

AN ANALYSIS OF THE INVESTMENT APPRAISAL PRACTICES OF IRISH COMPANIES

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Introduction

The objective of this paper is to analyse, on two levels, the investment appraisal practices of the top 1,000 Irish companies. The first level is a standard extent of usage analysis, deriving some basic structural data on investment appraisal practices. The deeper level and the unique contribution of this paper, is an examination of why discounted cash flow (DCF) techniques are not used in investment appraisal.

This paper falls into a long tradition of investment appraisal survey papers. Our particular concern has been with recent studies examining practices in Britain, Scotland and Ireland [Pike (1983a) Pike (1988), Ho & Pike (1991, 1992), McIntyre and Coulthurst (1986), (Sangster 1993)].

So far as we are aware, the only significant reported research on the investment appraisal practices of Irish companies was undertaken by Green and McIlkenny (1991). While producing some interesting results to which we return later, the study was hampered both by a small sample size (89 companies). This limitation was acknowledged by the authors, as was the probable presence of non-response bias.

Table 1 (over) summarises the investment appraisal practices reported in the present survey and three other large scale surveys conducted in the United Kingdom during the 1980's and early 1990's.

Table 1 suggests that there might be significant differences between the investment appraisal practices of Irish and UK companies. While Irish companies in this study tend to be more likely than UK companies to adopt a formal procedure (in the sense of having a uniformly applied mechanism for assessing expenditure), that procedure is less likely either to be 'DCF' based or to include a post-expenditure audit.

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Table 1: Main Features Of Reported Investment Appraisal Surveys.

<i>Comparator</i>	<i>The present study</i>	<i>Green & McIlkenny Ireland</i>	<i>Sangster Scotland</i>	<i>McIntyre & Coulthurst England</i>	<i>Pike UK</i>
<i>year of analysis</i>	1993	1991	1992	1985	<i>various</i>
<i>% of companies with formal investment appraisal procedures</i>	93%	59.1%	n/a	58%	74%
<i>% of companies using discounting methods (alone or in combination)</i>	49.1%	39.1%	73.1%	45%	60%
<i>% of companies with post expenditure audit</i>	42%	73.9%	n/a	90.9%	48%

The Dataset

The motivation for the present survey was a desire to take a snapshot of the investment appraisal techniques in use within the top companies operating in Ireland and to ascertain the managerial and behavioural issues that prompted their implementation. Utilising the 'Business and Finance' Top 1000 database (a database of the top 1137 companies ranked by turnover), a questionnaire was mailed to the financial controllers in May 1993. A total of 424 usable responses representing a response rate of 37% were received. It should also be noted that the sample represents a high proportion of the total employment and profitability of the Irish economy. Table 2 summarises statistics on the population and the respondents. It indicates that there is a large firm bias which we have not attempted to correct.

Table 2: Overview Of The Population And The Respondents

	<i>Universe B & F Top 1000</i>		<i>Respondents</i>	
	<i>Sum</i>	<i>Mean</i>	<i>Sum</i>	<i>Mean</i>
<i>employment (numbers)</i>	413,499	365	216,527	585
<i>as % of total non govt. employment</i>	69%		37%	
<i>turnover (in millions Ir£)</i>	£46,780	£41	£ 27,704	£75
<i>as % of GNP</i>	146%		87%	

In formulating the twenty questions contained in the questionnaire an attempt was made to deal with Rappaport's (1979) criticisms of previously reported research. Thus, the survey instrument was designed to facilitate statistically meaningful inferences about investment appraisal practices across different industries. Table 3 presents the response rates by industry.

