



Do managers behave the way theory suggests? A choice-theoretic examination of foreign direct investment location decision-making

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Abstract

Many empirical examinations of foreign direct investment location choice have relied on the use of secondary data and surveys on the choices made by firms about the form and location of overseas investment. These studies have two inherent and related problems. First, they rely solely on the location choices made by different firms, and assume that the domains of possible options considered were the same. Second, there is an assumption about the rules used by firms to make these decisions, yet the decisions are made by boundedly rational managers. After reviewing the literature, this study examines managers' choices about foreign investment location through the use of structured experimentation. The results show that in creating sets of investments to 'consider', managers appear to follow fairly rational rules. However, the choice of actual 'investments' appears less aligned to traditional models.

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Foreign direct investment choice: theory and empirical limitations

The location and control decisions of multinational enterprises are at the core of managerial decision-making and academic theorising in international business. For each activity the firm undertakes, it has two critical decisions: (1) Where should the activity be located? (2) How should it be controlled? (Buckley, 2004). The control decision is whether to own and operate the function in house, or subcontract or outsource it to an independent company. Joint ventures are an intermediate stage between ownership and contract. Strictly speaking, foreign direct investment (FDI) implies control of the operation involving the investment, but there are many ways to control a facility beyond ownership. For example, foreign investors with minority ownership may well have power over an entity through the control of technology, management or key organisational systems.

Research in this area is derived from two intertwined theoretical traditions. The first derives from trade theory and the economics of industrial organisation, following Hymer (1960). Within the international business literature the two most dominant paradigms are those related to Dunning (1981) and Buckley and Casson

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(1976). According to this tradition, the choice of location for foreign investment is a deliberate, if rationally bounded, decision made with the primary goal of profitability and rent extraction, which may be combined with secondary goals of asset seeking or protection of profitability and rent. A second approach is the more loosely structured internationalisation process model associated with the 'Uppsala tradition' (e.g., Johanson and Vahlne, 1977, 1990). According to this approach, managers make iterative decisions that are dominated by limited information and risk aversion. Such behaviour leads to a staged approach to entry that has specific characteristics and patterns. This approach emphasises that the subsidiary goal of 'learning to internationalise' is as important to explaining internationalisation patterns as a purely rational calculative approach.

Location decisions for FDI have received relatively little attention in the literature. Mudambi and Navarra (2003) consider location choice short-listing to be a lacuna in the literature. It is also known that FDI is not a point-of-time 'go/no-go' decision but a process (this has been known right from the inception of studies of managerial decision-making in FDI – see the title of Aharoni's (1966) book, *The Foreign Investment Decision Process*). An examination of this process yields important changes over its duration, as we shall see.

Empirically, there has been far more work utilising and attempting to validate the economics tradition (e.g., Mucchielli and Mayer, 2004; Wei *et al.*, 2005), with the more behavioural- and managerial-based internationalisation process model being relegated to case studies of small numbers of individual companies (e.g., Fina and Rugman, 1996; Sarkar *et al.*, 1999; Chetty and Blankenburg Holm, 2000) or cross-sectional surveys (e.g., Sullivan and Bauerschmidt, 1990; Eriksson *et al.*, 1997; Luo and Peng, 1999). However, both of these approaches have natural limitations and strong biases. The limitations of the internationalisation process model have been well documented, and are related mainly to the lack of a link between the empirical studies and a formal structural model (e.g., Melin, 1992; Andersen, 1993) and concerns about the domain of the firms studied (e.g., Sullivan and Bauerschmidt, 1990). But what is more worrying from our perspective are the unrecognised limitations of tests of the economics-based approach. Because most empirical FDI studies rely on panel or survey data they fail to

address several issues highlighted by Devinney *et al.* (2003):

- (1) The samples are based on final location choice only. Hence we do not know:
 - (a) which options were considered by the firms and discarded (because they are not in the database); and
 - (b) how these discarded options differed in terms of their perceived value to the managers making them.
- (2) The samples are based on intra-firm choice. Hence we do not know to what extent:
 - (a) the choices are idiosyncratic to the firms or managers making them (the assumption is that all managers are the same, and firm differences can be captured by covariates); and
 - (b) the consideration sets of the firms differed (an implicit but binding assumption is that the choices the firms/managers are making were possible choices of the firms not making them).

