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EUROPEAN SERIES

SURVEY ON THE APPLICATION OF
ANALYTICAL TECHNIQUES
IN INVESTMENT DECISIONS :
FRANCE 1974

Antony PARES

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SURVEY ON THE APPLICATION OF ANALYTICAL TECHNIQUES IN INVESTMENT DECISIONS:

FRANCE 1974^x

ANTONI PARES^{xx}

Many surveys have been undertaken, notably in the United States, to appraise the impact of investment theory, as presented in professional articles and text-books, on real world practices (e.g. see [1], [2], [3], [4]). Yet no comparable survey has been conducted in France of a scope sufficient to gain a broad view of investment decision practice¹. The surveys could be considered as a test of the relevance and validity of theoretically correct norms: some survey findings have prompted the researcher to propose avenues for more relevant theoretical work [2]. But surveys also serve to appraise the quality of investment analysis practised by businessmen.

All surveys have evidenced a lagged, but growing impact of normative models on business practices. Discounted cash flow techniques, in spite of quite strong restrictive hypotheses (e.g. see [6]) have been, however, increasingly adopted by practical men and business consultants as the only adequate tools to analyze investment decisions. Similarly, more recent applications of decision theory, the portfolio and capital asset pricing models, as well as techniques such as simulation, are being, or have already been, considered by the business world as helpful devices to improve investment decisions.

Governments are also very interested in the interaction between theory and practice. Some think that an analytical appraisal of investment alternatives may move both private and public firms to allocate scarce national resources to better uses than those stemming from decisions taken with less sophisticated analysis, and hence publish pamphlets to widen the use of analytical techniques².

Among previous surveys, the one made in the United States by Klammer in 1970 [1] was especially fit to serve as a guide and a basis for international comparisons. Hence it was used as such in the present survey which intended to provide a general view of French practices and a benchmark for further studies.

The research is presented in three sections. The first one describes the research design. Results are analysed, for France, and in comparison with the United States, in the second one. Finally, conclusions are reported in the third section.

^x Thanks are due to Joël Bessis for valuable assistance. Research funds were made available by CEDEP, as part of its research programme.

^{xx} Assistant Professor, Finance, INSEAD-CEDEP.

¹ A detailed survey [5] was made in 1973 for a limited number of large firms.

² For instance, the French and British Governments (see [7], [8]).

I RESEARCH DESIGN

A mail questionnaire was administered on a selected population of 500 firms. The questionnaire was intentionally short, in order to increase the expected response rate, whereas the population was as large as possible in order to gain a broad view of investment practices in France. A further meeting with respondents was scheduled in order to comment on the results of the questionnaire, deepen the analysis of some important points, and thus avoid some of the dangers of a mail questionnaire, by having some personal, first-hand confirmation of the results.

Population

The largest 500 French firms, classified by owners' equity, as reported in "Dossiers de l'Entreprise", November 1973, were polled. Owners' equity may represent the financial weight of a company, if taken as a proxy for financial mobility, independence and resistance to downswings in the economy. There is no determinant link between use of investment appraisal methods and firm size, except that large firms have more or bigger projects, and hence probably need more sophisticated analysis than smaller firms. The occurrence of analysis in the corporate sector may thus be somewhat exaggerated by the sample's results.

Questionnaire

The questionnaire (see Exhibit 2) was patterned after the U.S. survey [1], but it was adapted to the French situation; questions number 5, 6, 10, 11, 14, 15, and 16 being added. The questions were divided into three groups: first, those of a descriptive nature meant to gather information concerning administrative practices; second, questions as to which standard accepted methods were applied and how, and, third, questions dealing with the application of newer techniques or concepts. Where pertinent, the date of introduction of a technique or administrative practice was asked for.

Response Rate

Six months elapsed between the initial mailing and final data processing dates; a second mailing being sent three months before the final November closing. In all, 27% of contacted firms responded. The response rate by industry can be seen in Exhibit 1. Some 20 firms were not or very little concerned by the questionnaire, such as holding companies, with no real investment projects, and some public companies, e.g. EDF, with extremely sophisticated investment procedures. A contact was made, on judgmental and random basis, to determine the existence of biased non-responses. Explanations given by non-respondents did not indicate any systematic relationship between their lack of response and other non-respondent characteristics.

Follow up meeting

All respondents were personally invited to discuss the results of the survey early in 1975. Of the 132 respondents, 30 expressed interest in the meeting, and finally 15 attended. No disagreement was found between responses given earlier in the questionnaire and those in the meeting. Although limited to about 9% of respondents, this verification confirmed the consistency of the questionnaire's results.

