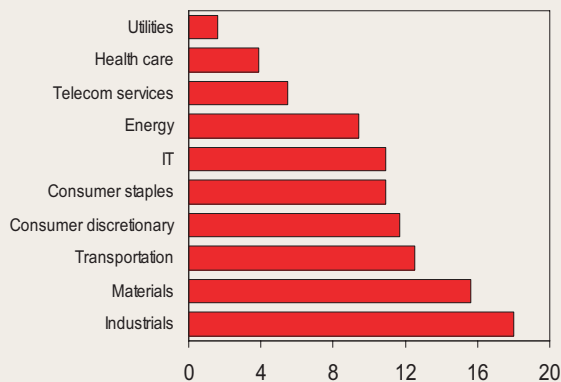


currency. Net exposure will generally be limited for all companies with a more or less equal share of income and expenses in foreign currency. Over one third of the companies in the survey are in this position, which indicates a high degree of natural hedging in relative terms.

In the lower right hand corner of the chart are companies with a larger share of expenses in foreign currency than income (net expenses in foreign currency). In this category, there is a clear predominance of companies selling consumer goods and companies that use imported capital goods as input factors. For this group, changes in the exchange rate will have a moderate effect on total expenses. Of the companies with no income in foreign currency, only a few have a high share of expenses in foreign currency, which presumably shows that expenses accruing in Norway such as wages, local rent and distribution constitute a considerable share of these companies' total expenses. Most companies with substantial net exposure are companies with a higher share of income in foreign currency than expenses (net income in foreign currency). These companies are shown in the top left-hand corner of the chart. There is a strong predominance of electricity, manufacturing and fishing companies in this category. One important reason for this may be that natural hedging techniques are not sufficiently available to these companies, as their operations are based on the use of specific Norwegian commodities.

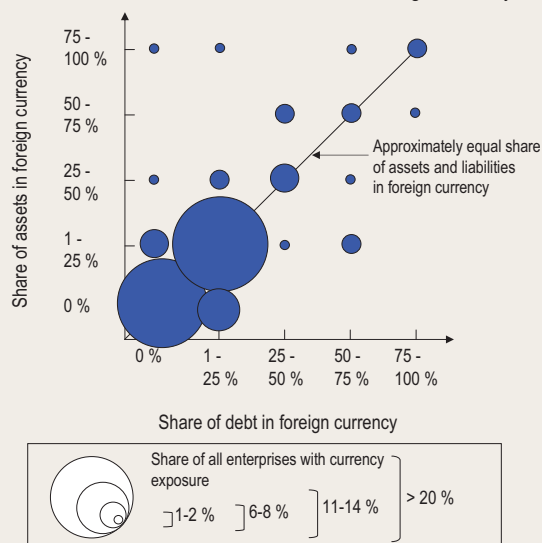
In addition to income and expenses figures, companies were also asked to state the exposure of their balance sheet items to changes in the exchange rate. Chart 3 shows that the spread of assets and liabilities in foreign currency is far smaller than the distribution of income and expenses in foreign currency. Two thirds of

Chart 1 Sample by sector



Distribution of companies that responded to the questionnaire, grouped according to the Global Industry Classification Standard (GICS). The figures show the percentage share of companies in the different business sectors.

Chart 3 Share of assets and liabilities in foreign currency



Percentage share of companies with assets and debt in foreign currency in a given interval. Larger circles indicate a larger share of all companies.

the companies exposed to exchange rate risk hold only a small share of assets and liabilities in foreign currency or none at all. No more than 16 per cent of the companies have more than half their assets in foreign currency, and in this category there is a marked predominance of shipping firms and companies in the energy sector, most of which are large, listed companies. The concentration of assets in NOK shows that Norwegian companies' operations are still largely based in Norway. The globalisation of companies occurs to a greater extent through trade with other countries than through relocation abroad.