Table 3: Responses To Survey Analysed By Industry

<i>Industry</i>	<i>Universe #</i>	<i>Response #</i>	<i>Response%</i>	<i>Universe % Distribution</i>	<i>Response Distribution %</i>
<i>1 Agriculture</i>	56	33	59%	5%	8%
<i>2 Non fuel mineral</i>	5	2	40%	0%	1%
<i>3 Other mfct.</i>	314	148	47%	28%	35%
<i>4 Distribution</i>	229	62	27%	20%	15%
<i>5 Finance/rental</i>	83	21	25%	7%	5%
<i>6 Other services</i>	52	37	71%	5%	9%
<i>7 Energy & water</i>	14	14	100%	1%	3%
<i>8 Metal mfct. & eng.</i>	178	31	17%	16%	7%
<i>9 Civil eng. & bldg.</i>	62	19	31%	5%	5%
<i>10 Transport & comms.</i>	54	22	41%	5%	5%
<i>11 Chemicals</i>	90	29	32%	8%	7%
<i>Total</i>	1,137	418	100%	100%	

$\chi^2 = 8.244$ for a difference in distribution proportions between the respondents and the universe with 9 degrees of freedom. As the critical value for 95% confidence is 16.919, we can conclude that there is no difference in the proportion of firms as between the response group and the universe - our response group is therefore a valid sample from the universe. [Six respondents could not be assigned to an industrial sector]

The Findings

The remainder of this paper contains analyses of some of the main results of an initial data analysis. We concentrate on three aspects of the survey in this initial presentation of results.

- Irish and international investment appraisal practice
- Non-cash influences in the investment appraisal process
- Views of respondents not using discounting methods of financial appraisal

Irish Investment Appraisal Practice

A total of 266 usable responses was received to the questions regarding the techniques used. To put this into perspective: this is a sample ten times larger than the previous Irish

study by Green & McIlkenny. Table 4 shows the distribution of technique usage by industry. Such a detailed breakdown of investment appraisal practices technique by industrial sector has not been reported prior to this survey.

Table 4: Industry Classification and Frequency Of Appraisal Techniques

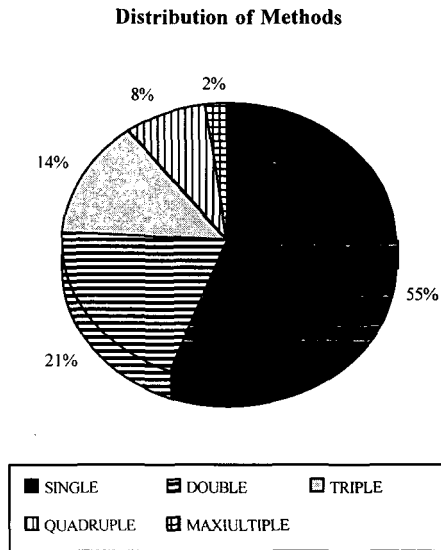
<i>Industry</i>	<i>Sector % using Formal Procedures</i>	<i>% Using Post expend. Audit</i>	<i>% Using Scenario Analysis</i>	<i>% Using Sensitivity Analysis</i>
<i>1 Agriculture</i>	70%	33%	18%	55%
<i>2 Non Fuel Mineral</i>	100%	50%	50%	100%
<i>3 Other Manufacturing</i>	92%	47%	18%	61%
<i>4 Distribution</i>	74%	35%	21%	55%
<i>5 Finance & Rental</i>	85%	33%	5%	52%
<i>6 Other Services</i>	81%	22%	11%	57%
<i>7 Energy & Water</i>	100%	64%	36%	86%
<i>8 Metal Mfct. & Eng.</i>	97%	48%	10%	55%
<i>9 Civil Eng. & Building</i>	74%	32%	32%	63%
<i>10 Transport & Comms.</i>	91%	32%	18%	73%
<i>11 Chemicals</i>	93%	59%	34%	45%
<i>Average</i>	87%	41%	23%	64%

Taking THE EXPANSION DECISION ONLY, the study reveals that 93% of respondents use a formal method of investment appraisal. However, the number of companies who report using no explicit method of investment appraisal represents a significant minority at 7%. Table 5 shows, in percentage terms, the distribution of techniques used for evaluating expansion type investments.