II ANALYSIS OF RESULTS

A general problem in this, like in all, questionnaires, is that respondents may be more oriented to use economic techniques than non-respondents. It is more likely, therefore, that the extrapolation of results would exaggerate the use of economic analysis, rather than the opposite.

Also, comparisons, on any aspect of the questionnaire, by industries, seemed unwarranted by the sample size and rate of response. Furthermore, it was difficult to classify multi-market groups in a single industry.

Results are given in Exhibit 2. United States' results are also included and a comparison on common questions, dealing with administrative procedures, intensity of use of economic analysis, and of newer techniques, will be made. The results need to be compared with caution, as it is possible that the same question could be interpreted differently in the United States and in France.

Administrative Practices (questions 1 to 7)

A high percentage of respondents, about 80 per cent, declare practicing formalized capital budgeting procedures, starting, on the average, around 1966. It is interesting to note, however, that United States' firms are using more administrative techniques, but for one, "formal long range capital budget", than their French counterparts. This relatively higher use by French firms is quite difficult to explain, in view of the other responses.

One could observe that United States' management practice suggests more analytical and "searching" (ref. question 1), more "control" minded (ref. question 3), and more formalized, "professional", behavior (ref. question 4). Conversely, French management practice suggests slightly more emphasis on the "espoused theory" (question 2), which, as seen by responses to all other questions (especially question 7) does not correspond to a "theory in use" since human resources and time required for rigorous analysis are not allocated accordingly. Administrative procedures have been started only a few years ago, and probably they were made necessary by the industrial concentration that took place in France, and by the progressive internationalisation and more acute competition of French firms with other sophisticated foreign firms.

Use of Economic Analysis

1) Frequency

A high percentage of respondent firms declare using formal economic analysis. As a result, approximately 58 per cent of all investment budget (question 8) and about 65 per cent of all projects (question 9) are approved, after formalized economic analysis. United States' results showed a slightly higher recourse to formal analysis: 64 and 70 per cent respectively.

2) Project evaluation criteria

a) Non analytical

Reasons given by businessmen were usually not very explicit, hence no other conclusion would be obtained than the fact that most decisions of this mode were justified by "strategy" and "urgency". These words could be interpreted as follows: strategy as a proxy word for an investment "too complex to be formally analysed" and "urgency" for "too obviously necessary an investment".

b) Accounting

Practically all accounting criteria used were payback and rate of return on total investment, the least unsound of all accounting criteria listed (question 12).

c) Financial

The internal rate of return (IRR) is the most widely used criterion for formal investment analysis, by about two thirds of respondents (question 13). Net present value (NPV) and profitability index account for the remaining one third¹. This result confirms previous findings about the popularity of IRR, in spite of an almost complete agreement by academicians on the superiority of NPV.

d) Relative use of each criterion and implications for Financial Theory

Answers to questions 8 and 9 showed that about two thirds of total investment proposals were formally analysed; this would imply that at most one-third of investments were approved based on non-analytical criteria. In fact, there is no clear-cut separation in the use of any one criterion, and actually many respondents tend to use simultaneously all criteria, in order to "round up" the profile of the investment proposal. They showed a clear preference to use both accounting and financial criteria for the same investment. This practice would tend to conflict with theoretical norms, since, to the extent that one accepts investor rationality and the existence of a perfect capital market, NPV is the only criterion to use. Hence, it would be at best redundant and at worst wrong, to introduce other decisional criteria, such as payback - which deals with risk - or consideration of earnings growth or variability - which regard stock market reactions - to "improve" upon NPV.

Therefore, if, in fact, businessmen do use several criteria, this can be construed, from a theoretical perfect market viewpoint, as lack of rigor. Conversely, one might suggest, practical men everlasting reluctance to discard "wrong" methods may be a first-rate piece of evidence of the inexistence of a perfect market for "real" capital, hence the need to analyse the investment decisions in imperfect markets, and to consider all criteria as relevant answers to different relevant questions. At INSEAD-CEDEP, a multidisciplinary effort is now under way to explore the implications of the survey findings (e.g. see [9]). We hope there will be some merit, following the suggestion of a previous survey ([2] pp. 359-360), in trying to achieve a more operationally meaningful theory, or at least to recentre and clarify the investment decision issue.