In the present study we explore the above issues by relying on choice-theoretic empirical methods (e.g., Hensher *et al.*, 2000; Train, 2003) to capture the preference structures of managers either actively or potentially actively involved in FDI location choices. The benefit of this approach is that it allows for the examination of combinations of investment and environmental features and the relative value of each in determining the choice of managerially preferred outcomes in a more controlled setting. In addition, it allows for the direct testing of the degree of managerial variation from a purely rational model, and in this way serves as a more direct comparison between the rational calculative model and the internationalisation process model.

The next section provides a review of recent literature and then a brief summary of the economics-based calculative model and behavioural-based internationalisation process model on FDI location choice. We then move on to the heart of the paper to describe the methods and results. As this paper is aiming to present a methodology as well as some exploratory findings relating to a comparison of theories, more of the paper is devoted to a description of the methods and results than to the theories being examined. The conclusions will show that the nature of FDI investment choice is, at one and the same time, both clearer and more



complex than normally discussed. We will also speculate on some of the implications of the application of experimental approaches in international business research.

Recent literature on FDI location decisions

Appendix A lists a selection of recent studies of FDI location decisions. It covers surveys of executives and managers (10 papers), secondary data including compilations of data sets at firm level (10 papers), and one survey-based Delphi study. The publication dates range from 1980 to 2006. It is natural that secondary data studies tend to emphasise 'objective' or instrumental determinants whereas surveys focus on experiential, cultural and knowledge (or information) related variables. However, the divide is not absolute. Many of the studies are of single-country outward investors (often the USA) and/or of single host countries.

The studies based on 'objective' firm-level data tend to adopt, consciously or unwittingly, a calculative approach to location decisions. Woodward and Rolfe (1993) find conventional results from factors such as market size, wage rates and transport costs. Barkema *et al.* (1996) find that cultural distance is a prominent factor in entry, particularly where another firm is involved, in a joint venture for example. Henisz (2000) finds that host country institutions are important, and that joint ventures are preferred when hazards in the host country are greatest. Chung (2001) finds technology factors to be important: both transfer and accession of technology show up as determinants in different contexts. Feinberg and Keane (2001) show interestingly mixed results on the impact of tariff reductions, even within narrowly defined manufacturing industries. Chung and Alcacer (2002) examine location within a single country – the USA – and find that, in addition to traditional location factors, knowledge-seeking motivations may operate through laboratories and manufacturing facilities. Mitra and Golder (2002) find that cultural distance from the home market is *not* a significant factor, but knowledge about nearby markets may have a significant effect. Zhou *et al.* (2002) find government policy initiatives to be a significant determinant of location among provinces in China for incoming FDI. Henisz and Macher (2004) find differences within semiconductor firms by level of technology, and find that firms also trade off their own experience against other firms' experience as sources of critical knowledge on foreign investment environments. Nachum and

Zaheer (2005) show that industries with different levels of information intensity are driven by different investment motivations. There are thus rich varieties of suggested determinants in this body of literature, but equally there are sources of differences that cannot easily be reconciled.

Survey-based results are similarly heterogeneous. Davidson's (1980) pioneering study showed that corporate experience affected location decisions in two ways. First, firms preferred nations in which they were already active to those in which they were not. Second, firms with extensive international experience exhibited less preference for near, similar and familiar markets. Markets that others might perceive as less attractive because of high levels of uncertainties are given increased priority as the firm's experience rises. Crucially, for our purposes, he found that, as firms gain experience, the location of foreign activity increasingly represents an efficient response to global economic opportunities and conditions. In a single-country study, Mudambi (1998) found that firms with a longer tenure of operations are significantly more likely to invest in the host country (UK) in any given period. Brush *et al.* (1999) is a survey of plant managers in US MNEs and finds that, for this group, manufacturing strategy dominates international strategy. This is an intriguing pointer to the fact that managers may perceive location decisions differently according to where they are in the organisation. Pedersen and Petersen (2004) find that the 'shock effect' of foreign market entry develops over time (reaching its lowest level of market familiarity 8 years after entry) and supports the 'psychic distance paradox' that adjacent countries provide high levels of shock. Time periods are important in perceptions of location. Mission also reflects location, as Ambos (2005) shows for the establishment of laboratories, a complement to Kuemmerle's (1999) argument that FDI can both augment and exploit R&D. The single Delphi study (MacCarthy and Atthirawong, 2003) found conventional results for the motivations of firms in manufacturing foreign investment location.

