國立雲林科技大學
95 學年度博士班招生入學考試試題

系所別：財務金融系、管理研究所
科　目：統計學

1. An economist believes that during periods of high economic growth, the U.S. dollar appreciates with probability 0.70; in periods of moderate economic growth, the dollar appreciates with probability 0.40; and during periods of low economic growth, the dollar appreciates with probability 0.20. During any period of time, the probability of high economic growth is 0.30, the probability of moderate economic growth is 0.50, and the probability of low economic growth is 0.20. Suppose the dollar has been appreciating the present period. What is the probability we are experiencing a period of high economic growth? _____. (10 points)

2. One of the problems that insider trading supposedly causes is unnaturally high stock price volatility. When insiders rush to buy a stock they believe will increase in price, the buying pressure causes the stock price to rise faster than under usual conditions. Then, when insiders dump their holdings to realize quick gains, the stock price dips fast. Price volatility can be measured as the variance of prices.
An economist wants to study the effect of the insider trading scandal and ensuing legislation on the volatility of the price of a certain stock. The economist collects price data for the stock during the period before the event (interception and prosecution of insider traders) and after the event. The economist makes the assumptions that prices are approximately normally distributed and that the two price data sets may be considered independent random samples from the populations of prices before and after the event. Suppose that the economist wants to test whether the event has decreased the variance of prices of stock. The 25 daily stock prices before the event give $S_1^2 = 9.3$ (dollars squared), and the 24 stock prices after the event give $S_2^2 = 3.0$ (dollars squared).

[1] Write down the null hypothesis H_0: _____. (5 points)
[2] Calculate the value of the test statistic with the information provided above. _____. (5 points)

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3. A sample of size 10 is given below. We are to choose three different numbers form which the deviations are to be taken. The first number is to be used for the first five sample points; the second number is to be used for the next three sample points; and the third number is to be used for the last two sample points.

sample	1	2	3	4	5	6	7	8	9	10
value	93	97	60	72	96	83	59	66	88	53

[1] What three numbers should we choose to minimize SSD (sum of squared deviations)? _____.(5 points)

[2] What is the df (degrees of freedom) for the calculated SSD? _____. (5 points)

4. A certain university held a meeting of administrators and faculty members to discuss some important issues of concern to both groups. Out of eight members, two were faculty, and both were missing from the meeting. If two members are absent, what is the probability that they should be the two faculty members? _____. (10 points)

5. A large shipment of computer chips is known to contain 10% defective chips. If 100 chips are randomly selected, use Chebyshev's theorem to give bounds such that there is at least 0.75 chance that the number of defective ships will be within the two bounds. _____. (10 points)

6. Suppose that X and Y are continuous random variables with the joint probability density function

$$f(x,y)=\begin{cases} k(1-x)(2-y) & \text{for } 0\le x\le 1, 0\le y\le 2 \\ 0 & \text{otherwise} \end{cases}$$

(a) Find E(X) and E(Y) and cov(X,Y) (5 points)

(b) Find the Marginal density of X and Y. (5 points)

7. Suppose that $\hat{\alpha}$ is an estimator of α derived from a sample of size T. We are given that $E(\hat{\alpha})=\alpha+2/T$ and $var(\hat{\alpha})=(4\alpha/T)+(\alpha^2/T^2)$

(a) Examine whether, as an estimator of α, $\hat{\alpha}$ is (1) unbiased, (2) consistent (5 points)

(b) What is the asymptotic variance of $\hat{\alpha}$? (5 points)

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8. An instructor wishes to "grade on the curve." The students' scores seem to be normally distributed with mean 70 and standard deviation 8. If the instructor wishes to give 20% A's, what should be the dividing line between an A grade and a B grade? (10 points)

9. Given that $y = e^x$ is normal with mean 2 and variance 4, find the mean and variance of x. (10 points)

10. Since the variance of the regression coefficient $\hat{\beta}$ varies inversely with the variance of x, it is often suggested that we should drop all the observations in the middle range of x and use only the extreme observations on x in the calculation of $\hat{\beta}$. Is this a desirable procedure? Explain. (10 points)

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國立雲林科技大學　財務金融學系
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財務管理

1. The value of financial asset is investor's major concern. Please describe the valuation models for the following assets including terms and explanations.
   (a) Bond (20 points)
   (b) Stock (20 points)

2. Please read the paper of Pramborg (2005) and answer the following questions:
   (a) According to the article, please find three prespecified objectives for hedging FX exposure and explain the difference between Korean and Swedish. (30% points). ** Write this answer in English**.
   (b) Assuming that you are asked to do an extended research project after reading Pramborg (2005) paper, please write down your project content including the title, motivation and other description. (30% points)

Bengt Pramborg*

1. Introduction

This paper uses survey evidence to compare Swedish and Korean firms' foreign exchange risk management practices. This is of interest because, as Lel's (2003) findings suggest, country-level and internal corporate governance structures and a country's degree of financial market development influence the hedging decisions of corporations. Notably, La Porta et al. (1998) reported that Korea lags Sweden in terms of law enforcement, antidirector rights, cash-flow rights, and accounting standards. These differences may cause Korean and Swedish firms to adopt different hedging policies and practices; by studying these, we may improve our understanding of firms' risk management practices.