There is generally a fairly close match between the share of assets and the share of liabilities in foreign currency. Very few companies have a large share of assets and a small share of liabilities in foreign currency (top left-hand corner of chart) or the opposite (lower right-hand corner of chart). This indicates that companies place more emphasis on the natural hedging of assets and liabilities. At the same time, there are a number of companies with limited net exposure to assets and liabilities in foreign currency. One reason for this may be that the company is trying to use liabilities in foreign currency to offset its expenses in foreign currency, thereby achieving natural hedging of the company's income in foreign currency, despite the fact that the company then incurs a balance sheet risk. Chart 3 can be interpreted as indicating that companies accept some, but not a high level of balance sheet risk. One of the reasons for this is probably that it is easy to influence the composition of liabilities, for example, by replacing a loan in NOK with a loan in a foreign currency.

Once a company has used the desired natural hedging techniques, it is left with net currency exposure in the

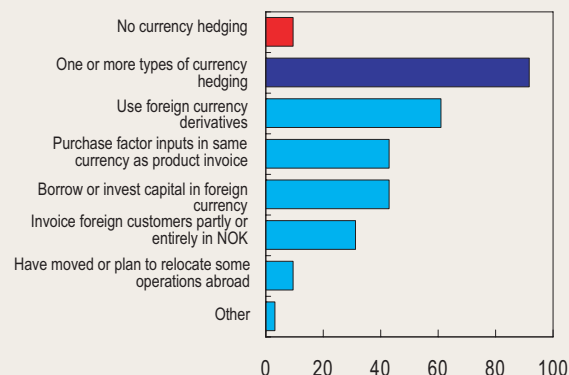
form of net income in foreign currency and net assets in foreign currency. If the company wants to change this exposure, it must do so through currency derivatives.

5.2 How and to what extent do Norwegian companies engage in hedging?

Chart 4 shows that 91 per cent of the companies that responded said that they use one or more forms of currency hedging. These different forms include the use of currency derivatives, natural hedging techniques, invoicing in NOK, relocation, etc. Currency derivatives are the most frequently used form of hedging, with 61 per cent of companies using derivatives. Natural hedging is also widely used, with 43 per cent of companies responding that they use such techniques. One form of natural hedging is to buy input factors in the same currency as is used in invoicing. In this way, both income and expenses fluctuate in line with changes in the exchange rate and these fluctuations offset each other totally or in part. Another form of natural hedging is to raise loans in the same currency as the company's assets. In this way, any exchange rate adjustments to items on the company's balance sheet offset each other so that the net effect on the profit and loss account is reduced. From the sample, 31 per cent of the companies hedge against exchange rate fluctuations by invoicing foreign customers entirely or partially in NOK. Another way of hedging against exchange rate fluctuations is to move parts of the business operations abroad; 9 per cent of the companies said that they have relocated or plan to relocate abroad. It is worth noting that other factors, such as Norwegian wage levels or market proximity, and not just currency hedging, are also important when a company is considering relocation.

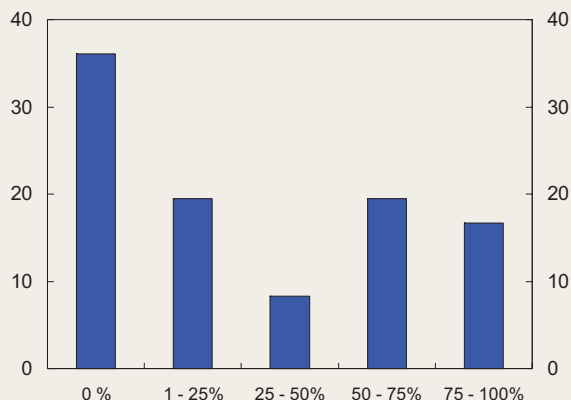
Further information can be gleaned by looking at the degree of hedging. Chart 5 shows the degree to which companies hedge net income in foreign currency; 36 per

Chart 4 Types of currency hedging



Percentage share of respondents that use different currency hedging techniques. The different shares in the chart add up to more than the total of 91% that use currency hedging, as several companies use one or more types of hedging in parallel.

Chart 5 Share of net income in foreign currency that is hedged



Distribution of percentage share of net income in hedged foreign currency
A total of 72 respondents answered this question.