These results suggest that process issues in internationalisation have also been found to be significant. Learning, acculturation and cultural assimilation are variously found to be significant in different contexts, for different managers in the FDI location decision. We can thus oppose the two traditions – the calculative and the process – in our hypothesis construction.

The calculative vs the internationalisation process approach to FDI location choice

The calculative and internationalisation process approaches to FDI location choice thus have a long overlapping tradition, and comparisons between them have been attempted. However, to a greater or lesser extent, such attempts have failed to come to any definitive conclusions, mainly because they rely on different levels of analysis, different sample domains, and different empirical traditions.

The economic approach grew from a broadening of traditional trade-theoretic approaches to account for differences in FDI and internationalisation patterns (see the 'research forum' articles by Dunning, Devinney, Tallman, Mitchell and de la Torre in Cheng and Hitt (2004), for an overview of the some of this history). Its fundamental predictions are that firms are quasi-rational in their choices, and once the costs and benefits of specific investment opportunities are considered in light of the economic and competitive constraints operating in a market, there is little room for managerial discretion. The best managers making the most financially viable location choices ultimately out-survive those making less commercially efficacious choices. Proof of the validity of the rational calculative viewpoint is typically revealed through econometric panel data-based studies that show that firms do indeed make decisions that are rational, based on components of the fit between their firm-specific advantages and the structures and needs of the markets that they enter.

The internationalisation process model has a humbler beginning, growing out of a single-industry study of expansion by Swedish logging companies. Approaching the decision to internationalise at a more micro level, this tradition concentrates more on the issues of how firms learn as they internationalise. It proposes that specific biases exist in the nature of the decisions that they make based on their experience. One of the hallmarks of internationalisation theory is a belief that less experienced managers behave in ways that overweight specific investment characteristics (such as cultural closeness to the home country), and behave in a more risk-averse manner. Proof of the validity of the internationalisation approach is typically revealed through case studies showing how a single firm or groups of firms in the same industry follow a systematic process as they become more internationally mature.

The tradition deriving from economics makes little allowance for managerial self-interest and

rent-seeking behaviour, factors given considerable latitude in the internationalisation process approach. Our experimental approach allows us both to incorporate insights from the process tradition and to highlight potential managerial biases including self-interest. As it focuses on the managers who are responsible for making the decisions it removes problems of 'the level of analysis' that bedevil comparisons of different conceptual approaches. Further, our hypotheses are framed so that we can test the degree to which final decisions over time converge on what is optimal for the firm, by gradually eliminating bias and self-interest as FDI decisions are repeated by the same manager. The effect of experience may make managerial decision-making more 'rational' from the point of view of the firm's best interest.

It would be apt to say that the debate between these two traditions is something of a dance where the partners never touch. This has been due to the inability to find a level of analysis or approach that allows for a more direct test of the tenets of the theories. However, one possibility – indeed, the approach used here – is to examine managerial decisions directly (albeit experimentally) in an attempt to address some of the areas of overlap between these two theoretical traditions. A direct test of the internationalisation process approach is to examine whether or not managers with less internationalisation experience utilise models that are distinctly different from those of more experienced managers, when facing precisely the same investment opportunities. A second test is to examine whether or not the risk profile of less experienced managers is different from the risk profile of the more experienced managers. We can state these as hypotheses:

Hypothesis 1: Managers with more internationalisation experience will use more calculative approaches than managers with less internationalisation experience.

Hypothesis 2: Managers with more internationalisation experience will show less risk aversion than managers with less internationalisation experience.

As we have shown above, both these hypotheses have support in the prior literature.