Several methods are available for managing foreign exchange exposure, including the use of financial derivatives such as forward contracts and currency options, foreign-denominated debt, and internal methods such as leading and lagging. Prior survey evidence pertaining to hedging primarily focused on the use of derivatives by firms in local markets,[1] while a few studies, notably those of Berkman et al. (1997), Alkebäck and Hagelin (1999), Bodnar and Gebhardt (1999), Sheedy (2001), and Bodnar et al. (2003), also compared derivatives use between countries. Recent studies have presented survey evidence pertaining to other hedging techniques, such as the use of foreign-denominated debt and internal hedging techniques. Such studies include those of Hakkarainen et al. (1998), who surveyed Finnish firms; Joseph (2000), who analyzed British firms; Marshall (2000), who analyzed regional differences between Asia-Pacific and Western multinational corporations (MNCs); and Allayannis et al. (2003), who investigated the hedging practices of East Asian firms during the recent East Asian financial crisis.

This paper adds to existing research by analyzing country differences in foreign exchange risk-management practices between Swedish and Korean firms. The focus is on descriptive data comparing hedging practices; these data are complemented by direct tests in order to investigate the potential of firm characteristics to explain differences. Korea and Sweden are both export-oriented countries, heavily dependent on foreign trade, suggesting that their markets would be suitable for this type of study. The countries' markets differ in other ways, such as their stage of economic and financial development. While Swedish derivatives markets are well developed, comparable Korean markets have been heavily regulated until very recently; this may have reduced firms access to, and consequently, knowledge of derivative instruments.

Use of derivatives and other hedging techniques are investigated, using survey evidence pertaining to the foreign exchange exposure and hedging practices of 163 firms in the two countries that replied to a survey distributed in September 2000. In contrast to Marshall (2000), who investigated only large multinational corporations, we sent our survey to all nonfinancial firms listed on the major stock exchange in each country. In view of the findings of Lel (2003) and Bartram et al. (2003), this is an important difference. Lel (2003) investigated large, international firms listed via ADRs in the US and found that country-specific factors were relatively more important than firm-specific factors in explaining the probability of hedging. Bartram et al. (2003) used a larger sample including smaller firms and found that firm-specific factors were relatively more important than country-specific factors. The survey procedure used in our research produced a representative sample of both large and small firms in Korea and Sweden, which may enhance our general understanding of firms' hedging practices.

Our findings suggest that while there are similarities between the hedging practices of firms in the two countries, there are notable differences as well. Firms in both countries

were equally likely to decide to hedge foreign exchange exposure, this decision being dependent of level of exposure and firm size. However, the aim of hedging activities differed. Korean firms were more likely to focus on minimizing fluctuations of cash flow rather than accounting earnings, while Swedish firms were more likely to focus on accounting numbers. This is in line with the findings of Alkebäck and Hagelin (1999) and Alkebäck et al. (in press) concerning Swedish firms. Perhaps our most striking finding is that the proportion of firms that used derivatives was significantly lower in the Korean than in the Swedish sample. This could not be accounted for by firm characteristics such as foreign exchange exposure, size, liquidity, or leverage. A possible explanation for this difference is that derivatives markets in Korea have been heavily regulated until very recently, which would support the finding of Lel (2003) that the degree of financial market development influences hedging policies. In line with this, Korean firms were more likely to use foreign-denominated debt and used it more extensively than did Swedish firms, suggesting a substitution effect. Furthermore, Korean firms were less rigorous in monitoring their risk exposure positions than were Swedish firms. This is in accordance with the findings of Sheedy (2001) and suggests that Asian firms lag Western firms in this regard. An absolute majority of firms in both countries used a profit-based approach to evaluate the risk management function. This contradicts theoretical assumptions and adds to the findings of Bodnar et al. (1998) and Sheedy (2001).

The paper is organized as follows: Section 2 presents prior research, Section 3 presents the sample description and variable definitions, Section 4 presents the empirical results, and Section 5 concludes the report. Throughout the paper, the findings are compared with evidence from other studies wherever possible.

