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Capital Budgeting Practices:

A Comparative Study of the Netherlands and China

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Abstract

This paper compares the use of capital budgeting techniques of Dutch and Chinese firms, using data obtained from a survey among 250 Dutch and 300 Chinese companies. Our main aim is to analyse the use of capital budgeting techniques by companies in both countries from a comparative perspective to see whether economic development matters. The empirical analysis provides evidence that Dutch CFOs on average use more sophisticated capital budgeting techniques than Chinese CFOs do. At the same, however, our results suggest that the difference between Dutch and Chinese firms is smaller than might have been expected based upon the differences in the level of economic development between both countries, at least with respect to the use of methods of estimating the cost of capital and the use of CAPM as the method of estimating the cost of equity.

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1.   INTRODUCTION

This paper reports the results of a survey with respect to the current practice of capital budgeting techniques in two countries at two different levels of economic development: the Netherlands and China. The main aim of this paper is to analyse the use of capital budgeting techniques by companies in a comparative perspective to see whether economic development matters. Whereas several papers in the past have investigated the use of such techniques, this is one of the very few studies that use such a comparative perspective, comparing a more developed with an emerging economy. We carry out this analysis using standard differences of means tests and multivariate regression analysis to see whether there is a so-called "country effect". This means that we investigate whether capital budgeting practices differ significantly between Dutch and Chinese firms and whether these differences can be explained by differences in levels of economic development. Again, only very few papers have addressed the determinants of capital budgeting practices using these types of analyses, let alone in a comparative economic perspective.[1] China and the Netherlands have been chosen for our comparison for the following reasons. We consider China as an interesting emerging, yet still less-developed economy in many respects, which has received a lot of attention in the economic and financial literature during recent years. Moreover, we consider the Netherlands as a typical example of a developed European economy.

An additional contribution of this paper to the existing empirical literature on capital budgeting practices is in terms of the countries for which we have gathered data. Most studies focus on the United States and the United Kingdom. There are only two studies available for the Netherlands (Herst, Poirters and Spekreijse, 1997; Brounen, De Jong and Koedijk, 2004). We are not aware of any study that deals with capital budgeting practices in China.

The paper is organised as follows. Section 2 discusses previous studies on capital budgeting practices, whereas in section 3 we evaluate the reasons why different levels of economic development may have an impact on the use of capital

budgeting practices. Moreover, we shortly discuss alternative determinants of capital budgeting practices, focusing on several characteristics of companies and CFOs of companies, which according to existing literature may influence capital budgeting practices. This is followed by a discussion of the design of our survey in section 4. Section 5 then provides the results of the survey and a discussion of the empirical analysis of determinants of capital budgeting practices. The paper ends with a summary and discussion of the results in section 6.

2.   PREVIOUS STUDIES ON CAPITAL BUDGETING PRACTICES: A BRIEF REVIEW

Capital budgeting decisions are among the most important decisions the financial manager of a company has to deal with. Capital budgeting refers to the process of determining which investment projects result in maximisation of shareholder value. Generally speaking, there are four main capital budgeting techniques the manager may use when evaluating an investment project.[2] The Net Present Value (NPV) and Internal Rate of Return (IRR) methods are considered to be discounted cash flow (DCF) methods. The Payback Period (PB) and Average Accounting Rate of Return (ARR) methods are so-called non-DCF methods. From a pure theoretical point of view the NPV is considered to be the most accurate technique to evaluate projects. Yet, it is also the most sophisticated of the four, followed by the IRR method. Both non-DCF methods are considered to be less accurate, of which the PB method is the least sophisticated.

In the past, several surveys of capital budgeting practice have been carried out. Survey results of capital budgeting practices have been reported in the literature since the late 1950s. Most surveys focus on companies in the U.S. This is especially true for surveys carried out before the 1980s. Some later studies are based on

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[1] Notable exceptions, among others, are Brounen, et al. (2004) and Payne, et al. (1999). Yet, both studies analyse the determinants of capital budgeting practices for a number of developed countries (The Netherlands, Germany, France, Canada, the U.S. and the U.K.).

[2] In fact, there are other techniques that could have been considered, such as sensitivity analysis, real options, book rate of return, simulation analysis, etc. (Graham and Harvey, 2001, pp.196-197). Yet, we have chosen to focus on the most well-known techniques to keep the survey simple.

information from Canadian, Australian and European companies. Three studies look at capital budgeting practices in some countries in East-Asian countries, but in these studies China is not included.

Comparing survey results of capital budgeting practices in the U.S. over time generally seems to show that the analytical techniques used by executives have increased in terms of sophistication. For example, in one of the earliest studies reporting the results of questionnaires on capital budgeting practices, Klammer (1972) shows that in 1959, based on a sample of 184 large U.S. firms, 19 per cent indicated that they used DCF methods as their primary method to evaluate projects. The majority of firms used either PB (34 per cent of the total sample) or ARR methods (34 per cent) as their primary method of evaluation. In 1970, the picture had changed dramatically: DCF methods were now used by 57 per cent of the firms; 26 per cent used ARR and only 12 per cent used PB as their primary method of evaluation. In a later study, Hendricks (1983) reports that in 1981 76 per cent of the firms in his sample reported they used DCF methods as their primary tool. Only 11 per cent stated they used the PB method as their primary tool. Trahan and Gitman (1995) show that, based on a 1992 survey of 58 of the Fortune 500 large firms and 26 of the Forbes 200 best small companies, most firms used DCF methods as their primary evaluation tool, although these methods were more important for the large (88 per cent for NPV and 91 per cent for IRR) than for the small firms (65 and 54 per cent). A recent study by Graham and Harvey (2001), which is the most comprehensive survey published on capital budgeting practices to date (using answers from a 1999 survey among 392 Chief Financial Officers (CFOs) of companies in the U.S. and Canada) shows that the NPV and IRR techniques are the most frequently used capital budgeting techniques. This survey reports that 75 per cent of the CFOs always use NPV and 76 per cent always or almost always use the IRR method.

The survey results also show, however, that even though over time the use of the PB method has declined as a primary tool for project evaluation, it remains to be an important secondary instrument CFOs use. According to Hendricks (1983), in his 1981 survey 65 per cent of the firms in his sample used PB as a secondary measure. Trahan and Gitman (1995) show that in 1992 72 per cent of the large and 54 per cent of the small firms used PB as one of the evaluation tools. In the 1999 survey of Graham and

Harvey (2001) 57 per cent indicated they use the PB method as one of their evaluation tools.

The general picture that emerges from the previous short discussion also emerges from survey studies based on other U.S. as well as U.K., European and Australian firms.[3] A comparison of the results of these survey studies also shows an increasing sophistication with respect to the use of evaluation techniques over time. At the same time, however, it seems that firms in European countries report lower rates of the use of DCF techniques as compared to U.S. firms. This finding is confirmed in Brounen, De Jong and Koedijk (2004). They replicate the Graham and Harvey (2001) survey in four European countries (U.K., France, Germany and the Netherlands; total sample is 313 firms) in 2002-2003 and find that for the U.K. firms in their sample 47 per cent states that NPV is (almost) always used as a tool of evaluating projects, whereas 69 per cent (almost) always use the PB. For the Netherlands these figures are comparable (70 and 65 per cent, respectively); for France and Germany the figures are even lower (42-50 per cent and 44-51 per cent, respectively).