1 An explanation of the general lesser use of NPV was provided by one respondent, who thought it was due to the reluctance of any one manager of an organization, to decide on the proper discount rate.

3) Adequacy in use of Analytical Criteria

The majority of respondents used financial criteria to a greater or lesser extent. Three questions were introduced to obtain a view on the correspondence between theoretical prescriptions and practical use: two referring to the determination of cash flows (questions 14 and 15) and one to the discount or hurdle rate (question 16).

a) Cash Flow and Finance Charges (question 14)

The deduction of finance charges from operating cash flows done by more than half of respondents, was probably due to a lack of conceptual clarity on the nature of the discount rate, which includes the cost of financing. A general explanation of this practice could be found in the accounting definition of cash flow (adding net profits - after tax and interest - and depreciation) which is practically used in the financial analysis. Some theoretically acceptable reasons could be found for this practice, such as when there is a linked investment - financing (e.g. leasing, building industry), but they could not certainly fit all firms. A more detailed investigation should be undertaken to fully understand a theoretically unsound practice.

b) Cash Flow and Taxes (question 15)

Again about one half of respondents declared utilising before-tax cash flows. Since the required rate is normally determined after tax, there is an inconsistency in this practice. There are two explanations, however, which can be advanced:

- public firms - some 15 in the sample - do not pay taxes;
- some engineering-oriented firms analyse projects before taxes - considering the project from a purely "physical" viewpoint - a financial analyst taking up the remaining economic and tax implications.

Here again, a more detailed inquiry should be made to fully understand the adequacy of this practice.

c) Required Rate (question 16)

Three groups of respondents can be identified:

- those which use a discount rate given by an authority (public firms and subsidiaries), be it the national plan rate or the rate of the parent company;
- firms using either the cost of debt or equity financing only; and
- firms using some sort of weighted average cost of capital,

each group being of about the same quantitative importance.

Only two of the 42 respondents explicitly mentioned that the required rate was before tax, thus confirming the impression that some firms use cash flows in a way which is not coherent with the discount rate.

Most references to the impact of inflation in the discount rate seemed theoretically sound. This was confirmed at the meeting, where all but

one respondent indicated clearly that the cost of capital already included an adequate adjustment to inflation; that is, that in investment analysis real cost (including that of capital) should be compared to real revenues, and nominal costs (including that of capital) to nominal revenues. It is interesting to note the correspondence between respondents' explanations and the writings of Irving Fisher and his followers.

Newer Techniques

The response rates for these three questions were considerably lower than for the others, thus probably indicating the lesser use of these tools, methods and criteria in investment decisions. Also, the average time since utilisation began is 5 years, lower than in all other techniques. Since academic developments in the field were also late in appearing, the result is consistent with all survey evidence of lagged impact of theoretical developments in the real world. It is probably safe to assume that in a next survey the rate of utilisation of these techniques will be higher.

Raising the required rate of return and shortening the payback period are the most widely used means of taking risk into consideration (question 18). Computer simulation, PERT and linear programming (question 19) are also used extensively.

Comparing France to United States management practices, one could observe a considerably higher emphasis in the United States on using "subjectively" oriented probability and decision theory analysis, and a higher use in France of "objective" engineer-oriented mathematical tools, such as PERT¹ and linear programming.

Other Comments

Comments at the end of the questionnaire and to question 10 were elucidated in the follow-up meeting. To determine the importance attached to formal analysis in the decision making process, respondents were asked in a 1 (most important) to 5 (unimportant) scale their opinion. The resulting average 2,3 tends to show the relative importance of formal analysis. Further inquiry as to the types of investments where analysis was more likely could not yield good results due to the difficulty of homogenous investment classification².

III CONCLUSIONS

Given the characteristics of this survey, one should conclude on three aspects: the comparison of French to United States investment practices; the relevance of theoretical prescriptions to the real world; and the use of analytical methods by businessmen.

1 PERT was included in the questionnaire because it appeared in [1]. Many respondents argued persuasively that it is not a technique for investment analysis, but for the construction of the physical investment itself.

2 Consensus, however, was reached in that social and "non-measurable" investments were never analytically justified, whereas maintenance and expansion investments almost always were.

Comparisons between U.S. and French practices have already been discussed in detail under the different headings. In general, one could say that there is some evidence of a slightly more rigorous investment analysis in the United States (even with a lag of four years), but that French firms are increasingly improving their standards.