Experimental methods

We applied two experimental methods in this study. The first is a variant of standard discrete



choice methods (DCM) with an experimental manipulation. The second is a best–worst (BW) experiment aimed at validating the preferences extracted from the discrete choice experiment.

The sample

The subjects were active managers in the top management team of a selection of firms headquartered mainly in Australia, Denmark and the USA, where the sample was representative of three groups:

- (1) local firms with international operations (managers answering here were located in the HQ);
- (2) subsidiaries of multinational enterprises (managers answering here were located in the subsidiary); and
- (3) managers in local firms with no international operations.

An attempt was made to match up a sufficient sample of firms in group (1) with those in group (2): for example, we sampled both the subsidiary of Danish firms in Australia and their Danish HQ. Firms in group (3) were sampled so as to approximate the size of the subsidiaries represented in group (2). Managers were approached via fax, and an interview was arranged with those willing to be involved in the study.

Although an attempt was made to have a balanced and moderately representative sample, the respondents were not drawn from a large sample. The task we asked managers to complete is difficult and long (a typical interview was 1.5–2 h), implying that many managers were unwilling to take the time to be involved. Because we are approaching the top management team at these firms, normal random sampling was abandoned for a more targeted approach. That allowed us to get managers with both some and no international experience. Approximately 200 firms were approached, with a net sample of 70 respondents. The characteristics of these individuals are shown in Table 1. They are senior in their organisations – 35% were CEOs, MDs or CFOs – and the organisations are representative of the Fortune Global 500 plus a sample of smaller firms in many of the same industries – the median turnover was between US\$500 million and US\$1000 million. Given that the purpose of this paper is to highlight a method, the sample is sufficient for preliminary analysis and evaluation of the techniques. In addition to conducting the experimental exercise with these managers, each was interviewed both at the time

Table 1 Sample and respondent characteristics

| | |
|---|-------------------------------|
| <i>Headquarters location</i> | |
| Australia | 29.0% |
| Denmark | 31.9% |
| Germany, Netherlands, Switzerland | 8.6% |
| Japan, Malaysia, Singapore | 4.2% |
| Singapore | 2.0% |
| UK | 2.9% |
| USA | 23.2% |
| Employees (median number) | 32,000 |
| Employees (mean number) | 21,147 |
| Turnover (median range) | \$500 million–\$1,000 million |
| Median levels between respondent and CEO | 1 |
| CEOs, managing directors, CFOs | 34.7% |
| Senior VP, directors, regional heads | 33.3% |
| <i>Manager personally engaged in</i> | |
| Import/export | 52.2% |
| Equity JV negotiation | 50.7% |
| Non-equity JV negotiation | 44.9% |
| JV or alliance | 53.6% |
| M&A | 47.8% |
| Traded companies | 37.7% |
| FDI location choice (LC) | 56.5% |
| FDI establishment (E) | 59.4% |
| FDI operations (O) | 47.8% |
| FDI experience (aggregation of LC or E or O) | 64.1% |
| Number of countries in which subsidiaries operate (median) | 10–25 |

of the experiment and in a debriefing in which their results were explained and discussed with them.

The choice experiment

The extant theories of FDI location choice were used to determine the features of investment alternatives that would be relevant to making a location choice decision. Based on pre-testing, we reduced an initial list down to 12 investment features and one size of investment condition (with three levels) and one political stability condition (with two levels). The features and the levels are shown in Table 2. They were aimed at capturing not just investment return but also potential opportunities, exploitation and exploration of/for assets, structural barriers, market inefficiencies and cultural proximity.

Theoretically, the calculative and internationalisation viewpoints would imply that specific investment attributes would be weighed more heavily or