2. Prior survey evidence

Prior survey evidence pertaining to regional and country differences in hedging practices has revealed significant differences in terms of hedging practices between US and New Zealand firms (Berkman et al., 1997), between US and Swedish firms (Alkebäck and Hagelin, 1999), between US and German firms (Bodnar and Gebhardt, 1999), between large MNCs in the Asia-Pacific region and in the US and the UK (Marshall, 2000), between US firms and firms in Hong Kong and Singapore (Sheedy, 2001), and between Dutch and US firms (Bodnar et al., 2003).

Berkman et al. (1997) and Alkebäck and Hagelin (1999) found similar differences in the hedging practices of New Zealand and Swedish firms as compared to firms in the US. The evidence presented in these studies shows a positive relationship between firm size and derivatives use in all markets, suggesting that there are economies of scale in the use of derivatives. Furthermore, the use of foreign exchange (FX) derivatives was more common than the use of interest rate derivatives, commodity derivatives, and equity derivatives in all three countries, which underlines the relative importance of FX exposure to firms in most countries. The use of FX derivatives was more common in New Zealand and Sweden than in the US, possibly because of the relative size and international dependency of these markets.

Bodnar and Gebhardt (1999) provided evidence suggesting that German firms were more likely than US firms to use derivatives. They were also more comfortable with derivatives use, indicating significantly less concern about issues related to derivatives than is the case in US firms. It was suggested that this might stem from the German firms' consistently stricter policies governing the control and monitoring of derivatives use within the firm. Alkebäck and Hagelin (1999) produced similar results when comparing their Swedish sample to the US sample of Bodnar et al. (1996).

Marshall (2000) investigated the FX hedging practices of MNCs in the Asia Pacific region, the US, and the UK and found similarities as well as differences among MNCs from the different regions. The MNCs were similar in their use of internal hedging techniques, but there were differences between the Asia Pacific MNCs and those from the other regions in terms of the emphasis on FX risk management. FX risk management was found to be significantly more important for the Asia Pacific MNCs than for MNCs from the US and the UK, and the author suggested that this might be explained by the Asian financial crisis.

Sheedy (2001) surveyed firms in Hong Kong and Singapore and compared their derivatives use to that of US firms. She found that a higher proportion of the Asian firms studied used derivatives than did the US firms, and moreover, that they did so with greater frequency. The evidence suggested that the Asian firms exercised less rigorous oversight of derivatives use than did the US firms, indicated partly by a lower proportion of firms that had a set schedule for evaluating derivatives positions.

3. Sample description and variable definitions

The data for this study were collected through a survey. In September 2000, a questionnaire was sent to Korean and Swedish nonfinancial firms (excluding utilities). Three hundred and eighty-seven Korean firms listed on the Korean Stock Exchange and 250 Swedish firms listed on the Swedish Stock Exchange received the questionnaire, which was sent in either a Korean or Swedish version as appropriate to increase the response rate. In January 2001, a reminder was sent to firms that did not respond to the first mailing. A total of 163 responses were received, 60 from Korean firms and 103 from Swedish firms. This represents a total response rate of 26%: 16% for the Korean and 41% for the Swedish sample. To check for response bias, responding firms were compared with those that did not respond to the survey, and the result suggested that the sample is unbiased (see Appendix A).

The use of a survey was necessary since information on firms' exposures and hedging practices is not publicly available. One caveat to bear in mind is that, although the information provided is unique and may provide important insights, surveys have several general shortcomings, such as the risk that survey subjects may give inaccurate or dishonest responses. In addition, because in our case the respondents are from two different countries with different cultures and languages, there is the additional problem of how respondents interpret the questions from Korean- and Swedish-language versions of the questionnaires. Firms operate under business conditions that differ in many respects between these two countries, and it should be noted that this survey, like other similar

surveys, can only document a limited set of characteristics and differences. It should be taken into account that other not included variables could add to, or explain, some of the results.

The questionnaire contained questions regarding (1) the respondent's exposure to foreign exchange rates and whether the respondent firm hedges; (2) the respondent's use of foreign currency derivatives (types of instruments, frequency of use, concerns); (3) the respondent's use of other foreign exchange risk management methods (foreign debt, internal techniques); and (4) the respondent's control and reporting procedures (decision-making process, evaluation).[2] Our decision to focus on only one type of exposure—FX exposure—and the hedging of this exposure has the downside that possible correlations with the hedging of other exposures are ignored. However, one important benefit is that the survey is kept shorter, possibly improving response rates and allowing for a deeper analysis of one exposure.

Summary statistics pertaining to the FX exposure of the sampled Swedish and Korean firms are shown in Table 1, panel (A). Swedish firms are characterized by higher levels of FX exposure for revenues, costs, and net assets as compared to Korean firms, although the percentage of firms with FX exposure is similar for each category. Also, the percentage of firms that indicated no exposure is similar in both countries. Furthermore, as can be seen in panel (B), larger proportions of Korean firms hedged, used foreign debt, and used internal methods, but these differences are not significant at a 10% level. However, the proportion of Korean firms that used derivatives was significantly lower.