A few studies have reported survey evidence on capital budgeting practices in the Asia-Pacific region. These studies show a somewhat different picture. Wong, Farragher and Leung (1987) use information from a survey among a large number of companies in Malaysia, Hong Kong, and Singapore they did in 1985 and find that in these countries the PB method is the most popular primary measure for evaluating and ranking projects. For Malaysia this picture is confirmed in Han (1986). In a recent paper by Kester, et al. (1999), based on information from surveys of 226 companies in Australia, Hong Kong, Indonesia, Malaysia, The Philippines and Singapore in 1996-1997, it is reported that the PB method is still an important method. Yet, DCF methods seem to have increased in importance as well. Excluding Australia from the sample of countries, 95 per cent of the firms in the five Asian countries indicate that they use the PB method and 88 per cent of them say they use the NPV method when evaluating

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[3] Without suggesting we provide a complete list of survey studies in this footnote, the reader is referred to studies from, for example, Gitman and Forrester (1977), Schall, et al. (1978), Kim and Farragher (1981), Shao and Shao (1996) for the U.S.; Pike (1996) and Brounen, et al. (2004) for the U.K.; Freeman and Hobbes (1991) and Truong, et al. (2005) for Australia; and Herst, et al. (1997) and Brounen, et al. (2004) for the Netherlands.

projects. In terms of importance (on a scale from 1 to 5, where 1 = unimportant and 5 = very important) both methods are rated almost equally important (3.5 versus 3.4). When comparing these results to the results of studies for firms in Western economies, these figures seem to be remarkably high. Comparing the results of study by Wong, et al. (1987) with those of Kester, et al. (1999) does seem to suggest that the level of sophistication of capital budgeting techniques has increased quite rapidly during a period of just one decade.

3.   DETERMINANTS OF CAPITAL BUDGETING PRACTICES

As was shown in the previous section, over time, financial managers have applied various methods and procedures to determine which investments are beneficial to the firm. The choice of the evaluation method may therefore be determined by individual preferences of the manager and/or by the environment in which decisions have to be made.

While in the literature several factors have been mentioned as determinants of the choice of capital budgeting practices, in this paper we want to focus on the role that is played by the level of economic development in this respect. The review of studies of capital budgeting practices in the previous section showed that over time, the use of more sophisticated DCF methods has become more popular. This may be explained by various factors. First, financial markets have developed over time, making the use of DCF methods more applicable, convenient and necessary. Due to the development of financial markets (and especially stock markets) shareholder maximization has gained in importance, which has pressured CFOs of firms to use DCF methods over other, more simple, but also less accurate alternatives. Second, training of CFOs has improved over time, which may have enabled them to better understand and thus use more sophisicated techniques. Third, financial tools and programmes that help the CFO to determine which investments are beneficial to the firm have become increasingly sophisticated, which may also have stimulated the use of more sophisticated techniques. Finally, the increased use of computer technology and the related reduction in the cost of this technology may have stimulated the use of more sophisticated techniques.

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We claim that these factors are all related to increasing levels of development. More developed countries generally tend to have more sophisticated financial markets[4], higher levels of human capital[5], and higher levels of technology[6]. This would also mean that the level of economic development of a country and the sophistication of the capital budgeting techniques implemented by CFOs in that country are positively related. In general terms, therefore, we would expect that CFOs of firms in more developed countries use DCF methods signifantly more often than do their counterparts in less developed countries. The opposite may hold for the use of non-DCF methods.

It is this hypothesis that will be investigated in this paper, using information from Dutch and Chinese CFOs with respect to their capital budgeting practices. Although since the late 1970s China has achieved impressive economic growth, with an average annual growth rate of 9.5 per cent over the period 1978-2000 (Fang and Meiyan, 2002), we claim that at the beginning of the new millenium there was still a wide gap in levels of economic, human and technological development between China and the Netherlands. Table 1 provides supportive evidence for this claim. Therefore, we hypothesize that CFOs of Dutch firms will use NPV and IRR methods more often than do Chinese CFOs, whereas the opposite will be true for the PB and ARR methods.

<Insert table 1 here>

To test this hypothesis we will also take into account other variables that according to the literature may also explain the use of capital budgeting practices.[7] These variables will be included in the multivariate analysis as control variables. In particular, we include measures of the size of the firm, the industry to which the firm belongs, and the educational level and age of the CFO of the firm. Firm size is included because some papers have argued and indeed found evidence for the fact that larger firms are more

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[4] There is a huge literature on the relationship between financial and economic development. One of the most comprehensive surveys of this literature can be found in Levine (1997).

[5] Schultz (1988) provides an excellent review of the voluminous literature on this relationship. See, among others, Boozer et al. (2003) for a recent empirical study on this relationship, and the references therein.

[6] See Evenson (1988) for a comprehensive review of the literature on this issue.

[7] See, e.g., Brounen, et al. (2004) and Graham and Harvey (2001).

inclined to use more sophisticated capital budgeting techniques (Payne, et al., 1999; Ryan and Ryan, 2002; Brounen, et al., 2004). One important reason for this may be that larger firms generally deal with larger projects, which makes the investment in the use of more sophisticated techniques less costly (Payne, et al., 1999). Based on this argument, we expect to find a positive relationship between firm size and the use of DCF methods. The measure of the educational level of the CFO is included, since it may be expected that CFOs with higher levels of education will have less problems in understanding and using more sophisticated capital budgeting techniques. Again, therefore, we expect a positive relationship between the level of the educational background of the CFO of the firm and the use of DCF methods. With respect to measures of the industry and age of the CFO, we have no specific a priori expectations about the nature of the relationship.

4.   SURVEY DESIGN AND METHODOLOGY

The data for the analysis have been obtained by using the results of a survey. This survey was sent to 250 Dutch and 300 Chinese listed and non-listed companies in the period between October 2003 and June 2004. The survey consisted of a number of closed-ended and open-ended questions related to capital budgeting practices of firms, questions specifying firm characteristics, such as size, foreign sales and industry, as well as questions asking for the age and educational background of the respondent. With respect to the questions related to capital budgeting practices we asked firms to indicate the frequency of the use of different project evaluation techniques (running from 0 to 4, where 0 = never and 4 = always), the cost of capital estimation method used most frequently, the use of methods to estimate the cost of equity, problems related to using DCF methods and reasons for using non-DCF methods.

To increase the chances of getting responses from the companies, we decided to keep the survey as short as possible. In total, it included only seven questions.[8] The same set of questions was sent to Dutch and Chinese companies. The questions were posed in Dutch and Chinese, respectively.

The survey was sent by email. To increase the level of response, two reminders were sent to the companies: the first one week and the second two weeks after the survey

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[8] The survey is available upon request from the authors.

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was sent. The survey was to be completed by the CFO of the company. We received 87 responses, 42 from Dutch and 45 from Chinese companies, resulting in a response rate of 17 per cent for the Dutch and 15 per cent for the Chinese sample. These response rates are somewhat higher than those found in other (recent) studies. For example, Graham and Harvey (2001) report a response rate of 9 per cent, Trahan and Gitman (1995) have a rate of 12 per cent and Brounen, et al. (2004) report a rate of 5 per cent (for the Netherlands the rate is 10 per cent). Kester, et al. (1999) show an average response rate for the five Asian countries of 15.5 per cent, which is in line with our response rate for China.

5.   EMPIRICAL RESULTS

This section first describes and compares the characteristics of Dutch and Chinese firms in our sample that we consider to be relevant as determinants of their capital budgeting practices. Next, it discusses the outcomes related to the answers to the questions on capital budgeting practices, focusing on the use of different capital budgeting techniques and methods used to estimate cost of capital. Finally, we present a univariate and multivariate analysis of the relationship between firm characteristics and capital budgeting practices for the Dutch and Chinese firms in our sample.