**Table 2** Investment features and levels used in the choice experiment

| <i>Features of investment</i> | <i>Levels</i> |
|--|---|
| <i>The cost of operations</i> – Choosing a specific location can lead to higher or lower costs of operation across the value chain | Decrease 10%, Decrease 5%, Increase 5%, Increase 10% |
| <i>Return on investment (ROI)</i> – Describes the rate of return expected from the investment | Less than home market and fails to meet hurdle rate, Less than home market but meets hurdle rate, Same as home market, Greater than home market |
| <i>Access to new resources, assets and technologies</i> – Choosing a specific location can lead to greater competences being developed in the firm, through access to physical resources, organisational assets, or new technologies | No New Access, Access |
| <i>Pre-emption of competition</i> – Choosing a specific location can allow a firm to pre-empt competition into a location, thereby securing a first-mover advantage | Pre-emption Important, Pre-emption Not Important |
| <i>Potential market size</i> | Large relative to home market, Same as home market, Small relative to home market |
| <i>Growth</i> – The rate of increase in sales in the market | Decline, No Growth, Low Growth, Strong Growth |
| <i>The existence of established relations</i> – Different markets will have different sets of established relationships. | No established relations, Yes established relations exist |
| <i>Trade and other structural barriers</i> – Markets will have different levels of trade protection. | High Barriers, No Barriers |
| <i>Potential for exploitation of existing resources, assets and technologies</i> – Companies enter markets sometimes with the intent of exploiting an existing competence in a new market | No Potential, Potential Exists |
| <i>Culture/language of the new market</i> – Indicates the natural native language used in the country | English, Arabic, Chinese, French, Portuguese, Russian, Spanish, Other |
| <i>Line of business</i> – Denotes whether the new investment is in a existing, related or new line of business | Same line of business, Related line of business, Completely new line of business |
| <i>Asset protection</i> – Denotes whether legal structures exist for the protection of assets, both physical and intellectual | No Protection, Adequate/Strong protection |

differentially. In particular, those investment attributes most readily identified with the return characteristics of the choice – the cost of operations, return on investment, potential market size, growth and access to new resources, assets and technologies – would, according to the calculative orientation, be more important. Indeed, once accounted for, the other attributes should matter little if the returns are assured. The internationalisation orientation, with its emphasis on the cognitive, learning and resource aspects of the location choice decision, would imply that man-

agers would put differential weight on those characteristics that would reduce risk and complexity: the existence of established relations, trade and other structural barriers, the potential for exploitation of existing resources, assets and technologies, the culture/language of the market, asset protection, and whether or not the expansion was in an existing line of business. In addition, according to internationalisation theory, the size of the investment and the degree of political stability would matter more to less experienced managers. However, it should be emphasised that the important

consideration laid out in the hypotheses is not the attributes that managers take into consideration alone, but that managers with different levels of experience will make quite different decisions.

Individuals made decisions about 32 investment pairs with varying levels across the 12 investment features. Each subject was put into one of six investment-political conditions – in essence nesting the choice experiment within this investment–stability condition experiment. The investment levels varied between 10, 30 and 50% of total investment funds available, and were meant to capture the importance of the magnitude of the investment being made. The political stability levels varied between politically stable and politically unstable. Details of these conditions are presented in Table 3. An example of a singular choice from the experi-

ment is presented in Figure 1. In all, each individual would be placed in 1 of 96 possible choice experiments × investment level × political stability conditions. Our design allowed us to test all main effects and all interaction effects; however, the size of the sample restricted us to an examination of main effects only.

In addition to the choice experiment, subjects were also asked to evaluate their organisation’s most recent example of FDI (e.g., establishing a call centre in New Zealand or opening a factory in China) on the 12 features presented in Table 2. Additional information was collected about the typicality of the most recent investment, the nature of the mode of entry, and the level of investment involved. As well as this information, standard firmographic data and information on the indivi-

Table 3 Environment and investment level conditions

Individuals were given the following information before the choice experiment:

The investments are being made in a country that is viewed as <Insert Political Condition>. Your organisation is considering directly investing in operations in this country and the investment being made represents <Insert Investment Level Condition> of the total cash available for investment for the next three years.

Political condition

Quite politically stable in the sense that there is little likelihood of either social disturbance or political transitions other than through organised or legitimate means.

Somewhat politically unstable in the sense that there is a not insignificant probability that social disturbances will arise or that unpredictable political transitions might occur

Investment-level condition

A relatively small investment totalling 10%.

A relatively moderate investment totalling 30%.