Reported differences, or the lack of such, may result from firm characteristics, differences between national markets, or a combination of the two factors. This is investigated further using logit regressions, as was done by Géczy et al. (1997), including firm characteristics as control variables. The dependent variables are decision variables representing firms' decisions regarding hedging policy and choice of instruments. Three decision variables are used, defined as follows:[3]

(a) *Hedging* (*H*), a dummy variable representing the decision to hedge. This variable is assigned a value of 1 in the case of a firm that hedged (using currency derivatives, foreign-denominated debt, internal methods, or a combination of the three) and 0 otherwise. All responding firms that indicated FX exposure are included in the analysis.

(b) *Currency derivatives* (*CD*), a dummy variable representing the decision to use currency derivatives to hedge. This variable is assigned a value of 1 in the case of a firm that used derivatives to hedge and 0 otherwise. Only firms that hedged are included in the analysis. Thus, this decision is defined as incremental to the decision to hedge.

(c) *Foreign debt* (*FD*), a dummy variable representing the decision to use foreign-denominated debt to hedge. This variable is assigned a value of 1 in the case of a

Table 1
Exposure and hedging practices

Panel (A) Exposure to foreign exchange rates

	Revenues	Costs	Net assets	Zero exposure
Sweden				
Mean	43.5	34.3	26.6	
Max	100	100	100	
3rd quartile	85	50	40	
Median	40	30	15	
1st quartile	5	10	0	
No. of firms exposed	74	78	64	15
Percentage of firms exposed	75	80	68	16
No. of answers	99	98	94	
Korea				
Mean	28.8	20.9	13.4	
Max	90	90	90	
3rd quartile	45	30	30	
Median	20	10	10	
1st quartile	10	10	0	
No. of firms exposed	49	47	38	8
Percentage of firms exposed	83	80	66	14
No. of answers	59	59	58	

Panel (B) Hedging practices

	Hedging	Derivatives	Foreign debt	Internal methods
Sweden				
Yes	54	44	37	44
No. of firms	88	54	52	51
Percentage	61	81	71	86
Korea				
Yes	38	21	33	37
No. of firms	52	41	39	40
Percentage	73	51	85	93
Total				
Yes	92	65	70	81
No. of firms	140	95	91	91
Percentage	66	68	77	89
Test for difference (p-value)	0.158	0.002	0.131	0.346

The table contains descriptive statistics for firms' foreign exchange exposure and hedging practices. Panel (A) presents the foreign exchange exposure of revenues, costs, and net assets for the sampled firms, where the exposure is calculated as the percentage of the total denominated in foreign currency. The last column presents the number and percentage of firms that had no exposure. "No. of firms exposed" represents the total number of firms with exposures of more than zero, "Percentage of firms exposed" is calculated as the percentage of responding firms with exposures of more than zero, and "No. of answers" is the total number of firms that answered each question. Panel (B) presents descriptive statistics for sample firms' hedging practices. For the first reporting column, "Yes" represents the number of firms that answered that they hedged, "No. of firms" represents the total number of firms that responded, while "Percentage" represents the proportion of responding firms that indicated that they hedged. The last row presents the p-value from a Pearson Chi-square test for country difference in the proportion of firms that hedged. Reporting columns 2 to 4 follow the same logic.

firm that used foreign-denominated debt to hedge and 0 otherwise. As for the variable *CD*, only firms that hedged were included in the analysis.

The explanatory variables for these regressions include a country dummy as well as proxies for FX exposure, size, growth opportunities, leverage, and liquidity. The reasons for including these variables and how proxies are defined are as follows (predicted signs for the model with dependent variable *H* appear in parentheses):

(i) *Country dummy*. This dummy measures the difference between the likelihood of finding a Swedish firm and that of finding a Korean firm that, for example, hedges, given that all other variables are controlled for. The dummy is set to 1 for Swedish and to 0 for Korean firms (±0).

(ii) *FX exposure*. It is expected that direct exposure to FX rates is positively related to the use of hedging instruments (see, e.g., Nance et al., 1993; Hagelin, 2003). The proxy for FX exposure is defined as the average of the share of total revenues and share of total costs that are denominated in foreign currency (+).[4]

(iii) *Size*. Empirical evidence suggests that economies of scale may influence the decision to use derivatives (see, e.g., Hagelin, 2003). This may carry over to this setting, as, for example, the implementation of a hedging program may be expected to exhibit economies of scale. The proxy for size is the logarithm of total revenues (+).[5]

(iv) *Growth opportunities*. Theoretical findings suggest that hedging reduces the incentive to underinvest (see Myers, 1977; Bessembinder, 1991). Because firms with more valuable growth opportunities are more likely to be affected by the underinvestment problem, these firms may be more likely to hedge. The proxy for growth opportunities is the book-to-market ratio. A lower value of this proxy variable suggests more valuable growth opportunities (−).