Table 5: Methods Used For Evaluating Estimated Cash Flows

		%
SINGLE METHODS	216	55.7%
PB	83	21.4%
ROI	49	12.6%
NFM	27	7.0%
IRR	23	5.9%
NPV	14	3.6%
OM	11	2.8%
DPB	9	2.3%
DOUBLE METHODS	80	20.6%
ROI+PB	20	5.2%
IRR+NPV	12	3.1%
NPV+PB	11	2.8%
IRR+PB	8	2.1%
ROI+NPV	7	1.8%
NPV+OM	4	1.0%
IRR+DPB	4	1.0%
ROI+IRR	4	1.0%
PB+DPB	3	0.8%
OM+PB	2	0.5%
ROI+DPB	2	0.5%
ROI+OM	1	0.3%
NFM+PB	1	0.3%
NPV+DPB	1	0.3%
TRIPLE METHODS	53	13.7%
ROI+IRR+PB	10	2.6%
IRR+NPV+PB	8	2.1%
ROI+NPV+PB	7	1.8%
ROI+IRR+NPV	7	1.8%
IRR+NPV+DPB	5	1.3%
ROI+DPB+PB	4	1.0%
NPV+PB+DPB	4	1.0%
IRR+PB+DPB	2	0.5%
ROI+IRR+DPB	2	0.5%
ROI+NFM+PB	1	0.3%
ROI+OM+PB	1	0.3%
ROI+NPV+DPB	1	0.3%
ROI+NPV+OM	1	0.3%
QUADRUPLE METHODS	31	8.0%
ROI+IRR+NPV+PB	12	3.1%
IRR+NPV+PB+DPB	8	2.1%
ROI+IRR+DPB+PB	5	1.3%
ROI+IRR+NPV+DPB	3	0.8%
ROI+NPV+PB+DPB	2	0.5%
IRR+NPV+OM+PB	1	0.3%
MAXIMULTIPLE METHODS	8	2.1%
ROI+IRR+NPV+DPB+PB	4	1.0%
ROI+NPV+IRR+OM+PB	1	0.3%
IRR+NPV+OM+DPB+PB	1	0.3%
ROI+IRR+NPV+OM+DPB+PB	2	0.5%

Key : PB = Payback ; DPB = Discounted Payback ; NPV = Net Present Value ; IRR = Internal Rate of Return ; ROI = Return on Investment ; OM = Other Methods ; NFM = No Formal Method

Figure 1: Distribution of Methods

Graphically, Figure 1 shows summary figures for this.

Of those who do adopt formal methods, in common with practices reported from the UK and Scotland, the most popular method of investment appraisal among Irish companies is the payback method. 21% of respondents listed it as the sole method used. This compares with the Sangster and Pike studies which reported 14% and 11% respectively. Interestingly, of the discounting methods available, IRR is more popular than NPV; almost 6% use IRR as a sole criterion compared with 3.6% for NPV. Almost 45% of respondents use more than one method of appraisal. Where appraisal methods are combined responses indicate that the combination typically includes a DCF method such as NPV or IRR or Discounted Payback. Thus, when we combine the numbers using a DCF technique as a single criterion with those using it in combination, we can see that the numbers using a 'sophisticated' technique is 50%. In this regard Ireland compares favourably with UK companies. In order to investigate further the differences between the usage of various techniques, a number of explanatory variables were examined. In Pike's 1988 analysis, size emerged as a significant positive variable in the adoption of sophisticated techniques. His 1983 study showed that there was a significant size effect in the adoption of DCF techniques, but not in ROI or Payback. Only for NPV did he find that there was no variation across industries.

Sangster concludes from a detailed statistical analysis of a number of studies that while size is an important factor, it is not as important in describing the adoption of DCF techniques as was previously assumed. Green & McIlkenny found that size was not a significant explanatory factor in the decision to use a particular appraisal technique, nor

in the decision to adopt a formal capital budgeting manual. Pike (1983 b) found that capital constraints tended to increase the emphasis firms placed on payback and to reduce the emphasis placed on DCF techniques. It also tended to be associated with an increased reliance on such sophisticated methods of assessment as mathematical programming. To assess the effects of various factors such as industry, size etc. on the decisions regarding the choice of method used by companies in our sample, a regression analysis was carried out, the results of which are shown in Table 6. The dependant variable was a binary variable, where 1 indicated the adoption of DCF techniques and 0 otherwise.