A relatively significant investment totalling 50%.

| Features of the Investment #3 | Option A | Option B |
|---|----------------------------------|--|
| Cost of operations | Increase 10% | Decrease 10% |
| Return on investment (ROI) | Greater than home market | Less than home market; fails hurdle rate |
| Access to new resources, assets and technologies | Access | No new access |
| Preemption of competition | Important | Not important |
| Potential market size | Smaller than home market | Larger than home market |
| Growth | Decline | Strong growth |
| Existence of established relations | Yes | No |
| Trade and other structural barriers | No barriers | High barriers |
| Potential for exploitation of existing resources, assets & technologies | Potential exists | No potential |
| Culture/Language of the new market | Other | English |
| Line of business | Same | New |
| Asset protection | Strong | No protection |
| . If the investment options described above were available to your organization, which option would you recommend giving further consideration (Tick ONE box only)? | <input type="checkbox"/> A | <input type="checkbox"/> B |
| | <input type="checkbox"/> Neither | |
| . If the investment option described above were available to your organization, which would you undertake instead of or in addition to other currently available investments (Tick ONE box only)? | <input type="checkbox"/> A | <input type="checkbox"/> B |
| | <input type="checkbox"/> Neither | |

Figure 1 Example of an investment choice option.

**Table 4** Characteristics of last investment made

| | | | |
|--|-------|--|-------|
| Percent with FDI | 84.1% | | |
| <i>Cost of operations^a</i> | | <i>Asset protection^a</i> | |
| Decrease 10% | 32.7% | No protection | 20.8% |
| Decrease 5% | 15.4% | Weak protection | 37.8% |
| Increase 5% | 13.5% | Strong protection | 32.1% |
| Increase 10% | 17.3% | Not considered relevant to decision | 9.3% |
| Not considered relevant to decision | 21.1% | | |
| <i>Return on investment^a</i> | | <i>Prior investment in this market^a</i> | 60.9% |
| Less than home market; fails hurdle rate | 12.7% | Dominant nature of that investment | |
| Less than home market; meets hurdle rate | 12.7% | Wholly owned subsidiary | 42.9% |
| Same as home market | 12.7% | M&A | 7.1% |
| Greater than home market | 54.6% | Equity JV | 28.6% |
| Not considered relevant to decision | 7.3% | Non-equity alliance | 7.1% |
| | | Import/export | 14.3% |
| <i>Potential market size^a</i> | | <i>Compared with other investments^a</i> | |
| Smaller than home market | 17.5% | This was relatively routine | 68.4% |
| Same as home market | 10.5% | This was out of the ordinary | 31.6% |
| Greater than home market | 57.9% | | |
| Not considered relevant to decision | 14.1% | | |
| <i>Potential market growth^a</i> | | <i>Compared with other investment^a</i> | |
| Decline or no growth | 1.8% | This amount was relatively insignificant | 14.0% |
| Low growth | 21.4% | This amount was normal | 35.1% |
| Strong growth | 66.1% | This amount was significant | 50.9% |
| Not considered relevant to decision | 10.7% | | |
| Established relationships existed in the market ^a | 74.6% | <i>Competitive pre-emption important^a</i> | 62.7% |
| Not considered relevant to decision | 8.5% | Not considered relevant to decision | 13.6% |
| <i>High trade barriers existed in the market^a</i> | 28.3% | <i>Same line of business entered^a</i> | 66.7% |
| Not considered relevant to decision | 11.3% | | |
| <i>Exploitation of existing assets important^a</i> | 81.3% | | |
| Not considered relevant to decision | 10.1% | | |
| <i>Last market entered^a</i> | | | |
| China | 16.3% | | |
| Other developing Asia (Vietnam, Indonesia, India, etc.) | 8.4% | | |
| Developed Asia (Korea, Taiwan, etc.) | 7.1% | | |
| Developed Western (EU-15, USA, etc.) | 22.9% | | |
| Developing Western (E. Europe, etc.) | 4.3% | | |

^aThese questions answered only by those whose last investment involved FDI.

dual manager was collected. Information on the firm's last investment is presented in Table 4. It shows that 84% of the firms have engaged in FDI across a wide range of countries. In addition, it hints at what might be relevant characteristics of investment choice. The last investments show a tendency towards:

- (1) markets with production cost reduction (48%);
- (2) markets with larger ROI (55%);
- (3) markets with larger markets (58%);

- (4) markets with strong growth (66%);
- (5) markets with prior investment and established relations (75%);
- (6) markets where existing assets and current lines of business can be exploited (81%); and
- (7) markets where they are concerned about pre-empting competitors (63%).