(v) *Leverage*. Hedging can reduce the variance of the value of the firm and thereby the expected cost of financial distress (see Smith and Stulz, 1985). Leverage can thus be hypothesized as positively related to hedging. The proxy for leverage is the book value of debt-to-equity ratio (+).

(vi) *Liquidity*. Hedging could increase the value of the firm by lowering the expected costs of financial distress (see Smith and Stulz, 1985). Nance et al. (1993) hypothesized that the probability of encountering financial distress may be reduced by maintaining more liquid assets, thereby reducing the need to hedge. The proxy for liquidity is the current ratio (−).

Data for creating the dependent and explanatory variables (i) and (ii) were taken from the survey responses. The financial data required to calculate explanatory variables (iii)–(vi) were collected from stock market guides: for the Korean firms from the Korea

Company Handbook (Asia-Pacific Infoserv, 2000) and for the Swedish firms from the Nordbankens Aktieguide (Delphi Economics, 2000). All financial variables were as of the beginning of year 2000.

In addition to the reported regressions, we also used alternative specifications which included industry dummies, with industries classified according to Bodnar et al. (1996), Berkman et al. (1997), and Alkebäck and Hagelin (1999). This did not change the results. Lel (2003) found that internal corporate governance structures influenced the hedging decision. Thus, it may be expected that the hedging practices of Korean chaebols (large conglomerates, such as Daewoo, Hyundai, and Samsung, usually dominated by a founding family) would differ from those of other firms (for studies on Korean chaebols see, e.g., Campbell and Keys, 2002; Ferris et al., 2001; Lim, 2001). Three different classification systems for chaebols were included: the classification system from Korea Listed Companies, 1999 (KLC), (Hyundai Securities), the classification system from the Korean Fair Trade Law (FTL; as used by Lim, 2001), and a more detailed classification system devised by Lim (2001). According to the classification system presented in KLC, 22 of the 60 surveyed Korean firms were chaebols, while according to the FTL system, only 14 of the 60 firms were chaebols.[6] The inclusion of dummy variables for chaebols did not change the results, but the small sample size means that no inference should be drawn from this inconclusive result. Further research is needed to determine possible differences in hedging behavior between chaebols and other firms.

4. Empirical results

This section presents the empirical results. The results of the three logit regressions, representing the decision variables discussed in Section 3, appear in Table 2. Before proceeding, a comment on the organization of this section is in order. Subsection 4.1 discusses various aspects of the hedging decision as represented by Model (2a) in Table 2. Subsection 4.2 presents findings regarding the use of derivatives and discusses Model (2b). Subsection 4.3 presents findings pertaining to foreign-denominated debt, represented by Model (2c), and internal hedging methods. Subsection 4.4, the last subsection, treats control and reporting procedures.

At least two shortcomings of the logit regression models in Table 2 should be noted. The first is that our classification of firms by means of dummy variables is crude. For example, the decision whether to hedge or not, represented by Model (2a), may conceal other relevant information, such as how much is hedged in each currency, whether or not exposures in various currencies are hedged, and how long the hedge horizon is. The second shortcoming is that the sample is small, especially for Models (2b) and (2c). Thus,

we should use caution when interpreting the regression results. However, it should be noted that various relevant information is provided by the surveys and presented in conjunction with the regression results, enriching the information concerning the regression results. Furthermore, the regressions are valuable in the sense that they indicate possible country effects that cannot be explained by the exposure of individual firms or other firm characteristics (included in the regressions).

4.1. Hedging

Model (2a) in Table 2 contains the dependent variable, H, which is set to 1 if a firm hedges and to 0 otherwise. The coefficients for size and exposure are both positive and statistically significant, suggesting that the decision to hedge FX exposure is strongly influenced by both the size of the firm and its FX exposure. This is in line with earlier studies that found support for economies of scale in the use of derivatives, which would translate in this setting into economies of scale in setting up a hedging program. Though the country dummy is negative, suggesting that Korean firms hedged more, it is not statistically significant; thus, the null hypothesis of no country effect cannot be rejected. Overall, the results are supported by the responses from firms that did not hedge. The nonhedgers were asked to rank the factors influencing their decision not to hedge (not reported). The responses suggest that insignificant FX exposure, difficulties in estimating the FX exposure, and the costs of setting up a hedging program were important determinants of the decision not to hedge for firms in both countries.

Firms that hedged were asked to rank three prespecified objectives for hedging FX exposure. The results suggest differences between Korean and Swedish firms, as displayed in Fig. 1. Korean firms hedged primarily to reduce cash flow volatility, while Swedish firms primarily hedged to reduce fluctuations in accounting earnings.