The results of the questionnaire, confirming those of previous surveys, show a persistent simultaneous use of criteria by businessmen. They disregard the exclusive use of the only rigorous criterion, NPV, resulting from the assumption of investors' rationality and the existence of a perfect capital market.

For future research the relationship, if any, between the efficient capital market and the real investment behaviour, both abundantly evidenced in many countries, should be explained. A necessary reconciliation should be subsequently obtained between general theoretical norms of behaviour and conflicting business practice₁.

Finally, the survey has uncovered questionable practices, notably concerning the nature of the discount rate and the proper way of analyzing cash flows. By identifying some topics where theory and practice do not fit, the survey may be of immediate usefulness to firms, to the extent that they are improperly using analytical techniques; to governments, by suggesting to them the points they should emphasize in their publications in order for firms to achieve better analyses (hopefully leading to better decisions); and to academicians, by suggesting to them some avenues for research relevant to business problems.

1 A step in this direction was a recent article by Bogue and Roll [10].

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EXHIBIT 1
RESPONSE RATE

Branch	Number of firms actually contacted + (1)	Number of usable answers (2)	Response rate (2)/(1) x 100
Public utilities	12	3	25
Transportation	24	9	37,5
Petrol	18	7	38,9
Chemical industry	17	11	64,7
Non-ferrous metals	2	1	50,0
Glass, ceramics	3	2	66,7
Metallurgy	26	4	15,4
Foods	34	8	23,5
Cars	19	4	21,1
Electrical equipment, appliances, elect- ronics	34	13	38,2
Miscellaneous	11	2	18,2
Extraction	6	0	0
Building materials	24	7	29,2
Rubber, tires	10	4	40,0
Aeronautics	9	0	0
Public works	15	3	20,0
Para chemical industry	18	5	27,8
Beverages	18	5	27,8
Leasing	10	0	0
Department stores	11	3	27,3
Textile	14	4	28,6
Edition	4	1	25,0
Plastics	2	0	0
Import-export	6	1	16,7
Real estate	15	1	6,7
Advertisement	3	1	33,3
Distribution	22	8	36,4
Precision mechanics	8	1	12,5
Trade companies	11	3	27,3
Mechanics	32	9	28,1
Shipbuilding	3	2	66,7
Leather and shoes	1	1	100,0
Papers, packing	10	3	30,0
Tourism, leisure	7	2	28,6
Building	15	1	6,7
Consumers cooperative	5	1	20,0
Transportation auxiliaries	1	0	0
Wood, furniture	3	1	33,3
Clothing	1	0	0
Engineering	3	0	0
Total	487	132	27,1

+ 13 firms could not be contacted on time.

EXHIBIT 2

QUESTIONNAIRE ON CAPITAL BUDGETING TECHNIQUES

R E S U L T S

FRANCE AND USA (see (1))

QUESTIONS AND RESPONSES

	Relative frequency %		Response rate (% of 132)
	<u>France</u>	<u>USA</u>	<u>F</u>
1. <u>Administrative techniques</u>			
1. Are alternatives to major investment proposals specifically searched for and considered ?			98,5
1 Yes	80,0	94	
2 No	20,0	6	
If yes, since 8.0 years (1)			59,1
2. Is a long range capital budget formally prepared?			99,2
1 Yes	88,5	69	
2 No	11,5	31	
If yes, since 8.8 years (1)			68,2

	relative frequency %	USA	response of 132 F1
3. Does your firm carry out postaudits of major projects?			97,7
1 Yes	77,5	88	
2 No	22,5	12	
If yes, since 6.2 years (1).....			58,3
4. Are standard forms generally used for budget and appropriation requests ?			97,7
1 Yes	69,3	97	
2 No	30,2	3	
If yes, since 8.4 years (1).....			51,2
5. Is the investment decision decentralized ?.....			99,2
1 Yes	21,4		
2 No	78,6		
If yes, since 8.0 years (1).....			12,1
6. What types or proportion of investment are not decentralized?			84,9
1 Those of a strategic nature, common to two or more departments, for prestige	35,4		
2 Others	4,7		
3 All	26,0		
4 Those of a minimum amount.....	33,9		
7. Is at least one member of your staff assigned full time to capital budgeting?			99,2
1 Yes	46,6	56	
2 No	53,4	44	
If yes, since 8.0 years (1).....			28,8