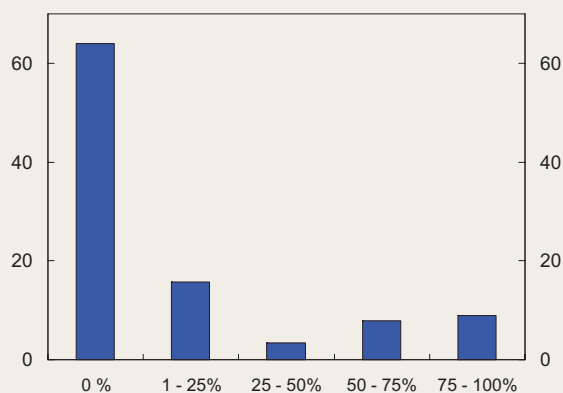
cent of the companies that responded do not hedge net income in foreign currency, 47 per cent hedge some, but less than 75 per cent of their net income in foreign currency and only 17 per cent hedge up to 100 per cent of their exposure. This shows that even though a large share of companies engages in currency hedging, the hedging is only partial. Hedging appears to be aimed at reducing - and not eliminating - exchange rate risk.

Chart 6 shows the degree to which companies hedge net assets in foreign currency. The picture here is clearer: a total of 64 per cent do not hedge net assets in foreign currency, which corresponds with the high degree of natural hedging for assets and liabilities in foreign currency.

5.3 Currency derivatives usage in Norwegian companies

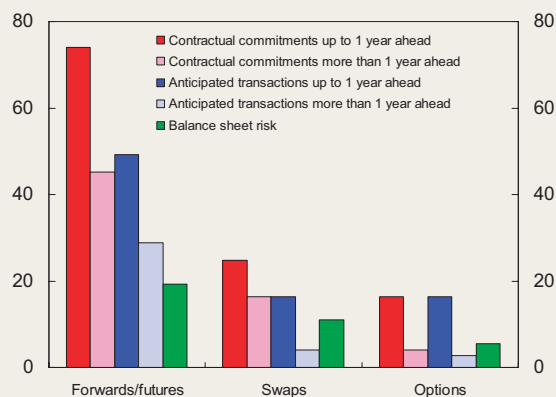
Companies typically use derivatives to hedge firm commitments and anticipated transactions. Chart 7 shows

Chart 6 Share of net assets in foreign currency that is hedged



Distribution of percentage share of net assets in hedged foreign currency.
A total of 89 respondents answered this question.

Chart 7 Distribution of derivative use and purpose



Percentage share of all derivatives users that use different derivatives, by type of underlying risk.

the use of different types of derivatives by hedging purpose. Use of options is still considerably lower than forward exchange contracts, but the market is growing.

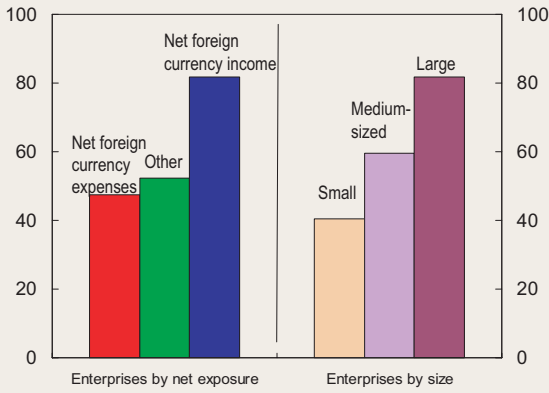
Some components are hedged to a further extent than others, for example, balance sheets are hedged less than transactions. A key observation is that derivatives usage increases when exposure is contract-related or short-term (up to one year). Companies intuitively want to know what currency exposure they will actually have before hedging. If not, they may risk that the hedging instrument (for example, a forward agreement) actually increases their exposure rather than hedging an underlying exposure. This induces companies to hedge firm commitments rather than expected exposure, which also entails a preference for short-termism, as companies as a rule will have a better overview of exposure in the short term than the long term. Different factors, such as the degree of uncertainty associated with customer relations, may be of considerable importance to a company's choice of time horizon.

Chart 8 shows that the share of companies using currency derivatives increases in line with the size of the company, as also seen in all international empirical studies. The existence of economies of scale in derivatives usage is often given as an explanation. In this connection, it is interesting to note that medium-sized and small companies report that they invoice foreign customers in NOK to a much greater extent than large companies. In this way, the smaller companies seem to adjust to disadvantages of scale by transferring the exchange rate risk to their trading partners.