Korean firms ranked the latter alternative about as highly as did Swedish firms. The results can be compared to Berkman et al. (1997) and Bodnar and Gebhardt (1999), who found similar differences between New Zealand or German firms and US firms. US firms emphasized cash flows as well as earnings, while firms in New Zealand and Germany focused relatively more on earnings. Also, Marshall (2000) found that Asian MNCs, like German and New Zealand firms, largely focused on earnings.[7] Berkman et al. (1997) and Bodnar and Gebhardt (1999) argued that the differences may be attributed to differences in accounting regulations, where accounting rules in the non-US countries made a stronger link between accounting earnings and cash flows. This link is due to the comparatively strong connection between earnings, taxes, and dividend payments. Swedish accounting regulation is tax related and somewhat similar to German regulation (see Hung, 2001), while Korean accounting has, since the Asian crisis in 1997, been heavily influenced by US GAAP, which would support these

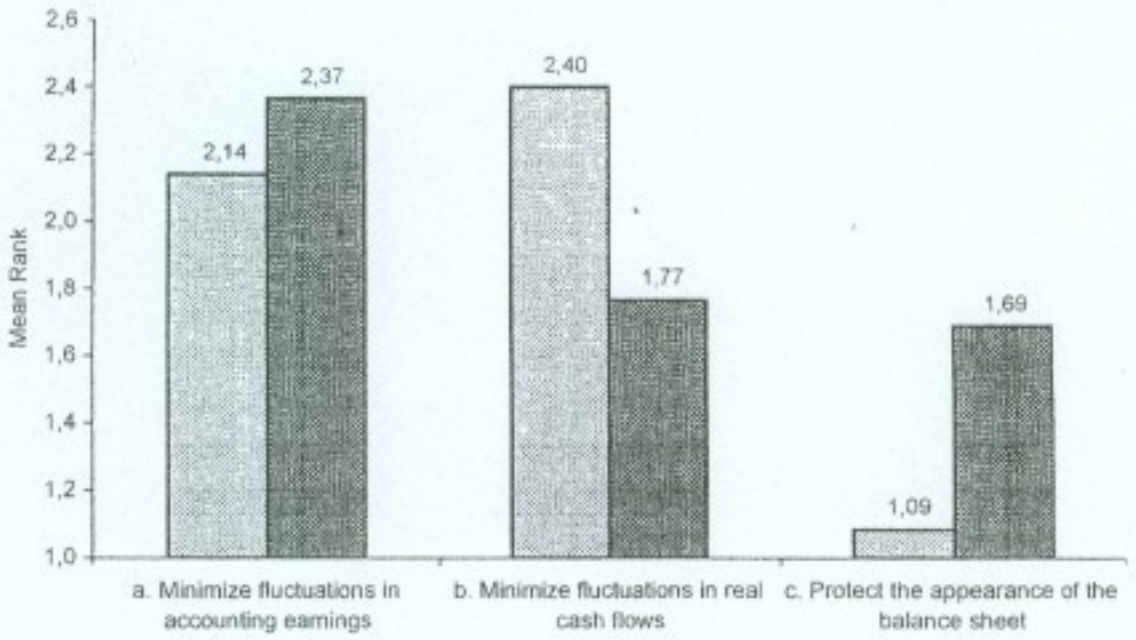

Fig. 1. Objectives of hedging. The figure displays the answers to a question where firms were asked to rank what they were trying to achieve by hedging. The possible ranks available were 3 = most important, 2 = next most important, 1 = least important, and 0 = not at all important. A total of 88 answers was obtained, of which 36 were from Korean and 52 were from Swedish firms. The vertical axis displays the mean rank calculated from the responses from Korean and Swedish firms, respectively.

arguments. However, La Porta et al. (1998) reported that Korean accounting standards lag Swedish standards considerably. Therefore, an alternative and perhaps more plausible explanation is that Korean firms focus on cash flows because earnings are manipulated extensively by, for example, backward accounting practices, and in the case of chaebols, the transfer of profits within these large conglomerates.[8] From Fig. 1, it is also evident that Swedish firms ranked hedging of the balance sheet as about as important as hedging cash flows, ranking it considerably higher than did Korean firms. As compared to firms in the US and Europe (Bodnar et al., 1998, 2003; Bodnar and Gebhardt, 1999), Swedish firms seem to focus relatively more on balance sheet hedging. This practice is not supported by theory since it is aimed at accounting numbers and not cash flows. However, if this hedging is a proxy for economic exposure (see Oxelheim and Wihlborg, 1997; Hagelin and Pramborg, 2004a) or if firms have loan covenants expressed in accounting ratios (see Hagelin and Pramborg, 2004b), such hedging may be rational.