Table 6: Explaining the use of DCF techniques

<i>Predictor</i>	<i>Coefficient</i>	<i>Standard Deviation</i>	<i>t-ratio</i>
<i>Constant</i>	-0.2864	0.1039	-2.76***
<i>Industry</i>	0.0110	0.0085	1.29
<i>Turnover</i>	0.0869	0.0219	3.97***
<i>MNC Subsidiary</i>	0.1294	0.0520	2.49**
<i>Capital Shortage</i>	0.0074	0.0231	0.32
<i>Existence Of Formal Capital Budgeting Procedures</i>	0.2583	0.0837	3.09***
<i>Use Of Scenario Analysis</i>	-0.0289	0.0627	-0.46
<i>Use Of Sensitivity Analysis</i>	0.338	0.0534	6.34***

R-sq... = 27.4% R-sq...(adj.) = 25.7% *** = Significant at 1% level, ** significant at 5% level

As regards the significance of these results, it may first be noted that there is a weak industry effect. Second, there is a strong size effect (where size is proxied by turnover); the larger firms seem more likely to adopt DCF methods than do smaller firms. Third, Irish enterprises that are subsidiaries of multinational companies are more likely to adopt DCF methods than are independent domestic firms. Contrary to the findings of Pike (1983b) a financial constraint apparently does not influence the choice of investment criterion. However, there is a clear relationship between adopting DCF methods and the use of sensitivity analysis and the existence of a formal process. All of these relationships are of the expected sign. The one strange result is the negative, albeit non-significant relationship, between DCF usage and scenario analysis. This is unusual, and the results for scenario and sensitivity analysis are the reverse of the results found by Pike (1983b). Clearly, we can begin to explain a good deal of the variation in the use and non use of DCF techniques. It is also heartening to see that the signs are mainly in the direction one might expect.

Non-cash Influences in the Investment Appraisal Process

For most companies, the formal economic/cash appraisal is only one element of the overall investment decision. In this study, a series of questions was asked to elicit managers' perceptions of the relative importance of the cash flow computation vis-a-vis other dimensions of the appraisal. 83% of respondents indicated that cash flow appraisal was merely one of many determinants, while only 27% indicated that it was the main determinant. Table 7 below presents a summary of the responses.

Table 7: The Importance Of The Cash Appraisal In The Overall Investment Appraisal Process

	<i>% Of Firms Indicating this</i>
<i>Cash is the Main Determinant</i>	27%
<i>Cash is One Of Many</i>	83%
<i>Cash is a Post Facto Justification</i>	4%

Clearly a great many firms believe that the non-cash elements of capital budgeting are important. McIntyre & Coulthurst stated that the majority of companies which reported taking non quantifiable elements into account also indicated that they judged these elements to be important or very important. Table 8 reproduces this.

Table 8: Importance Of Non-Quantifiable Elements - Firms' Perceptions

<i>Importance of Non Quantifiable Elements</i>	<i>% Of Firms Indicating this</i>		
	<i>Few Projects</i>	<i>Most Projects</i>	<i>All Projects</i>
<i>Not Important</i>	7%	20%	7%
<i>Important</i>	18%	30%	18%

Source : McIntyre & Coulthurst 1986 (adapted)

8% indicate that these elements were important for most or all projects. Pike (1983a) evaluated the relative importance of systematic and qualitative elements of the investment appraisal decision. He found that 82% of companies rated qualitative factors as important or very important, compared with only 72% of companies responding on a similar scale for systematic procedures. A significant size effect was not found, possibly due to the formal inclusion of non cash elements in more highly developed systems, as might be expected to be found in larger firms (Pike 1983a). With this in mind, we proceeded to an analysis of the main non-cash determinants of capital appraisal. We asked respondents to indicate if a number of issues (strategic considerations, ethical or social issues, regulation etc.) were taken into account in their capital budgeting. Table 9 below reproduces the results of this analysis; 209 companies responded to this question in a usable form.