Another factor that appears to influence derivatives usage is net currency exposure. In Chart 8, companies are divided into three categories on the basis of their net currency exposure. The chart shows that companies with net income in foreign currency use currency derivatives to a greater extent than other companies. Even when adjusted for size, this difference is considerable⁵.

⁵ Small, medium-sized and large businesses are evenly distributed in all categories of exposure, with a slight predominance of large companies in the category with net income in foreign currency. However, this predominance is too small to explain the major difference in derivatives usage between such companies and other companies.

Chart 8 Use of derivatives by net exposure and size. Per cent



Share of companies using derivatives by category of company. Firms in the category "net foreign currency expenses" have higher expenses than income in foreign currency. The opposite applies in the category "net foreign currency income". In the distribution by size, a third of the sample has a turnover of under NOK 150 million. These companies are described as small companies. A third of the sample companies have a turnover in excess of NOK 500 million and are called large. The last third are medium-sized companies.

The hedging rate also increases in line with the degree of net exposure in companies with net income in foreign currency. This means that the more net income in foreign currency a company has, the greater is their tendency to use derivatives, and the greater the share of net income in foreign currency that will be hedged. These companies limit the effect of exchange rate fluctuations in an intuitive way. The greater the exposure, the more they hedge. On the other hand, companies with net expenses in foreign currency tend to use derivatives to a lesser extent than companies with net income in foreign currency and other companies in general, despite the fact that the latter have lower net foreign exchange exposure. One reason for this could be that competition is lower in import markets so that changes in the exchange rate can to a greater extent be transferred to customers. If that is the case, the need for currency hedging among companies would be lower. Companies can then use the possibility of adjusting price lists as their currency hedging strategy.

In the survey, companies were also asked indicate the time horizon of their hedging. Chart 9 shows that 12 per cent of the companies using currency derivatives have contracts with maturities of over 3 years, whereas 44 per cent have contracts with maturities between 1 to 3 years, but for most of these companies, such contracts only account for a small share of their total derivatives holdings. Even though the figures in themselves show that the number of long-term currency derivatives is limited, they are considerably higher than turnover figures for the Norwegian market for currency derivatives. BIS (2004) shows that of all the currency derivatives sold by Norwegian financial institutions to non-financial companies, derivatives with a maturity of over one year

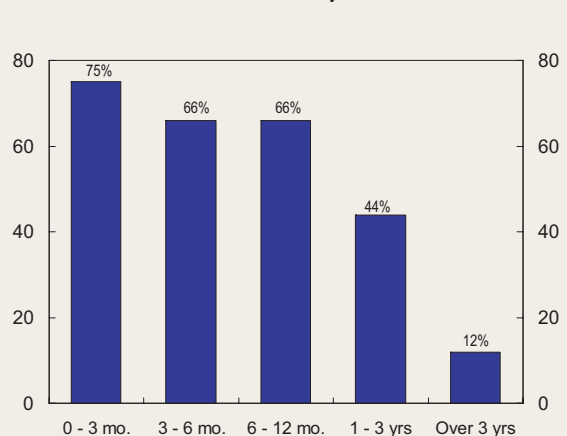
account for only 1 per cent of turnover value. The reason for this difference is probably that the share of large companies included in the BIS survey is considerably larger than for the Norwegian corporate sector as a whole. Moreover, in our survey there is a predominance of shipping firms and companies in the power sector among users of long-term derivatives. It is possible that these companies also use foreign financial institutions when they buy currency derivatives, which are not included in the data for the Norwegian market.

On the other hand, most companies use short-term derivatives contracts (with maturity of up to one year). For 18 per cent of all derivative users, short-term contracts account for more than 75 per cent of their total derivatives holdings. Companies targeting the consumer segment of the market dominate among those who are the main users of short-term derivatives.

Overall, the Norwegian data show that currency derivatives usage is focused on short-term hedging. In an attempt to elucidate why the use of long-term currency derivatives is so limited, companies were asked to respond to a number of statements regarding barriers to and motivations for long-term hedging and derivatives usage. The companies had to give each statement a score to the extent that it applied to them. Table 3 shows the distribution of respondents for each alternative answer.