5.1   Firm and CFO Characteristics

Table 2 shows the information on the characteristics of both the Dutch and Chinese firms in our sample. With respect to total sales the table shows that the Dutch firms on average report higher sales than the Chinese firms. While 36 per cent of the Dutch firms have sales of more than 1 billion euro, none of the Chinese firms reports sales in this category. 47 per cent of the Chinese firms have sales between 100 and 499 million euro, while another 33 per cent reports having sales between 25 and 99 millions euro. If we classify small firms having sales of less than 100 million euro, medium-sized firms having sales of between 100-499 million euro, and large firms having sales of 500 million euro or more, then the figures indicate that the majority of

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the Dutch sample consists of large firms (48 per cent), whereas the Chinese sample mainly consists of medium-sized firms.

<Insert table 2 here>

Additionally, with respect to the share of foreign sales both samples differ quite substantially. Whereas almost 75 per cent of the Chinese firms report that their foreign sales are zero or are less than 25 per cent of total sales, 50 per cent of the Dutch firms state they have 50 per cent or more foreign sales. Table 2 also shows that 50 per cent of the Dutch and two thirds of the Chinese firms are classified as manufacturing firms.

Table 2 also provides information on CFO characteristics. In general, Dutch CFOs seem to have a higher level of education. Whereas almost 70 per cent of the Dutch CFOs have a non-MBA master or PhD, this is only 44 per cent for the Chinese CFOs. At the same time, 36 per cent of the Chinese CFOs have an undergraduate degree as their highest level of education; for the Dutch CFOs this is only 12 per cent. With respect to the age structure CFOs in both countries are rather similar.

5.2   Capital Budgeting Techniques

The first question in the questionnaire relates to the capital budgeting practices of firms. Similar to Graham and Harvey (2001) and Brounen, et al. (2004), we asked firms to rate different capital budgeting methods on a 4-point scale in terms of the frequency with which they are used (where 0 = never and 4 = always). This provides information with respect to the methods that are being used, as well as with respect to the relative importance of the different methods. The following capital budgeting techniques are used: two DCF methods (NPV and IRR), two non-DCF methods (PB and ARR) and other techniques. As was already discussed above, from a pure theoretical point of view the NPV is the most accurate technique. Yet, it is also the most sophisticated of the four, followed by the IRR method. Both non-DCF methods are considered to be less accurate, of which the PB method is the least sophisticated method.

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Table 3 shows the results of the responses from Dutch and Chinese firms. First of all, the table shows the percentage of CFOs who indicate that they always or almost always use a certain capital budgeting method (scores 3 and 4). Next, the table shows the mean scores for the different methods in both countries. Finally, the tables shows the mean scores for different methods of different categories of firms, using the characteristics of firms and CFOs discussed in table 2 to categorize firms in sub-samples. Before going into the analysis of the differences between the Dutch and Chinese CFOs, we will shortly discuss our results and compare them to those of other studies relevant for our analysis.

<Insert table 3 here>

Dutch CFOs

Table 3 shows that the NPV method is the most popular method among the Dutch CFOs. 89 per cent of the respondents indicate they use this method (almost) always, and its mean score is 3.50, which is 0.4 above the second most popular method (the PB method). The IRR and PB method are quite comparable in terms of their mean scores and percentage of CFOs who say they use these methods (almost) always. The ARR method is clearly the least popular: its mean score is 0.24 and only 2 per cent of the CFOs in our sample state that they use this method (almost) always.

If we compare our results for the Dutch CFOs with those found in Brounen, et al. (2004), it seems that we find significantly higher percentages and mean scores for most of the methods reported in table 3. Brounen, et al. show that 70, 56 and 65 per cent of firms (almost) always use the NPV, IRR or PB method, and they report mean scores of 2.76, 2.36 and 2.53, respectively. The differences between their findings and ours may be due to the fact that in their sample there are more smaller firms: almost 40 per cent of their firms have total sales between 25 and 99 million euro, whereas in our sample we have only 12 per cent of the firms in this size category.[9] In contrast, in our study 36 per cent of the firms has sales of more than 1

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[9] The data on sales in our study are given in euros, whereas in Brounen et al. they are given in US dollars. Yet, between November 2002 and January 2003, the period during which Brounen

billion euro, whereas in the sample of the study by Brounen, et al. only 20 per cent of the firms is in this size category.

Table 3 also shows the results of a standard differences of means test of the mean scores of the NPV, IRR, PB and ARR method for the five different categories of firms listed in table 2 (size, educational level of the CFO, age of the CFO, industrial sector and percentage foreign sales of total sales). The results of these tests show that for larger firms the mean score for the NPV method is significantly higher (at the 5 per cent level) than for smaller firms. The opposite is true for the PB method. With respect to the PB method, the table also shows that firms with lower foreign sales have significantly higher mean score than firms with higher foreign sales. The other mean tests report either insignificant t-values or values that are only significant at the 10 per cent level. These results are comparable to similar tests results presented in Brounen, et al., who also find that larger firms have significantly higher mean scores for the NPV method. They do not find significant differences for any of the other methods for any of the categories of firms they use in their study.

Chinese CFOs

Table 3 shows that the IRR and the PB method are the most frequently used methods. 89 and 84 per cent of the CFOs in our sample state that they use these methods (almost) always. The NPV method is used much less: only 49 per cent of the CFOs report they use this method (almost) always. Looking at the mean scores the IRR and PB method are comparable with 3.38 and 3.16, respectively, whereas the NPV method's score falls behind with only 2.51. As was true for the Dutch sample, the ARR method is the least popular. The mean score for this method is 1.00 and only 9 per cent of the Chinese CFOs in our sample say they use this method (almost) always. We are unable to compare our results for China with those found in other studies, simply because as far as we know this is the first study that looks at capital budgeting practices in China. Probably the best comparison we can make is by looking at the

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et al. (2004) did their survey, the euro-dollar exchange rate was 0.97. Moreover, inflation rates were low during 2002-2004 (2.2 per cent on average), which is the period during which both surveys were carried out. Based on both these facts, we argue that we may compare size categories used in both studies.

outcomes of a recent survey of capital budgeting practices for five Asian countries carried out by Kester, et al. (1999). As was already mentioned in section 2, they find that 95 per cent of the Asian firms in their sample indicate they use the PB method, whereas 88 per cent report they use the NPV method. The mean scores for both methods are 3.5 and 3.4 (on a scale of 5), respectively. Although it is difficult to make a simple comparison between the outcomes of the survey by Kester, et al. and our survey results since the questions in their survey were slightly different from the ones we used, these figures nevertheless seem to suggest that CFOs in China use the NPV method on a much less regular basis than their colleagues in Hong Kong, Indonesia, Malaysia, The Philippines and Singapore.

The results of the standard differences of means test of the mean scores of the NPV, IRR, PB and ARR method for the five different categories of firms show for the higher educated and younger CFOs the mean score for the NPV method is significantly higher than for the lower educated and older CFOs. Also, firms with foreign sales have a significantly higher mean score for the NPV method than firms with no foreign sales. The mean score of the NPV method of the larger firms is higher than for the smaller firms, yet the t-value is only just significant at the 10 per cent level. The other mean tests report either insignificant t-values or values that are only significant at the 10 per cent level. Kester, et al. do not report mean scores of different categories of firms, so we cannot compare our results on the differences of means tests for China to similar tests for other countries in the region.