4.2. Currency derivatives

4.2.1. The decision to use derivatives

Table 2, Model (2b), presents the results of a logit regression on the decision to use derivatives. The dependent variable is *CD*, a dummy that is set to 1 if a firm uses currency derivatives and to 0 otherwise. This model includes hedgers only, so the implicit assumption is that the choice to use derivatives is subsequent to the decision to hedge. It is suggested that derivatives use differs significantly between firms in the two countries, Swedish firms being more likely to use derivatives to hedge FX exposure than are Korean firms. Furthermore, firm size is positively related to the decision to use derivatives, confirming earlier findings that there are economies of scale in the use of derivatives.

This country difference may be due to a number of factors. It may partly be a consequence of the maturity of the two markets. The Swedish derivatives market was established relatively early on, when the options exchange began trading in 1986; in Korea, derivatives trading on exchanges began as recently as 1996 for stock index futures and 1997 for stock index options. The trading of FX derivatives in Korea began as recently as 1999, when the Korean Futures Exchange opened for trading in standardized USD futures and options. The longer history of the Swedish market suggests that Swedish firms

have more experience using these types of instruments. However, Korean firms have long been able to use, for example, nondelivered forwards in Singapore for their US dollar–won exposure, so this difference in experience may thus be of less significance. A related, and perhaps more important, reason for the difference between Korean and Swedish firms is that in Korea, OTC derivatives have until recently been heavily regulated by the authorities (due to the potential risk in derivative products, despite their positive economic role as risk-hedging instruments). This heavy regulation can be expected to have discouraged Korean firms from using derivatives. It was only in April 1999 that government regulation changed, freeing up derivatives trading.[9] If this interpretation of the country difference is correct, the relative reluctance of Korean firms to use derivatives may be a transitory phenomenon.

The above discussion is supported by the responses displayed in Table 3, regarding reasons for not using derivatives. This question asked firms to rank three of seven alternatives, assigning them the following values: 3 = most important, 2 = next most important, and 1 = least important. Panel (A) displays the percentages of firms that assigned each alternative a "top three" ranking. Panel (B) displays the mean rank of each alternative, where the results include only the responses of those firms that ranked the alternative among their top three reasons. Thus, the values in panel (B) could range from 1.00 (if all firms that ranked the alternative ranked it as least important) to 3.00 (if all firms that ranked the alternative ranked it as most important). The only significant difference between the countries is in their ranking of alternative (c), "Difficulty pricing and valuing derivatives," suggesting that Korean firms have relatively less experience with derivatives.

Table 2
Logit regressions on hedging variables

Model	Dependent variable		Country	Size	Liquidity	Growth	Leverage	Exposure	Pseudo R^2	Correctly predicted [%] (0/1)	No. observations total (0/1)
(2a)	*H*	Coeff.	−0.825	0.680	0.084	−0.259	−0.047	0.020	0.305	80	134
		Δ prob.	−0.188	0.155	0.019	−0.059	−0.011	0.005		(62/90)	(47/87)
		p-value	(0.160)	(0.000)	(0.496)	(0.216)	(0.539)	(0.036)			
(2b)	*CD*	Coeff.	1.336	0.675	−0.024	−0.179	−0.296	0.006	0.283	75	87
		Δ prob.	0.286	0.144	−0.005	−0.038	−0.063	0.001		(52/85)	(27/60)
		p-value	(0.078)	(0.001)	(0.931)	(0.576)	(0.274)	(0.597)			
(2c)	*FD*	Coeff.	−1.412	0.548	−0.219	−0.317	0.202	0.000	0.186	85	87
		Δ prob.	−0.250	0.097	−0.039	−0.056	0.036	0.000		(35/100)	(20/67)
		p-value	(0.102)	(0.007)	(0.516)	(0.295)	(0.532)	(0.986)			

The table reports results of logit regressions on variables representing hedging decisions. The dependent variable in Model (2a) is *H*, a dummy that has the value of one if a firm hedges and zero otherwise. The dependent variable in Model (2b) is *CD*, a dummy that has the value of one if a firm uses derivatives and zero otherwise. In Model (2c), the dependent variable is *FD*, a dummy that is set to one if a firm uses foreign debt to hedge. The independent variables are as follows: Country—a dummy set to one for Swedish firms; Size—the logarithm of total revenues; Liquidity—the current ratio (current assets divided by short-term debt); Growth—the book-to-market ratio; Leverage—the debt-to-equity ratio; Exposure—the average of the share of total revenues and costs that is denominated in foreign currency. For each model the coefficients, marginal effects (Δ prob.), and *p*-values of the coefficients are reported. For each model, the Cox and Snell pseudo R^2 is reported. The last two columns present the percentage of correctly predicted observations and the number of observations, respectively. Each of these columns presents the total, and in parentheses, the corresponding number of zeros and ones, respectively. The models are estimated with intercepts (not reported).