The responses show that the market environment for using long-term currency derivatives is regarded as satisfactory. Relatively few companies think that banks' prices are too high or that the collateral requirement is too strict. However, a few companies do think that the use of currency derivatives is complicated with regard to accounting practices. At the time that the survey was carried out, it was still unclear whether the new accounting standard IAS 39 for assessing derivatives would be implemented in the EU, but the survey does show that existing Norwegian accounting standards in this area are not seen to be a barrier. Most companies report that they

Chart 9 Correlation between maturity and derivatives use



Percentage share of all derivatives users that use derivatives with different maturities. One respondent could tick several answers.

Table 3. Views on long-term foreign exchange derivatives

To what extent do the following statements apply to your company?	Percentage share of response on scale from 1 to 5 (1=strongly disagree; 5=strongly agree)					
	1	2	3	4	5	Don't know
Long-term currency derivatives are not offered to the company	50%	7%	7%	5%	21%	11%
Long-term FX exposure cannot be hedged using derivatives	45%	14%	13%	10%	7%	12%
The company does not prioritise hedging long-term exchange rate risk	31%	15%	18%	12%	18%	7%
Accounting practices for currency derivatives make them difficult to use	48%	18%	12%	6%	6%	10%
Bank prices for long-term currency derivatives (price, spread or premium) are too high	30%	19%	20%	13%	8%	11%
Banks require credit assurance for long-term currency derivatives which makes them difficult to use	41%	22%	15%	7%	5%	11%

are offered long-term derivatives contracts, but the respondents are divided on this point, with 21 per cent answering that they were generally not offered such contracts. One reason for the discrepancy here in relation to the other statements may be that such contracts are not marketed to customers if the bank already knows that the customer does not satisfy the collateral requirement. However, none of these supply-side factors and requirements seem to explain why currency derivatives with maturity of more than one year are used on such a limited scale. It is therefore interesting to note that so many companies, in relative terms, respond that they do not place emphasis on long-term exchange rate risk to a moderate or great extent.

5.4 Hedging practices

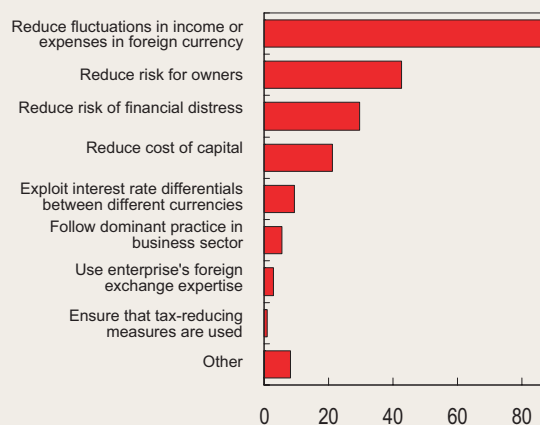
One advantage of using questionnaires is that it allows questions of a more subjective nature, which can be used to give more qualitative answers regarding hedging practices. The Norwegian survey therefore included a number of questions on companies' actual hedging practices. Several of the questions were motivated by existing hypotheses and some of the most interesting findings are presented below.

Companies were asked directly why they hedged exchange rate risk. Chart 10 summarises the responses. As many as 86 per cent say they hedge in order to reduce fluctuations in income and expenses in foreign currency. This underlines the fact that exchange rate risk is deemed to be important, which is further confirmed by the fact that 30 per cent of companies prioritise reducing the risk of financial distress. Liquidity problems were mentioned in the survey as an example of this. The result means that nearly one in three companies believe that foreign exchange fluctuations influence them to the extent that they may risk payment problems - and thus in the worst case, insolvency – if exchange rate move-

ments are unfavourable. Reducing the owners' risk is a motive for 43 per cent of the companies. This implies that many companies believe that exchange rate risk is important to owners and that companies think they are more able to hedge this kind of risk than the shareholders are, for example, by means of diversification.