Dutch versus Chinese CFOs

If we compare the results for the Netherlands and China, the following differences in the use of capital budgeting methods come to the fore. First, Dutch CFOs seem to use the NPV method more often than their colleagues in China. Whereas 89 per cent of the Dutch CFOs indicate they (almost) always use this method, this is only true for 49 per cent of the Chinese CFOs. Instead, the IRR method is used more by Chinese CFOs than by Dutch CFOs (89 versus 74 per cent). The differences with respect to the use of the NPV and IRR method in the Netherlands and China are confirmed when we look at the mean scores. In the Netherlands the mean score for the NPV

method is 3.50 whereas in China it is 2.51. For the IRR method mean scores are 2.98 and 3.38, respectively. The differences of the mean scores with respect to the use of the NPV and IRR method between Dutch and Chinese CFOs are statistically significant, as is shown in table 3 (see the t-values in italics presented in the row below the mean scores for China). Note, however, that for the IRR method the difference is only significant at the 10 per cent level. Although the PB method seems to be more popular in China (84 per cent of the Chinese CFOs indicate they (almost) always use this method, against 79 per cent for the Dutch CFOs), the difference between the mean scores of China versus the Netherlands is not statistically significant. Finally, the ARR method is not used very much in both China and the Netherlands; yet the analysis shows that the mean score for the Chinese CFOs is significantly higher than the score for their Dutch counterparts (1.00 versus 0.24). The above discussion seems to suggest that the Dutch CFOs are using the most sophisticated capital budgeting method (i.e. NPV) on a significantly more regular basis than their Chinese colleagues do. Instead, Chinese CFOs use the less sophisticated ARR method significantly more than the Dutch CFOs. This result seems to, at least partly, confirm our hypothesis that, based on the fact that there is quite some difference in the level of economic development of the two countries, on average Dutch CFOs will use more sophisticated capital budgeting methods than their Chinese colleagues.

5.3 Cost of Capital Estimation Methods

The next important question in the questionnaire focuses on the methods that are used to estimate the cost of capital. Estimating the cost of capital is necessary when a firm applies discounting techniques like the NPV or IRR method. We asked firms to indicate which method they use most frequently when estimating the cost of capital. In particular, we asked them to make a choice out of the following set of possible methods, i.e. the project dependent (risk-adjusted) cost of capital (PDCC), the weighted average cost of capital (WACC), the cost of debt and other methods. Whereas the PDCC and WACC are the more sophisticated methods, the cost of debt is clearly the least sophisticated of the three methods. In fact, using the cost of debt

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for capital budgeting purposes is in most cases not appropriate. Yet, since in many cases projects are financed by newly issued debt, using the cost of debt is tempting, also because of the ease with which it can be calculated.

Table 4 presents the results of the responses from Dutch and Chinese firms. In particular, it presents the percentage of firms that indicates that a certain method of cost of capital estimation is the one they use most frequently. We again use the characteristics of firms and CFOs discussed in table 2 to categorize firms in sub-samples.

<Insert table 4 here>

The results in table 4 show that 66.7 per cent of the Dutch firms state that they use the WACC for discounting purposes. Only 9.5 per cent of the firms use a project dependent (risk-adjusted) cost of capital. In addition, table 4 shows that a relatively large number of Dutch firms (14.3 per cent) use the simple cost of debt as the discount rate. When looking at the results for different sub-samples of firms, a couple of points are noteworthy. Small firms use the cost of debt more often than large firms do: 22.7 versus 5.0 per cent. In addition, CFOs with higher levels of education make less use of the cost of debt than less educated CFOs. Less educated Dutch CFOs do not use a project dependent (risk-adjusted) cost of capital at all, while 13.8 per cent of the higher educated CFOs indicate that they use this one the most frequently.

Of the Chinese firms, 53.3 per cent indicate that they use the WACC most frequently, 28.9 per cent mention the cost of debt, while 15.7 per cent state that they use the project dependent cost of capital most often. Compared to the Dutch firms, Chinese firms appear to use the cost of debt more often. In addition, like Dutch CFOs, Chinese CFOs with higher levels of education use the cost of debt less often than their less educated colleagues. Moreover, small Chinese firms use the cost of debt more often than larger firms. This result is consistent with those for the Dutch firms in our sample. In contrast to the Dutch case, however, older Chinese CFOs are more inclined to use the cost of debt and, in addition, Chinese manufacturing firms use the

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cost of debt more often than other Chinese firms. The level of CFO education does not seem to influence the use of the project dependent (risk-adjusted) cost of capital.

All in all, when looking at the methods used to measure the cost of capital, the outcomes presented in table 4 suggest that the main differences between China and the Netherlands are with respect to the use of the cost of debt. In China, the cost of debt is used more often than in the Netherlands. Based upon the difference in the level of economic development between both countries, this may be expected, since the cost of debt is a relatively simple method of calculating the cost of capital.

5.4   Cost of Equity Estimation Methods

We finally asked firms to indicate which methods they use to estimate the cost of equity. Estimating the cost of equity is necessary when a firm applies discounting techniques like the NPV or IRR method. The cost of equity is an input for calculating the project dependent (risk-adjusted) cost of capital and the WACC. We asked firms to indicate which method they use most frequently when estimating the cost of equity. In particular, firms were asked to indicate whether they make cost of equity estimations, and if they do, what type of method they use most. Although there are several possible methods available, the survey results showed that firms basically use two (in the Netherlands) or three (in China) different methods on a regular basis. The following methods were mentioned by the respondents: average historical returns on common stock, Capital Pricing Asset Model (CAPM), no estimation done, and other methods (e.g. dividend discount type of models). Of these methods, the CAPM can be seen as the most sophisticated model.

Table 5 presents the results of the responses from Dutch and Chinese firms. In particular, it presents the percentage of firms that indicates that a certain method of cost of equity estimation is the one they use most frequently. We again use the characteristics of firms and CFOs discussed in table 2 to categorize firms in sub-samples. The percentages between brackets in columns 3, 4 and 5 refer to the share of firms that indicate they do estimate the cost of equity. So, for instance of all Dutch firms in our sample stating they do estimate the cost of equity, 52 per cent uses the CAPM.

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<Insert table 5 here>

The results in table 5 show that almost 36 per cent of the Dutch firms in our sample state that in most cases they do not estimate the cost of equity. Of the firms that do regularly estimate the cost of equity, roughly half of them state that they use the CAPM in most cases. When looking at the results for different sub-samples of firms, the table shows that 80 per cent of the manufacturing firms state they do regularly estimate the cost of equity, a percentage that is much higher than for the total sample of Dutch firms. When splitting up the firms into two groups based on the age of the CFO, the table shows that firms with younger CFOs seem to be much less regularly making cost of equity estimations than firms with older CFOs (26 versus 44 per cent).

If we turn to the outcomes for those firms that do make frequent estimations of the cost of equity, the table shows that CFOs of smaller firms are less frequently stating they use CAPM as compared to their colleagues of larger firms. Moreover, CFOs with lower levels of education use the CAPM more often than highly educated CFOs do. Given the fact that CAPM is the most sophisticated method, the results with respect to the educational level of the CFO may be somewhat surprising and cannot easily be explained. For this we would have to know more about what is included in the category "other methods", but unfortunately this information is lacking in the current version of the questionnaire.[10] One plausible explanation may be that other methods used by Dutch firms consist of methods such as dividend discount models, which belong to the more sophisticated DCF-methods. For the other sub-samples, there is no big difference in the use of methods between different types of firms or CFOs.