Table 9: Non-Cash Elements Taken Into Account

<i>Elements Taken Into Account</i>	<i>% of respondents</i>
Single Element Only	10%
Strategy	7.%
Market Trends	3%
Multiple Methods	90%
Regulation, Market Trends & Strategy	18.%
Regulation, Market Trends , Strategy & Ethics	15%
Regulation, Market Trends, Prestige, Ethics & Strategy	13.%
Strategy & Market Trends	11.%
Regulation & Strategy	10.%
Regulation, Strategy & Ethics	9%
Strategy, Market Trends & Ethical Or Social Issues	4.%
Other Combinations	10%

The most significant single non-cash determinant was strategy, followed by market trends. However, the vast majority of companies take multiple non-cash factors into account. The industry which reported taking greatest account of ethical and social issues was unsurprisingly the chemical industry. Another highly rated factor for industry in general was the need to follow market trends. What was surprising however was that while companies indicated a desire to follow market trends, there were fewer companies following market trends than one might expect, even hypothesising that market trends and strategic issues are rarely distinct one from another.

Table 10 shows the breakdown of non cash determinants across expenditure categories. What is interesting here is the small proportion of firms that indicate that regulation or government compulsion is an important non cash factor affecting their capital investments. As might be expected, for expansion and diversification the pre-eminent determinant, apart from the financial issues, is strategy.

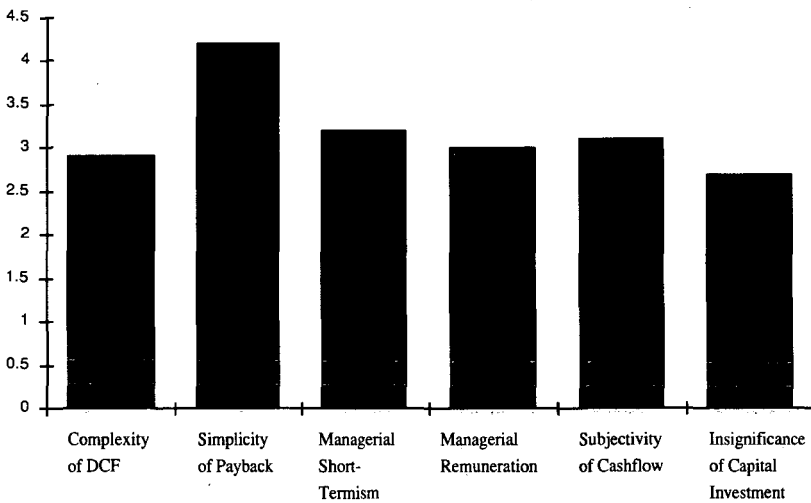
Table 10 : Importance Of Non-Cash Issues In Different Categories Of Investment Decision.

<i>Determinant</i>	<i>Basic Replacement</i>	<i>Expansion Expenditure</i>	<i>Diversification Expenditure</i>	<i>Downsizing Expenditure</i>
<i>Strategic Issues</i>	64%	88%	83%	75%
<i>Ethical/Social Compulsion/ Regulation</i>	27%	17%	16%	30%
<i>Following Market Trends</i>	65%	40%	33%	35%
<i>Prestige</i>	37%	48%	40%	37%
	5%	12%	12%	2%

Views Of Respondents Not Using Discounting Methods Of Appraisal

A unique feature of this survey was to seek the reactions of those who do not use discounting methods in their appraisal. We were interested in why respondents did not use such methods. Respondents were required to indicate their degree of agreement or otherwise with a number of statements. A 5 point Likert scale was employed. We did not feel, at this stage, that detailed individual questions were required and we are conscious that these questions do contain a number of sub questions, and intend to undertake further work on the importance of these sub questions. Figure 2 shows the average responses to the questions asked.