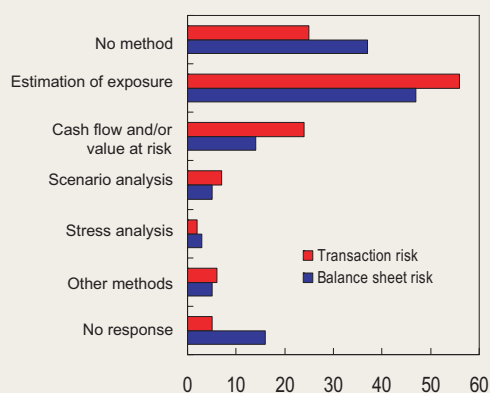
A total of 21 per cent of companies are seeking to reduce capital expenses. In many cases, reducing the owners' risk will result in lower capital expenses, if there is a risk premium. In addition, the reduced risk of liquidity problems also diminishes the likelihood of defaulting on loans and could thus help to reduce borrowing costs. Lower capital expenses are therefore an indirect effect of currency hedging.

Very few reasons other than reducing risk are given as motives for using currency derivatives. Only 3 per cent of the companies want to exploit their foreign exchange expertise for speculation and profit purposes and only 9 per cent seek to exploit interest rate differentials between different currencies. One company in the sam-

Chart 10 Motives for currency hedging

Percentage share that ticked the different answers. It was possible to tick more than one answer.

Chart 11 Methods for assessing risk



ple was motivated by the fact that tax-reducing items (such as loss carry-forwards) could be used. Simply following the prevailing practice in the sector was the motivation for only a few companies.

In order to find out in more detail how aware companies are of their foreign exchange exposure, the companies were asked if they had a foreign exchange strategy. A total of 70 per cent of the companies in the survey said that they had a foreign exchange strategy, of which 74 per cent had been approved by the board and 20 per cent had been approved by management. Only 6 per cent of companies with a foreign exchange strategy had not had it approved by a more senior body than the finance department. Even though the content of these foreign exchange strategies was not specified in the survey, this indicates that the companies are well aware of their foreign exchange exposure.

Another way of gauging how active companies are in relation to risk is to look at the methods used for assessing exchange rate risk. Chart 11 shows which methods companies use for measuring exchange rate risk. Only 25 per cent said that they did not use an explicit method for assessing their transaction risk. This means that more companies used currency hedging than those that had a method for measuring exchange rate risk. Roughly half of the companies responded that they estimated their exposure. This alternative captures widely varying measurement methods, from simple calculations to sophisticated methods. Of the more established risk measures, Value at Risk and/or Cash Flow at Risk were used by 24 per cent of the companies to assess transaction risk and by 14 per cent to assess balance sheet risk. A minority of companies used other methods.⁶

The results indicate that many companies adhere to simpler measurement methods to assess exchange rate risk. Simple methods may not only be one of the reasons why time horizons for currency hedging are relatively short, they may also be an attendant consequence. It is

easier to keep an overview of short-term exposure, which places fewer demands on measuring. The most extreme consequence would be that if a company only hedges firm commitments, measuring instruments would not be necessary. The lack of measurement methods may then become a barrier to using long-term currency hedging. At the same time, it is important to point out that not all strategies and forms of hedging require the use of sophisticated measurement methods. It is therefore difficult to assess the results definitively without knowing more about the strategies used. Overall, it should be emphasised that the share of companies that do not use any method is relatively low. One conclusion is that the companies that responded to the questionnaire have an active attitude to currency risk.

The same instruments that are used for hedging can also be used for speculation. Only a small minority of the companies, 3-4 per cent, said that they used currency derivatives for profit and speculation purposes. A small number of companies indicated that they on occasion take on more risk than they would otherwise have done if they were not covered. With the exception of this minority, the survey shows that currency hedging and currency derivatives are used to reduce foreign exchange exposure and currency risk. Moreover, one in three companies state that their hedging practices involve making decisions based on exchange rate expectations and on whether the exchange rate is overvalued or undervalued. In 60 per cent of the cases where the company has a foreign exchange strategy, the strategy allows the company to have such an opinion on exchange rate movements. This indicates that in a number of companies, currency hedging is implemented not only to reduce risk, but also to achieve gains from changes in the exchange rate. The survey does not provide information on the extent to which the companies succeed in earning money in this way.