With respect to the Chinese firms in the sample, table 5 shows that the percentage of firms stating that they do not regularly make cost of equity estimations is much higher than for the Netherlands: almost 65 per cent for China versus 36 per

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[10] Next versions of the questionnaire should include a more diverse set of methods of calculating the cost of equity from which CFOs may choose.

cent for the Netherlands. The table also shows that there are quite some differences for several of the sub-samples on the issue of whether or not estimations of the cost of equity are made on a regular basis. In particular, smaller firms, firms with no foreign sales, and firms with CFOs who are older or have lower levels of education make cost of equity estimations (much) less frequently. Of the firms that do regularly estimate the cost of equity, almost 70 per cent state that they use CAPM in most cases, whereas 13 per cent say that they use average historical returns on common stock as their estimation method. Looking at different sub-samples, the table suggests that higher educated CFOs use the CAPM much more frequently than CFOs with lower levels of education (78 percent versus 57 per cent). Moreover, older CFOs seem to use average historical returns quite often as their method of estimating cost of equity (34 per cent). These outcomes for sub-samples are more or less in line with what has been hypothesized in section 3.

To conclude the analysis in this sub-section, the outcomes presented in table 5 show that there seems to be quite some difference with respect to the use of techniques between the Netherlands and China. In particular, the results from the questionnaire seem to establish that the Dutch CFOs are more inclined to use more sophisticated methods to estimate cost of equity. This outcome is in line with what may be expected based on the differences in the level of economic development between the two countries. It also seems to confirm what was already found before in table 3, i.e. that Dutch CFOs use discounting techniques, and in particularly the NPV method, significantly more often than Chinese CFOs do. This probably explains the higher percentage of Dutch CFOs reporting they make use of cost of equity estimations as compared to their Chinese colleagues.

5.5 Capital Budgeting Techniques, Cost of Capital and Cost of Equity Estimations: Multivariate Analysis

The discussion in the previous sub-sections was based on comparing averages. Although the discussion provided some interesting results on the differences in the use of capital budgeting methods between the Netherlands and China, in this section, we want to go one step further by performing multivariate regression analysis. In

particular, we want to investigate whether the use of different capital budgeting techniques and different methods of estimating the cost of capital is determined by a so-called country effect, i.e. we ask ourselves whether it matters if the firm is Dutch or Chinese when it decides on using a capital budgeting, cost of capital, and/or cost of equity estimation method. When investigating this country effect, we control for other factors that may influence the choice of capital budgeting, cost of capital, and/or cost of equity estimation methods.

The multivariate analysis is set up as follows. We estimate two different versions of three different models. The first version of the first model establishes to what extent the choice of a specific type of capital budgeting method is determined by the country effect. In the second version of this model, a number of control variables are added to see if the country effect still holds when adding other possible determinants of the choice of the capital budgeting method. The first version of the second model investigates whether the choice of a specific cost of capital estimation method is determined by the country effect, whereas in the second version of this model we again introduce a number of control variables to see if the country effect still holds even after controlling for other possible determinants of the choice of the cost of capital estimation method. The first version of the third model investigates whether the choice of a specific cost of equity estimation method is determined by the country effect, whereas in the second version of this third model we again introduce a number of control variables to see if the country effect still holds even after controlling for other possible determinants of the choice of the cost of equity estimation method.

With respect to the first model we investigate the determinants of three different capital budgeting methods, i.e. the NPV, IRR and ARR method. The PB method has been left out, since the results in table 3 showed that for this method there was no significant difference in the mean scores between Dutch and Chinese firms. The category of "other methods" has been left out due to the fact that only a very few number of firms in both The Netherlands and China indicated they used other capital budgeting methods.

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With respect to the second model we analyse the determinants of the decision to make estimations of the project dependent (risk-adjusted) cost of capital, the WACC, as well as of the cost of debt. The category 'other methods' is left out, since the results in table 4 show that the percentage of Chinese firms that using other methods is very low (only 2 per cent).

With respect to the third model we analyse the determinants of the decision not to make estimations of the cost of equity, as well as of the CAPM and 'other methods'. The control variables we include are the same for all model specifications: we use measures of size, level of education of the CFO, age of the CFO and type of industry.[11]

The dependent variables are binary dummy variables. In table 6, the dependent variables are created as follows: $NPV = 1$ if the score for a firm for the NPV method is 3 or 4, it is 0 if the score of a firm is less than 3; $IRR = 1$ if the score for a firm for the IRR method is 3 or 4, it is 0 if the score of a firm is less than 3; $ARR = 1$ if the score for a firm for the ARR method is 1 or higher, it is 0 if the score of a firm is 0. The dependent variables used in table 7 are defined as follows: $PDCC = 1$ if a firm indicates that in most cases it uses a project dependent (risk-adjusted) cost of capital, it is 0 if this is not the case; $WACC = 1$ if a firm indicates it uses the weighted average cost of capital on a regular basis to estimate the cost of capital, it is 0 if this is not the case; $CD = 1$ if a firm indicates it uses the cost of debt as an estimate for the cost of capital on regular basis, it is 0 if this is not the case. Finally, the dependent variables used in table 8 are defined as follows: $NOCC = 1$ if a firm indicates that in most cases it does not make estimates of the cost of equity, it is 0 if it does make estimations of the cost of equity on a regular basis; $CAPM = 1$ if a firm indicates it uses the CAPM on regular basis to estimate the cost of equity, it is 0 if this is not the case; $Other = 1$ if a firm indicates it uses another, not explicitly identified model to estimate the cost of equity, it is 0 if this is not the case.

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[11] We have excluded the share of foreign sales to total sales as one of the control variables, since with respect to this variable the Chinese and Dutch firms cannot really be compared in the context of a multivariate analysis. For the Chinese firms in our sample 30 per cent does not have foreign sales and another 40 per cent has foreign sales less than 25 per cent. Instead, half of Dutch firms in the sample have foreign sales of more than 50 per cent of their total sales.

The independent variables are also binary variables. We have used the following variable specifications: *CHINA* = 1 if the firm is a Chinese firm, it is 0 if the firm is Dutch, this variable is used to measure the country effect; *SIZE* = 1 if a Dutch firm has total sales of less than 500 million euros or if a Chinese firm has total sales of less than 100 million euros, it is 0 if a Dutch (Chinese) firm has total sales of 500 (100) million euros or more; *EDUC* = 1 if the CFO of the firm has a PhD or Master degree, it is 0 if (s)he has an undergraduate or MBA degree; *AGE* = 1 if the CFO of the firm is 50 years or older, it is 0 if (s)he is younger; *INDUSTRY* = 1 if the firm is manufacturing firm, it is 0 if it is not.

All estimations are carried out using the logit estimation method. The results of the multivariate logit analysis are presented in tables 6, 7 and 8.

Capital Budgeting Techniques

Table 6 shows the results for the determinants of the use of the different capital budgeting techniques. The results provide the following picture. First, for the NPV method the country effect is negative and statistically significant (see column [1]). This result can be interpreted as supportive evidence for the fact that Chinese firms use the NPV method significantly less often than Dutch firms do. This finding supports the hypothesis on the relationship between the level of development and the choice of the capital budgeting technique as discussed in section 3 of this paper. This result holds even if we include control variables for size, CFO education and age, and type of industry (column [2]). Moreover, the results show that the choice for the NPV method is also determined by the size of the firm and the age of the CFO; both variables have a negative and statistically significant coefficient. This means that smaller firms and firms with older CFOs use the NPV method less often than larger firms and firms with younger CFOs do. Based on the discussion in section 3 of this paper, the outcomes with respect to the size variable are as expected.