II. Criteria and techniques for project evaluation

	Relative Frequency %		Response rate (% of 132)
	<u>France</u>	<u>USA</u>	<u>F</u>
8. What is the approximate percentage (based on dollar value) of capital projects for which your firm makes an estimate of profit contribution?			97,0
1 More that 75%	42,2	53	
2 From 50 to 75%	30,6	41	
3 From 25 to 50%	14,8		
4 Between 0 and 25%	12,5	6	
Formal analysis has been conducted since 7.0 years (1).....			47,0
Weighted average	58	64	
9. Does your company require proposals for capital investment to meet minimum standards of profitability?			90,2
1 3/4 and more	58,8	77	
2 From 1/4 to 3/4	31,9	13	
3 Less that 1/4	9,2	10	
Minimum standards have been-introduced since 6 4 years (1).....			40,2
Weighted average	65	70	
10. What criteria does your firm use? If many criteria are used, please indicate why (for instance according to the size of investment, risk, etc.). Comments :			

	Relative Frequency %	Response rate (% of 132)
	<u>France</u>	<u>USA</u> <u>F</u>
11. Non analytical criteria.....		93,2
1 Urgency	28,5	
2 Strategy	46,6	
3 Intuition	10,9	
4 Safety	5,7	
5 Others	8,3	
12. Accounting criteria		74,2
1 Pay back before tax	34,5	
2 Pay back after tax	30,4	
3 Pay back reciprocal before tax	0,0	
4 Pay back reciprocal after tax	2,0	
5 Average accounting rate of return on total investment before tax	13,5	
6 Average accounting rate of return on total investment after tax	12,2	
7 Average accounting rate of return on average investment before tax	3,4	
8 Average accounting rate of return on average investment after tax	1,4	
9 Other (Please describe).....	2,6	

	Relative Frequency %	Response rate (% OF 132)
	<u>France</u>	<u>USA</u> <u>F</u>
13. Financial criteria (discounted cash flow).....		87,9
1 Internal rate of return.....	58,4	
2 Net present value	25,6	
3 Net present value per invested dollar.....	11,9	
4 Discounted pay back	9,6	
5 Others	0,0	
14. In the financial criteria used, does your firm deduct from the operating profit the financial expenses to obtain cash flows ?.....		91,7
1 Yes	52,9	
2 No	44,0	
3 Yes and no	2,5	
15. In the financial criteria used does your firm determine cash flows before or after tax?		87,9
1 Before	40,5	
2 After	52,0	
3 Before and after.....	6,9	
16. What method does your firm use to determine the discount rate or minimum profitability? What factors, if any, led you to change it and when? Please describe.....		35,6
1 <input type="checkbox"/> Market rate of debt	21,3	
2 <input type="checkbox"/> Cost of equity	2,1	
3 <input type="checkbox"/> Growth rate or average return.....	14,9	
4 <input type="checkbox"/> Weighted average ; debt, equity, growth.....	21,3	
5 <input type="checkbox"/> National plan rate.....	10,6	
6 <input type="checkbox"/> Parent company rate.....	6,4	

III - Newer Techniques

	<u>France</u>	<u>USA</u>	<u>F</u>
17. Does your firm have a formal method of considering risk?.....			43,9
1 <input type="checkbox"/> Yes.....	50,8		
2 <input type="checkbox"/> No	49,2		
If yes, since 5.6 years (1).....			15,9
18. What method is used?			47,7
1 <input type="checkbox"/> Raising required return	38,4	38	
2 <input type="checkbox"/> Shortening pay back period	28,4	18	
3 <input type="checkbox"/> Determining probability distribution.....	14,4	23	
4 <input type="checkbox"/> Measuring covariances of projects.....	0,0	17	
5 <input type="checkbox"/> Sensitivity analysis	15,6		
6 <input type="checkbox"/> Others.....	2,2		
19. Does your firm also use management science techniques?.....			52,3
1 <input type="checkbox"/> Game theory	1,5		
2 <input type="checkbox"/> Linear programming.....	18,0	13	
3 <input type="checkbox"/> Non linear programming.....	1,5		
4 <input type="checkbox"/> Computer simulation.....	32,3	23	
5 <input type="checkbox"/> Probability theory.....	10,5	37	
6 <input type="checkbox"/> Decision theory.....	3,0		
7 <input type="checkbox"/> PERT/critical path.....	31,6	24	
8 <input type="checkbox"/> Utility theory	1,5		
9 <input type="checkbox"/> Others	0,0	3 (2)	

(1) Weighted average responses

(2) Responses 1,3,8,9 are included in this percentage

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