Graph 2: Average Responses



As these averages are obviously quiet close, it was felt that some analysis of them was required. A nonparametric test (Wilcoxon) was carried out on all of them, the null hypothesis being that the median response was 3, which would indicate indifference. A test of the mean being so was also carried out. The results are presented in Table 11.

Table 11 - Tests Of Indifference Regarding DCF Non-Use

<i>Statement</i>	<i>Mean</i>	<i>Estimated Median</i>	<i>Wilcoxon Statistic (Median)</i>	<i>t Value (Mean)</i>
The calculations and concepts underlying DCF methods are too complex	2.8482	3.0	5692*	-1.73*
Payback is a simple, easily understood method of project appraisal	4.1498	4.5	18510***	14.15***
Managers have a preference for short-term/ profit oriented objectives and DCF may militate against projects that fulfil these criteria	3.2117	3.0	7256**	2.47**
Remuneration & reward systems for managers are linked to conventional profit measures	3.0134	3.0	7401	0.15
The modelling of cash flows is subjective. It does not make sense to apply objective methods to subjective data	3.1250	3.0	6746	1.49
Capital investment decisions in general are not very significant and as such do not warrant complicated methods of appraisal.	2.6282	2.5	6996***	-3.8***

Significant at 1% ** Significant at 5% * Significant at 10%

Of the six broad statements which managers were invited to agree or disagree with as possible explanations for not using discounting techniques in their capital investment appraisal processes, the most strongly held views were expressed about the statement that 'payback is a simple, easily understood method of project appraisal'. With a response mean of 4.15 on a Likert 5 point scale, where a score of 1.0 indicated strong disagreement and a score of 5.0 indicated strong agreement, there was relatively strong support for this statement. The next most strongly held view was that managers tended to disagree with the hypothesis that capital budgeting decisions are not very significant and as such do not warrant complicated methods of appraisal'. A Wilcoxon test for the significance of these medians and a t test for the significance of means indicated that these statements were significantly different from indifference at the 1% level. Respondents also indicated moderate agreement with the view that 'managers have a preference for short term, profit oriented objectives and that [the use of] DCF may militate against projects satisfying these criteria.'. This was significant at the 5% level

under both the t test and the Wilcoxon test. Respondents did not hold clear views one way or the other about the remaining three statements from the set of six. They did, however, express mild disagreement with the contention that 'the concepts and techniques underlying DCF methods are too complex'. In addition, there was just a modicum of support for the notion that the modelling of cash flows is subjective to the extent that it does not make sense to apply objective methods to such projections (leading to a sense of spurious accuracy). Opinion was neutral on the contention that remuneration and reward systems for managers are linked to conventional profit measures' thus, it is argued, militating against the construction and use of cash based project evaluations, including DCF. None of these were significantly different from indifference.

What emerges from the responses to the six broad (and sometimes composite) hypotheses offered as possible explanations for the non-use of DCF techniques in capital investment appraisal may be reasonably summarised as follows: Managers strong attachment to the simplicity of payback is both mirrored in and underpinned by their preference for short-term, profit oriented objectives the achievement of which could be compromised by the application of DCF techniques [which evaluate a project over its whole life cycle]. At the same time managers appear to recognise that capital investment decisions are generally not insignificant and claim that they are not averse to using complex methods of appraisal when the occasion warrants it, a view which is reinforced by their belief that the concepts and techniques underlying DCF methodologies are not necessarily too complex to implement. The findings indicate some support for the view that short termism exists in Irish companies, though the degree to which this is true of managers in general may be overstated due to the fact that the questionnaires were completed by financial controllers. The overall statistical evidence across the six hypotheses may be just about strong enough to suggest that managers' preoccupation with payback and short term profitability outweighs their willingness to conduct DCF analyses, despite the fact that on the whole, they disagree that DCF methodologies are too complex. Given certain limitations in the questionnaire design (associated with the grouping/bundling of factors which some managers might see as inherently different in nature), the summary above must be offered as a tentative and, some might argue, relatively crude effort to define a managerial rationale for not using DCF techniques. The authors would contend, however, that it is both reasonable and justifiable to portray the results in this fashion. They further contend that the relatively widespread non-use of DCF techniques together with managers' responses* to the various hypotheses which were advanced as possible causes of this should not be construed as constituting an unsophisticated or unenlightened approach to the appraisal of capital projects. On the contrary, it is possible to argue that the findings support the views of several authors (Jones & Dugdale, Northcott, Hopper, Wilson) who have drawn attention to the necessity to distinguish between different forms of rationality (thin v broad, economic v sociological/political/psychological, academic v practitioner etc.). As a further test of the relationships between the various statements, a correlation analysis was carried out. The objective was to see if there was a real clustering of relationships. To this end,