<Insert table 6 here>

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Second, table 6 shows that the country effect for the IRR method is positive and significant, which indicates that the IRR method is used more often by Chinese firms than by Dutch firms (column [3]). Note, however, that the coefficient is only significant at the 10 per cent confidence level. If we introduce the control variables in the model, the country effect is still positive, yet it becomes insignificant (column [4]). This suggests that the choice for the IRR method may not really be different between Dutch and Chinese firms. This finding is perhaps somewhat surprising in the light of the hypothesis on the relationship between the level of development and the choice of the capital budgeting technique as discussed in section 3, based on which we might have expected that Dutch firms are more regular users of DCF methods than Chinese firms are. On the other hand, combined with the findings with repect to the use of the NPV method, these findings may make sense. It might be the case that in recent years Dutch firms have been substituting the IRR method for the NPV method. Consequently the use of the IRR method by Dutch firms has decreased.

Third, table 6 shows that the country effect is positive for the ARR method, indicating that Chinese firms are using this method significantly more often than Dutch firms do (column [5]), a result that still holds after introducing the control variables (column [6]). This result seems to be in line with the hypothesis that we have formulated on the relationship between the level of development and the use of capital budgeting techniques. Of the control variables, only the education variable is statistically significant and it has the expected negative sign, meaning that higher educated CFOs will use the ARR method significantly less, which is consistent with what is expected.

Cost of Capital Estimation

Table 7 presents the results for the determinants of the use of the different methods of estimating the cost of capital. For the PDCC and WACC we do not find statistically significant coefficients for the country effect variable, indicating that for these two methods of estimating cost of capital there is no difference in use between Dutch and Chinese CFOs. Although the country effect is positive and statistically significant at the 10 per cent level in the bivariate model for the cost of debt estimation method

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(column [9]), this effect becomes statistically insignificant after we add the control variables (column [10]). In the extended, multivariate model, the size variable is positive and statistically significant at the 1 per cent level. Moreover the age variable is also positive and statistically significant at the 5 per cent level. The result for the size variable is in line with what may be expected based on our discussion in section 3.

<Insert table 7 here>

Cost of Equity Estimation

Table 8 presents the results for the determinants of the use of the different methods of estimating the cost of equity. The results can be summarized as follows. First, the country effect is positive and statistically significant in the model explaining when firms do not regularly make cost of capital estimations (column [11]), which means that Chinese firms do make such estimations on a less regular basis than Dutch firms do. This result holds even after we have added the control variables (column [12]). This outcome seems to be in line with the results presented in table 6, showing that Dutch firms do use the NPV method significantly more often than Chinese firms do.

<Insert table 8 here>

Second, the country effect is negative but not statistically significant in the models explaining the use of the CAPM (columns [13] and [14]). Thus, there seems to be no difference between Dutch and Chinese firms with respect to the frequency with which they use the CAPM to estimate cost of capital.

Third, table 8 shows that the country effect is negative and significant for the 'other methods', suggesting that Chinese firms use other methods less regularly than Dutch firms do (column [15]). This result remains after adding the control variables (column [16]). If 'other methods' can be interpreted as being dividend discount models – which belong to the sophisticated DCF-methods – then this finding supports the hypothesis on the relationship between the level of development and the choice of the cost of equity estimation methods presented in section 3. Since detailed

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information about the contents of the other methods category is lacking, this conclusion remains to be tentative, however. The table also shows that the education variable is positive and statistically significant, confirming the idea that more developed estimation methods are positively related to the level of education of the CFO.

6.   SUMMARY AND DISCUSSION

In this paper, we have argued that the use of capital budgeting practices may be related to the level of economic development. We have given a number of arguments to support this argument. First, financial markets have developed over time, making the use of DCF methods more applicable, convenient and necessary. Due to the development of financial markets (and especially stock markets) shareholder maximization has gained in importance, which has pressured CFOs of firms to use DCF methods over other, more simple and less accurate alternatives. Second, training of CFOs has improved over time, which may have enabled them to better understand and thus use more sophisticated techniques. Third, tools and packages that help the CFO to determine which investments are beneficial to the firm have become increasingly sophisticated, which may also have stimulated the use of more sophisticated techniques. Finally, the increased use of computer technology and the related reduction in the cost of this technology may have stimulated the use of more sophisticated techniques.

This paper has investigated this hypothesis using information on the use of capital budgeting techniques by companies in the Netherlands and China. This information was obtained from a survey among 42 Dutch and 45 Chinese firms. With this information, we carried out the analysis using standard differences of means tests and multivariate regression analysis to see whether the level of economic development matters for the use of capital budgeting practices. We focused on whether there was a so-called "country effect", i.e. whether capital budgeting practices differed significantly between Dutch and Chinese firms and whether these differences can be explained by differences in levels of economic development. We are not aware of any other study in the literature that has looked at this issue.

The main findings of our analysis can be summarized as follows. First, Dutch CFOs use the NPV method significantly more often than their Chinese colleagues do. Second, Chinese CFOs use the ARR method significantly more than Dutch CFOs do. Third, CFOs of Chinese companies less often make cost of equity estimations as compared to Dutch CFOs. These results may be explained by the fact that there is still a gap with respect to the level of economic, financial, human and technological development between the two countries.

At the same time, however, we also find that the use of the IRR method does not seem to differ significantly between Dutch and Chinese firms. The same is true for the estimation of the cost of capital and the use of CAPM as a method of estimating the cost of equity. The latter three results do not lend support to the central hypothesis of this paper. Therefore, we restrain ourselves from drawing too strong conclusions with respect to the importance of the "country effect" as an explanation for differences in capital budgeting practices between the Netherlands and China. Instead, we propose that further research into this issue is required and that more and larger data sets should be created, in terms of the number of firms and individual (annual) firm observations, as well as in terms of the countries included in the research.

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Table 1: Selected Measures of Levels of Economic, Financial, Human and Technological Development for the Netherlands and China, 2003

	the Netherlands	China
Economic development:		
- GDP per capita, 2003 (US dollars)	29,544	1,094
Financial development:		
- Stock market capitalization to GDP, 2003	95.5	48.1
Human development:		
- Tertiary education, gross enrolment ratio, 2002-2003	57	13
Technological development:		
- Number of computers per 1,000 inhabitants, 2003	466.6	27.6
- Information and communications technology expenditure, 2003 (US dollars per capita)	2,009	58
- Information and communications technology expenditure, 2003 (percentage of GDP)	6.8	5.3

Source: World Bank (2005).