The survey also included a question about the extent to which sector standards are an important factor in companies' currency hedging. The reason for this question is that if all companies in a sector hedged their foreign exchange exposure in the same way, the effect of changes in the exchange rate would be the same for all companies. This type of mechanism would be particularly relevant to import markets and could help to explain why companies with net expenses in foreign currency use currency derivatives less than other companies. The survey results lend little support to this hypothesis. Very few companies responded that sector standards have influenced their currency hedging. It is particularly interesting to note how many companies say that they do not know the answer to this question. A prerequisite for adjusting to sector standards is familiarity with these practices. There is no clear pattern among the companies that did answer that they were motivated by and had adjusted to practices within their sector.

⁶ Value at Risk and Cash Flow at Risk are both "downside measures" of risk. Value at Risk is calculated for a portfolio of assets by looking at what the portfolio's maximum loss in value would be for given time horizons and probabilities. Cash Flow at Risk is a similar measure for a company's cash flows. A scenario analysis is carried out by selecting a set of probable "scenarios" for the variables that are being measured for exposure and then looking at how these scenarios effect the company's value. Stress analysis focuses more on "worst case" scenarios.

Table 4 . Views on currency hedging practices

Enterprise's actual currency hedging practice entails that ...	Percentage share of responses on scale from 1 to 5 (1=strongly disagree; 5=strongly agree)					
	1	2	3	4	5	Don't know
... the enterprise is not concerned about which direction the exchange rate is moving in or whether it is over or undervalued	18%	17%	18%	25%	19%	3%
... the enterprise sometimes takes on more risk that it would otherwise if it was not covered	38%	23%	16%	14%	4%	5%
... the enterprise always hedges an agreed share of net cash flow in foreign currency	29%	11%	15%	22%	20%	3%
... the enterprise's short-term exchange rate risk (up to one year) is always limited to a recognised maximum value	30%	17%	17%	20%	11%	6%
...the enterprise's hedging practice entails an adjustment to the practices in the sector as a whole	28%	13%	17%	6%	4%	33%

However, there is uncertainty attached to the results on this point as the number of responses was negligible. One possible source of error is the interpretation of the word sector, as this has been left to the respondent's interpretation.

The survey also asked whether the companies used two simple hedging techniques. The first technique implies that the company's short-term currency risk (up to one year) is limited at any given time to a recognised maximum value. The other technique involves the company always hedging a given share of net cash flows in foreign currency. The distribution in Table 4 shows that hedging a fixed share of net cash flows is a more widely used technique than limiting maximum risk. However, in both cases, it seems that around 30 per cent of the companies only use the technique to a very limited extent. This shows that neither technique is used by all companies, but that each one is used by some.

As may be recalled from the theoretical presentation,

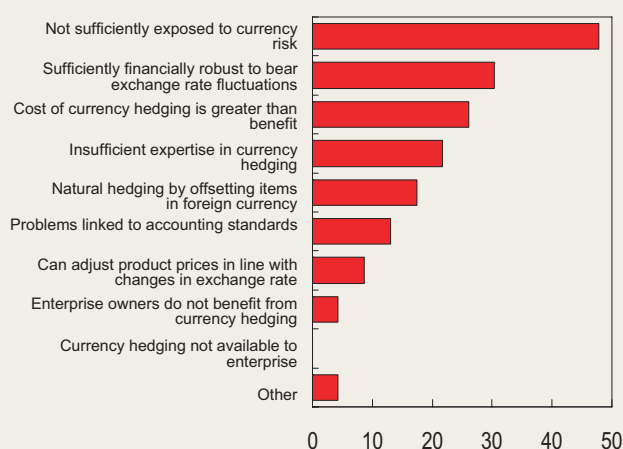
companies are entirely free to refrain from hedging. Chart 12 gives an overview of responses to the question of why the company does not use currency hedging. Given the companies that answered the question, currency hedging must be interpreted to mean currency derivatives usage. Only 23 companies answered the question and the results must therefore be interpreted with caution. However, two patterns clearly emerge. First, the most common reason for not hedging is that the risk is not deemed to be great enough or important enough. And second, it is obvious that the market environment for using currency hedging is not seen to be of any concern.