tests of the significance of the correlation coefficients on the hypothesised relationships were carried out. The results are presented in Table 12

Table 12: Correlation Analysis Of Agreement With Statements

	<i>DCF Complexity</i>	<i>Simplicity of Payback</i>	<i>Managerial Short- termism</i>	<i>Managerial Pay link</i>	<i>Subjective Cashflow</i>
<i>Simplicity Of Payback</i>	0.107 <i>23.81</i>				
<i>Managerial Short Termism</i>	0.162 <i>36.60</i>	0.163 <i>36.84</i>			
<i>Managerial Pay Link</i>	0.131 <i>29.32</i>	0.033 <i>7.27</i>	0.274 <i>65.17</i>		
<i>Subjective Cashflow</i>	0.164 <i>37.08</i>	-0.073 <i>-16.15</i>	0.2 <i>45.83</i>	0.196 <i>44.84</i>	
<i>Insignificance Of Capital Budgets</i>	0.157 <i>35.41</i>	-0.057 <i>-12.58</i>	0.175 <i>39.72</i>	0.205 <i>47.08</i>	0.148 <i>33.29</i>

T statistics in italics (200 df) : All are significantly different from zero at 1% or less

We may explain Table 12 as follows: all of the statements on which we solicited responses have semantic content; however, there are weak but statistically significant relationships between the statements.

These subjective feelings do differ across the size, nature, and to some extent the industry of the respondent company. In general, we found that as the size of the company increases, regardless of how this is measured (turnover or staff size), managers appear to become more attached to the inherent simplicity of payback yet do not appear to adopt it more. The same firms reluctance to adopt a method that they find appealing may be linked to the fact that these same large companies find cashflow forecasts less subjective, and presumably therefore more amenable to relatively more complex methodologies, and may also be due to the fact that they generally feel that capital budgets are sufficiently large to warrant serious analysis. In terms of industrial breakdown, only in the case of the Finance/Renting industry is there a significant difference from the usual pattern. This industry, which is by its nature less intensive in physical capital, shows, on average, a higher level of agreement than the overall average with the idea of discounting not being useful due to its perceived usefulness being

limited to the long/medium term. Given the long time horizons of many banking and financial projects this is a surprising finding.

Conclusion

We have reported here just some of the data which we have collected from our recent survey of the top 1,000 Irish companies. The paper also reported some of the initial analyses we have performed. We have attempted to advance some tentative explanations for the differential levels of usage of discounting techniques. At this stage, we are reluctant to advance any firm conclusions of an explanatory kind about the investment appraisal practices that Irish firms adopt. However, we would hope that this paper will become a useful data source for 'structural' information about the capital budgeting practices of Ireland's top companies.

Further research is needed on many of the issues raised in this paper. In addition, we have other information on which we have not reported. Some of this is qualitative, in the form of comments and explanatory memoranda that companies attached. One tentative research agenda would look at the issues of audit firm influence, legal form and techniques used, and at the different capital investments made and the techniques chosen to analyse and approve them. Also, there is the vital question of whether or not there is any importance to the choice of technique - if there is no identifiable difference between the performance of firms that have sophisticated techniques and those that use more simplistic, then it begs the question of whether or not academics should worry about the theoretical foundations of the techniques.

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