Table 2: Firm Characteristics

	Dutch firms (%)	Chinese firms (%)
Sales (millions of euros)		
Less than 25 million	17	4
25-99 million	12	33
100-499 million	24	47
500-999 million	12	16
More than 1 billion	36	0
Foreign sales (% of total sales)		
No foreign sales	2	31
1-24 %	19	42
25-49 %	26	22
50-99 %	50	4
100 %	0	0
Industry		
Manufacturing	50	67
Technology	21	13
Retail and wholesale	12	9
Transport and energy	14	11
Financial	2	0
CFO education		
Undergraduate	12	36
MBA	19	20
Non-MBA master	36	24
PhD	33	20
CFO age		
Less than 40	7	0
40-49	48	51
50-59	45	49
More than 60	0	0

Source: survey results

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Table 3: Capital Budgeting Methods Used: Survey Responses

	NPV	IRR	PB	ARR	Other
Netherlands (*N = 42*)					
% 3 and 4 scores	89	74	79	2	2
Mean score	3.50	2.98	3.10	0.24	0.17
Total sales					
< €500 million	3.27	2.73	3.36	0.09	0.05
≥ €500 million	3.75	3.25	2.80	0.40	0.30
	*2.30**	*1.32*	*2.10**	*1.33*	*1.56*
CFO Master/PhD					
Yes	3.55	3.00	3.10	0.10	0.14
No	3.38	2.92	3.08	0.54	0.23
	0.70	*0.18*	*0.09*	*1.76**	*0.51*
CFO age					
< 50	3.52	2.78	3.17	0.22	0.09
50 or older	3.47	3.21	3.00	0.26	0.26
	0.22	*1.07*	*0.61*	*0.19*	*1.06*
Industry					
Manufacturing	3.52	3.14	3.00	0.05	0.24
Others	3.48	2.81	3.19	0.43	0.10
	0.22	*0.83*	*0.68*	*1.66**	*0.86*
Foreign sales					
< 50% of sales	3.55	3.15	3.40	0.20	0.00
≥ 50% of sales	3.45	2.82	2.82	0.27	0.32
	0.43	*0.82*	*2.17**	*0.31*	*1.98**
China (*N = 45*)					
% 3 and 4 scores	49	89	84	9	0
Mean score	2.51	3.38	3.16	1.00	0.02
	*4.43***	*1.82**	*0.35*	*3.92***	*1.73**
Total sales					
< €100 million	2.12	3.29	3.00	0.82	0.00
≥ €100 million	2.75	3.43	3.25	1.11	0.04
	*1.65**	*0.64*	*1.22*	*0.90*	*0.78*
CFO Master/PhD					
Yes	2.95	3.45	3.00	0.70	0.00
No	2.16	3.32	3.28	1.24	0.04
	*2.15**	*0.63*	*1.40*	*1.81**	*0.89*
CFO age					
< 50	3.13	3.48	3.00	1.00	0.04
50 or older	1.86	3.27	3.32	1.00	0.00
	*3.82***	*1.01*	*1.61*	*0.00*	*0.98*
Industry					
Manufacturing	2.43	3.43	3.10	1.03	0.03
Others	2.67	3.27	3.27	0.93	0.00
	0.58	*0.77*	*0.78*	*0.31*	*0.70*
Foreign sales					
No	1.50	3.29	3.43	0.93	0.07
Yes	2.97	3.42	3.03	1.03	0.00
	*4.21***	*0.60*	*1.88**	*0.31*	*1.51*

Note: The row labelled "% 3 and 4 scores" presents the percentage firms that indicate they use a certain capital budgeting method always (score = 4) or almost always (score = 3). The row labelled "mean" gives the mean score of all firms, using a 0 (never) to 4 (always) scale. The other rows show mean scores of different categories of firms, based on firm characteristics discussed in table 1. The figures in italics are t-test statistics based on a standard differences of means test, showing whether the averages for the different categories of firms are significantly different from each other. The t-test statistics shown for the mean scores of China report whether they are significantly different from the mean scores reported for the Netherlands. *, **, *** are significance levels of 10, 5 or 1 per cent respectively.

Table 4: Most Frequently Used Methods to Measure the Cost of Capital: Survey Responses (% of total)

	Project dependent (risk-adjusted) cost of capital (PDCC)	Weighted Average Cost of Capital (WACC)	Cost of debt (CD)	Other methods
		Netherlands ($N = 42$)		
% of total firms	9.5	66.7	14.3	9.5
Total sales				
< €500 million	13.6	63.6	22.7	0.0
≥ €500 million	5.0	70.0	5.0	20.0
CFO Master/PhD				
Yes	13.8	62.1	10.3	13.8
No	0.0	76.9	23.1	0.0
CFO age				
< 50	13.0	56.5	21.7	8.7
50 or older	5.3	78.9	5.3	10.5
Industry				
Manufacturing	14.3	71.4	14.3	0.0
Others	4.8	61.9	14.3	19.0
Foreign sales				
< 50% of sales	10.0	65.0	20.0	5.0
≥ 50% of sales	9.1	68.2	9.1	13.6
		China ($N = 45$)		
% of total firms	15.7	53.3	28.9	2.2
Total sales				
< €100 million	5.9	47.1	47.1	0.0
≥ €100 million	21.4	57.1	17.9	3.6
CFO Master/PhD				
Yes	15.0	70.0	15.0	0.0
No	16.0	40.0	40.0	4.0
CFO age				
< 50	21.7	69.6	4.3	4.3
50 or older	9.1	36.4	54.5	0
Industry				
Manufacturing	13.3	43.3	40.0	3.3
Others	20.0	73.3	6.7	0.0
Foreign sales				
No	7.1	50.0	35.7	7.1
Yes	19.4	54.8	25.8	0.0

Note: The percentages given in this table refer to the share of firms in each of the categories that indicate that a certain discount rate used is the one they use most frequently. Total percentages for different categories of firms may add up to more than 100 per cent due to rounding errors.

Table 5: Most Frequently Used Method of Cost of Equity Estimation: Survey Responses (% of total)

	No Estimation done	Average historical returns on common stock	Capital Asset Pricing model (CAPM)	Other methods
		Netherlands (*N = 42*)		
% of total firms	35.7	0	33.3 (52.0)	31.0 (48.0)
Total sales				
< €500 million	31.8	0	27.3 (40.0)	40.9 (60.0)
≥ €500 million	40.0	0	40.0 (66.7)	20.0 (33.3)
CFO Master/PhD				
Yes	34.5	0	24.1 (36.8)	41.4 (63.2)
No	38.5	0	53.8 (87.5)	7.7 (12.5)
CFO age				
< 50	43.5	0	30.4 (53.8)	26.1 (46.2)
50 or older	26.3	0	36.8 (50.0)	36.8 (50.0)
Industry				
Manufacturing	19.1	0	42.9 (53.0)	38.1 (47.0)
Others	52.4	0	23.8 (50.0)	23.8 (50.0)
Foreign sales				
< 50% of sales	30.0	0	35.0 (50.0)	35.0 (50.0)
≥ 50% of sales	40.9	0	31.8 (53.8)	27.3 (46.2)
		China (*N = 45*)		
% of total firms	64.4	4.4 (12.7)	24.4 (68.5)	6.7 (18.8)
Total sales				
< €100 million	76.5	0	17.6 (74.9)	5.9 (25.1)
≥ €100 million	57.1	7.1 (16.7)	28.6 (66.7)	7.1 (16.7)
CFO Master/PhD				
Yes	55.0	5.0 (11.1)	35.0 (77.8)	5.0 (11.1)
No	72.0	4.0 (14.3)	16.0 (57.1)	8.0 (28.6)
CFO age				
< 50	43.5	4.4 (7.8)	39.1 (69.2)	13.0 (23.0)
50 or older	86.4	4.6 (33.8)	9.1 (66.2)	0
Industry				
Manufacturing	66.7	3.3 (9.9)	20.0 (60.1)	10.0 (30.0)
Others	60.0	6.7 (16.7)	33.3 (83.3)	0
Foreign sales				
No	92.9	0	7.1 (100.0)	0
Yes	51.6	6.5 (13.3)	32.3 (66.7)	9.7 (20.0)

Note: The percentages given in this table refer to the share of firms in each of the categories that indicate that a certain method of cost of capital estimation is the one they use most frequently. The percentages between brackets in columns 3, 4 and 5 refer to the share of firms using a certain estimation method out of the total group of firms that indicate they do estimate the cost of capital.