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95 學年度博士班招生入學考試試題

系所別：財務金融系、管理研究所
科　目：經濟學理論

There are four questions included in this exam. Each of them includes a couple of sub-questions, whose grading points are shown in the end of each sub-question.

1. Consider that income of a consumer is M and he spends all of his income on two goods, whose quantities are respectively x_1 and x_2, and price respectively p_1 and p_2. The utility function is $U = x_1^{\alpha_1} x_2^{\alpha_2}$, where α_1 and α_2 are constants.

   (a) Show that the implied demand curve are

   $$x_1^* = \frac{\alpha_1}{(\alpha_1 + \alpha_2)} \frac{M}{p_1}$$

   $$x_2^* = \frac{\alpha_2}{(\alpha_1 + \alpha_2)} \frac{M}{p_2}.$$ (15 points)

   (b) Verify $\lambda^* = \frac{\partial U^*(x_1^*, x_2^*)}{\partial M}$, Where λ^* is the Lagrange multiplier and $\frac{\partial U^*(x_1^*, x_2^*)}{\partial M}$ is the marginal utility of income. (10 points)

2. Consider that a firm uses two production factors, whose price are respectively w_1 and w_2, to produce one good. The production function is $y = x_1 x_2^2$, where y is output, and x_1 and x_2 are quantities of the factors. Assume there is a cost-minimizing input combination for any given output level y_0.

   (a) Find the constant-output factor demand curve. (15 points)

   (b) Show the marginal cost of wage $\frac{\partial C^*}{\partial w_1} = x_1^*$ and $\frac{\partial C^*}{\partial w_2} = x_2^*$. (10 points)

3. Consider the economy as being described by the IS and LM model that takes the form of:

$$Y = C(Y-T) + I(r) + G,$$
$$C(Y-T) = a + b(Y-T),$$
$$I(r) = c - dr,$$
$$\frac{M}{P} = L(r,Y),$$
$$L(r,Y) = eY - fr \quad .$$

where Y = domestic output;
C = consumption;
T = taxes;
I = investment;
r = interest rate;
G = government purchases;
M = the quantity of money;
P = price;
L = money demand;
a, b, c, d, e, f = constants.

(a) Use the LS-LM model to derive the aggregate demand equation, which describes a relationship between the price level and the level of national income. (10 points)

(b) Explain how an expansionary monetary policy affects the aggregate demand curve and domestic output. (5 points)

(c) Explain the effects of an increase in government spending (G) on domestic output. Compare the multipliers for fiscal policy in the Keynesian cross with that in the IS-LM model, and explain the difference between these two multipliers. (10 points)

4. Consider a Cobb-Douglas production function that takes the form of:

$$Y(t) = K(t)^{\alpha} \times R(t)^{\beta} \times T(t)^{\gamma} \times \left[A(t) \times L(t)\right]^{1-\alpha-\beta-\gamma},$$

$$\alpha > 0, \quad \beta > 0, \quad \gamma > 0, \quad \alpha + \beta + \gamma < 1.$$

where t denotes time;
Y denotes output;
K denotes capital;
R denotes resources used in production;
T denotes the amount of land;
A denotes "knowledge" or the "effectiveness of labor";
L denotes labor;
α, β, γ are constants.

The initial levels of capital, labor, knowledge, resources, and land are taken as given. The dynamics of K, L, A, T, and R are as follows:

$\dot{K}(t) = s \times Y(t) - \delta \times K(t)$;
$\dot{L}(t) = n \times L(t)$;
$\dot{A}(t) = g \times A(t)$
$\dot{T}(t) = 0$;
$\dot{R}(t) = -b \times R(t), \quad b > 0.$

where s, δ, n, g, and b are exogenous parameters and where a dot over a variable denotes a derivative with respect to time (that is, $\dot{X}(t)$ is shorthand for $dX(t)/dt$.)

A *balanced growth path* is defined as a situation where each variable of the model is growing at a constant rate. (For example, on the balanced growth path, the growth rate of K, which is expressed as $\frac{\dot{K}(t)}{K(t)} = s \times \frac{Y(t)}{K(t)} - \delta$, is constant.)

(a) What is the growth rate of output (Y) on the balanced growth path? What is the growth rate of output per worker ($\frac{Y}{L}$) on the balanced growth path? (10 points)

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(b) Is the growth in income per worker ($\frac{Y}{L}$) on the balanced growth path definitely negative (i.e. $\frac{Y}{L}$ eventually falling), as a result of resource and land limitations? Explain your answer. (5 points)

(c) Show that the economy in fact converges to a balanced growth path. (10 points)