6 Conclusion

The most important conclusions of the Norwegian survey are:

- The results that are comparable with international surveys show that Norway is on a par with the rest of the world.
- Nearly all companies with foreign exchange exposure use one or more forms of currency hedging. Derivatives are the most common form of currency hedging, but forms of natural hedging are also widely used. Most companies use several techniques.
- Companies that do not use currency hedging indicate that this is primarily because they have little exposure or because the company is sufficiently financially robust to cope with foreign exchange fluctuations.
- The companies that responded appear to approach exchange rate risk and hedging in a systematic and active way. Most companies have a foreign exchange strategy that has been approved by the management or the board. A large share of companies seek to measure their foreign exchange exposure.
- Derivatives usage is higher among larger companies.
- Companies with net income in foreign currency use

Chart 12 Reasons for not hedging. Per cent



Percentage share of respondents.
A total of 23 respondents indicated why they did not use currency hedging.

currency derivatives to a greater extent, whereas companies with net expenses in foreign currency use currency derivatives to a lesser extent.

- The use of currency derivatives is to a large extent geared towards short-term hedging. Beyond the scope of natural hedging techniques - which also have a long-term effect – the companies are vulnerable to long-term trends in the exchange rate. The survey cannot rule out the possibility that the companies have an active awareness of how such trends might affect their competitive situation, but there is a risk that short-term focus on hedging may overshadow long-term, strategic exposures.

However, readers are reminded that the response rate to the survey was 37 per cent and that our conclusions are drawn on the assumption that those companies that did respond are representative of the sample.

Bibliography

- Alkebäck, Per & Niclas Hagelin (1999): "Derivatives usage by nonfinancial firms in Sweden with an international comparison", *Journal of International Financial Management and Accounting*, 10(2): 105–120
- Bartram, Söhnke M., Gregory W. Brown & Frank R. Fehle (2003): International evidence on financial derivatives usage. *Working Paper*, University of North Carolina
- BIS (2004): "Triennial central bank survey of foreign exchange and derivatives market activity in April 2004. Preliminary global results." Bank for International Settlements *Working Paper*. www.bis.org
- Bodnar, Gordon M., Abe de Jong, & Victor Macrae (2003): "The impact of institutional differences on derivatives usage. A comparative study of US and Dutch firms", *European Financial Management*, 9(3): 271–297
- Bodnar, Gordon M. & Günther Gebhardt (1999): "Derivatives usage in risk management by US and German non-financial firms: A comparative survey", *Journal of International Financial Management and Accounting*, 10(3): 153–187
- Bodnar, Gordon M., Richard C. Marston & Greg Hayt (1996): "1995 survey of financial risk management by US non-financial firms", *Financial Management*, 25: 113–133
- Bodnar, Gordon M., Richard C. Marston & Greg Hayt (1998): "1998 survey of financial risk management by US non-financial firms", *Financial Management*, 27(4): 70–91
- DeCeuster, Marc J.K., Edward Durinck, Eddy Laveren & Jozef Lodewyckx (2000): A survey into the use of derivatives by large non-financial firms operating in Belgium. *European Financial Management*, 6(3): 301–318
- Géczy, Christopher, Bernadette Minton & Catherine Schrand (1997): "Why firms use currency derivatives", *Journal of Finance*, LII(4): 1323–1354
- Hakkarainen, Antti, Nathan Joseph, Eero Kasanen & Vesa Puttonen (1998): "The foreign exchange exposure management practices of Finnish industrial firms", *Journal of International Financial Management and Accounting*, 9(1): 34–57
- Korsvold, Pål (2000): *Valutastyring* (Currency management). Cappelen Akademisk Forlag, 2nd edition
- Loderer, Claudio & Karl Pichler (2000): "Firms, do you know your currency risk exposure? Survey results", *Journal of Empirical Finance*, 7: 317–344.
- Norges Bank (2004): *Norske finansmarkeder – pengepolitikk og finansiell stabilitet* (Norwegian financial markets – monetary policy and financial stability). *Norges Bank Occasional Papers* No. 34. Oslo 2004
- Sercu, Piet & Raman Uppal (1995): *International Financial Markets and the Firm*. South-Western/Chapman & Hall
- Stulz, René (2003): *Risk Management and Derivatives*. South-Western College Publishing
- Wettre, Sigbjørn & Anders Borgersen (2005): "Undersøkelse av valuta og derivatmarkedene i 2004: Sterk vekst i det norske rentederivatmarkedet", *Penger og Kreditt* No. 1/05 (Norwegian only)