These items line up nicely with theory, and the question we need to ask is whether they are simply a bias associated with the nature of recent

opportunities, or whether they are truly representative of the preferences of the managers. In other words, these are clearly factors that managers desire in the best of circumstances, but how do they make decisions when there are conflicts between these factors across investment options?

The BW experiment

To validate and further extend the models developed based on the choice-modelling experiment, we also conducted a BW experiment using the 12 features given in Table 2 plus four additional factors – political stability, currency value, investment assistance, and the existence of a democratic government in the host country. The use of BW scales is aimed at addressing two issues. The first is to examine any bias in the way individuals respond to the choice experiment. In theory, the DCM experiment and the BW experiments are tapping the same underlying preferences and therefore should provide confirmatory results. Second, BW experiments are relatively simple to conduct. If the results of the DCM experiment and the BW experiment are indeed equivalent, a much larger sample can be examined using the simpler method without any loss of generality of the results.

One of the biggest challenges in determining the relative importance of a set of factors in an international environment is the existence of scalar inequivalence (Cohen, 2003). Scalar inequivalence arises primarily because of differences in response styles, which are defined as ‘tendencies to respond systematically to questionnaire items on some basis other than what the items were specifically designed to measure’ (Paulhus, 1991: 17). There is ample empirical evidence to show that individuals in different countries differ significantly in their

response styles (Chen *et al.*, 1995; Steenkamp and Baumgartner, 1998; Steenkamp and Ter Hofstede, 2002), and that these differences can lead to seriously biased conclusions (Baumgartner and Steenkamp, 2001). For example, Cohen (2003) argued that differences in international market segmentation studies may be due more to differences in scale use than to true differences in consumer needs and preferences. Although most of this work is related to consumer research, there is every likelihood that similar issues arise with respect to managerial decisions as assessed by surveys.

BW scaling is a multiple-choice extension of the paired comparison approach that is scale-free and forces respondents to make a discriminating choice among the issues under consideration. As Finn and Louviere demonstrated (1992: 13), ‘BW scaling models the cognitive process by which respondents repeatedly choose the two objects in varying sets of three or more objects that they feel exhibit the largest perceptual difference on an underlying continuum of interest’. Appendix B provides a detailed discussion of the logic and algebra of BW scaling. Readers are referred to Marley and Louviere (2005) for a more detailed description of the scale properties of BW experiments. BW experiments permit intra- and inter-feature comparison of levels through the use of a common interval scale (McIntosh and Louviere, 2003; Cohen and Neira, 2003). Figure 2 provides an example from the BW experiment.

Empirical estimation

Choice model results

Examination of the choice-modelling responses is done through a series of binary logit models. Respondents were asked to evaluate pairs of investments

| Question No. | Which issue matters LEAST to you? (tick ONLY ONE box for each question) | Sets of social and ethical issues for you to consider | Which issue matters MOST to you? (tick ONLY ONE box for each question) |
|--------------|--|---|--|
| 1 | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Cost of operations Potential market size Growth Existence of established relations | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
| 2 | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Access to new resources Potential market size Trade and structural barriers Potential for exploitation of existing resources | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
| 3 | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Potential market size Culture/Language of market Line of business Strong asset protection | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |

Figure 2 Example of the best–worst experiment.