Table 6: Determinants of Capital Budgeting Methods: Multivariate Logit Analysis

	NPV	NPV	IRR	IRR	ARR	ARR
	[1]	[2]	[3]	[4]	[5]	[6]
Constant	2.001***	2.957***	1.036***	1.585*	-2.001***	0.028
	(4.20)	(3.35)	(2.95)	(1.88)	(-4.20)	(0.04)
CHINA	-2.046***	-2.324***	1.043*	0.807	2.315***	2.350***
	(-3.64)	(-3.61)	(1.77)	(1.32)	(4.10)	(3.68)
SIZE		-1.172**		-0.593		-0.883
		(-2.010)		(-1.00)		(-1.55)
EDUC		0.525		-0.523		-1.626***
		(0.93)		(-0.83)		(-2.61)
AGE		-1.212**		-0.293		-0.674
		(-2.15)		(-0.50)		(-1.15)
INDUSTRY		0.155		0.595		-0.948
		(0.27)		(1.02)		(1.53)
Number of observations	87	87	87	87	87	87
Mc Fadden R^2	0.15	0.24	0.04	0.07	0.19	0.28

Note: All models presented in this table are estimated using the logit estimation method. The variables used in the analysis are defined as follows: *NPV* = 1 if the score for a firm for the NPV method is 3 or 4, it is 0 if the score of a firm is less than 3; *IRR* = 1 if the score for a firm for the IRR method is 3 or 4, it is 0 if the score of a firm is less than 3; *ARR* = 1 if the score for a firm for the ARR method is 1 or higher, it is 0 if the score of a firm is 0; *CHINA* = 1 if the firm is a Chinese firm, it is 0 if the firm is Dutch, this variable is used to measure the country effect; *SIZE* = 1 if a Dutch firm has total sales of less than 500 million euros or if a Chinese firm has total sales of less than 100 million euros, it is 0 if a Dutch (Chinese) firm has total sales of 500 (100) million euros or more; *EDUC* = 1 if the CFO of the firm has a PhD or Master degree, it is 0 if (s)he has an undergraduate or MBA degree; *AGE* = 1 if the CFO of the firm is 50 years or older, it is 0 if (s)he is younger; *INDUSTRY* = 1 if the firm is manufacturing firm, it is 0 if it is not. The figures between brackets are t-test statistics. *, **, *** are significance levels of 10, 5 or 1 per cent respectively. The McFadden R^2 is an analogue to the R^2 reported for regular OLS regression models.

Table 7: Determinants of the Most Frequently Used Methods to Measure the Cost of Capital: Multivariate Logit Analysis

	Project dependent (risk-adjusted) cost of capital (PDCC)	Weighted Average Cost of Capital (WACC)	Cost of debt (CD)	Cost of debt (CD)
	[7]	[8]	[9]	[10]
Constant	-2.251***	0.693**	-1.1792***	-3.766***
	(-4.28)	(2.12)	(-4.06)	(-3.61)
CHINA	0.560	-0.560	0.891*	0.746
	(0.84)	(-1.26)	(1.62)	(1.13)
SIZE				1.886***
				(2.75)
EDUC				-0.974
				(-1.52)
AGE				1.298**
				(2.02)
INDUSTRY				1.213*
				(1.72)
Number of observations	87	87	87	87
Mc Fadden R^2	0.01	0.01	0.03	0.24

Note: All models presented in this table are estimated using the logit estimation method. The variables used in the analysis are defined as follows: *PDCC* = 1 if a firm indicates that in most cases it uses a project dependent (risk-adjusted) cost of capital, it is 0 if this is not the case; *WACC* = 1 if a firm indicates it uses the weighted average cost of capital on a regular basis to estimate the cost of capital, it is 0 if this is not the case; *Cost of debt* = 1 if a firm indicates it uses the cost of debt as an estimate for the cost of capital on regular basis, it is 0 if this is not the case; *CHINA* = 1 if the firm is a Chinese firm, it is 0 if the firm is Dutch, this variable is used to measure the country effect; *SIZE* = 1 if a Dutch firm has total sales of less than 500 million euros or if a Chinese firm has total sales of less than 100 million euros, it is 0 if a Dutch (Chinese) firm has total sales of 500 (100) million euros or more; *EDUC* = 1 if the CFO of the firm has a PhD or Master degree, it is 0 if (s)he has an undergraduate or MBA degree; *AGE* = 1 if the CFO of the firm is 50 years or older, it is 0 if (s)he is younger; *INDUSTRY* = 1 if the firm is manufacturing firm, it is 0 if it is not. The figures between brackets are t-test statistics. *, **, *** are significance levels of 10, 5 or 1 per cent respectively. The McFadden R^2 is an analogue to the R^2 reported for regular OLS regression models.

**Table 8: Determinants of Cost of Capital Estimation Methods:
Multivariate Logit Analysis**

	No Cost of Capital Estimation (NOCC)	No Cost of Capital Estimation (NOCC)	Capital Asset Pricing Model (CAPM)	Capital Asset Pricing Model (CAPM)	Other	Other
	[11]	[12]	[13]	[14]	[15]	[16]
Constant	-0.588*	-0.386	-0.693**	0.203	-0.802**	-2.90***
	(-1.83)	(-0.57)	(-2.12)	(0.28)	(-2.40)	(-2.87)
CHINA	1.182***	1.283***	-0.435	-0.664	-1.837***	-1.662**
	(2.64)	(2.60)	(-0.91)	(-1.26)	(-2.68)	(-2.30)
SIZE		0.308		-0.765		0.900
		(0.64)		(-1.45)		(1.40)
EDUC		-0.464		-0.348		1.325*
		(-0.95)		(-0.66)		(1.80)
AGE		0.581		-0.798		0.290
		(1.23)		(-1.55)		(0.46)
INDUSTRY		-0.700		0.135		0.897
		(-1.43)		(0.267)		(1.36)
Number of observations	87	87	87	87	87	87
Mc Fadden R^2	0.06	0.10	0.01	0.05	0.11	0.20

Note: All models presented in this table are estimated using the logit estimation method. The variables used in the analysis are defined as follows: *NOCC* = 1 if a firm indicates that in most cases it does not make estimates of the cost of capital, it is 0 if it does make estimations of cost of capital on a regular basis; *CAPM* = 1 if a firm indicates it uses the CAPM model on regular basis to estimate the cost of capital, it is 0 if this is not the case; Other = 1 if a firm indicates it uses another model to estimate the cost of capital, it is 0 if this is not the case; *CHINA* = 1 if the firm is a Chinese firm, it is 0 if the firm is Dutch, this variable is used to measure the country effect; *SIZE* = 1 if a Dutch firm has total sales of less than 500 million euros or if a Chinese firm has total sales of less than 100 million euros, it is 0 if a Dutch (Chinese) firm has total sales of 500 (100) million euros or more; *EDUC* = 1 if the CFO of the firm has a PhD or Master degree, it is 0 if (s)he has an undergraduate or MBA degree; *AGE* = 1 if the CFO of the firm is 50 years or older, it is 0 if (s)he is younger; *INDUSTRY* = 1 if the firm is manufacturing firm, it is 0 if it is not. The figures between brackets are t-test statistics. *, **, *** are significance levels of 10, 5 or 1 per cent respectively. The McFadden R^2 is an analogue to the R^2 reported for regular OLS regression models.