**Table 5** Propensity to choose any investment (percentage of all investments presented)

| | <i>Would consider an investment</i> | <i>Would invest</i> |
|---|---|-------------------------|
| Overall (N=4414 choices each) | 26.0 | 14.0 |
| <i>When environment is</i> | | |
| Unstable (N=2430) | 25.4 | 8.8 |
| Stable (N=1984) | 26.5 | 14.9 |
| <i>When investment is</i> | | |
| Small (N=1408) | 35.3 | 16.2 |
| Medium (N=1454) | 42.4 | 12.6 |
| Large (N=1552) | 37.2 | 13.0 |
| <i>Cost of production</i> | | |
| Declines 10% | 31.8 | 15.2 |
| Declines 5% | 25.4 | 13.1 |
| Increases 5% | 20.2 | 8.8 |
| Increases 10% | 24.2 | 14.5 |
| <i>Return on investment</i> | | |
| Less than home market; fails hurdle rate | 14.4 | 13.9 |
| Less than home market; meets hurdle rate | 21.8 | 10.9 |
| Same as home market | 25.7 | 11.2 |
| Greater than home market | 40.0 | 15.7 |
| No access to new resources | 23.4 | 13.9 |
| Access to new resources | 28.6 | 12.9 |
| Pre-emption important | 29.4 | 14.9 |
| Pre-emption unimportant | 22.7 | 11.9 |
| <i>Market size</i> | | |
| Smaller than home market | 24.5 | 14.7 |
| Same as home market | 21.8 | 10.6 |
| Larger than home market | 32.8 | 15.4 |
| <i>Market growth</i> | | |
| Declining | 14.9 | 12.9 |
| None | 18.6 | 10.7 |
| Low | 23.6 | 11.6 |
| Strong | 43.3 | 16.7 |
| Established relations unimportant | 21.4 | 11.4 |
| Established relations important | 30.7 | 15.4 |
| Barriers to trade exist | 21.4 | 12.4 |
| Barriers to trade do not exist | 30.8 | 14.4 |
| No exploitation of existing assets | 23.9 | 12.1 |
| Exploitation of existing assets | 28.1 | 14.7 |
| <i>Language</i> | | |
| English | 24.6 | 12.5 |
| Arabic | 16.6 | 7.1 |
| Chinese | 25.4 | 12.3 |
| French | 23.9 | 9.9 |

Table 5 *Continued*

| | <i>Would consider an investment</i> | <i>Would invest</i> |
|--------------------------|---|-------------------------|
| Portuguese | 22.0 | 12.8 |
| Russian | 20.1 | 13.1 |
| Spanish | 24.8 | 10.2 |
| Other | 37.4 | 20.7 |
| <i>Diversification</i> | | |
| Same line of business | 34.9 | 18.3 |
| Related line of business | 24.6 | 10.6 |
| New line of business | 19.0 | 11.8 |
| No/weak asset protection | 19.9 | 12.1 |
| Strong asset protection | 32.4 | 14.8 |

by indicating which of the options: (1) they would 'recommend giving further consideration'; and (2) 'would undertake instead of or in addition to other currently available investments'. These two decisions are akin to asking the manager a 'consideration set' question and a go/no-go, or investment, question. In this sense, they can be seen to represent nested decisions. The choices from question (2) force individuals to make a definitive decision from the set generated from decision (1).

However, before proceeding to the logit analysis, it is useful to examine the tendency of respondents to indicate whether they would consider or undertake an investment based on the characteristics of those investments. Table 5 indicates simply whether or not an investment was chosen (in other words, the 'neither' option was not chosen) cross-tabulated against different conditions. Overall, respondents would 'consider' 26% of the investments and 'undertake' 14%. In situations where the market was politically unstable these percentages drop to 25 and 9%, respectively. The level of the investment does not seem to reveal a consistent pattern of choices. Overall, individuals are less likely to make any choice when asked the 'would invest' question.

In addition, there are some logical patterns that arise. First, cost-of-production increases are related to a smaller likelihood of considering an investment (although not making the investment); however, the effect is not monotonic. Second, a higher ROI is positively and monotonically related to the consideration of an investment, but slightly less so in the case of the go/no-go decision. Third, access to new resources, exploitation of existing assets, pre-emption of competition, the existence of established relations in the market and avoidance



of barriers to trade are all related to making or considering an investment. Fourth, market growth and market size are important to considering an investment but less so in making an investment. In both cases, large markets with strong growth are the clear choice winners. Fifth, being in the same line of business is important to considering and making an investment. Sixth, asset protection is a strong consideration factor, but less so in making the final investment. These simple results provide face validity as to the seriousness with which the managers involved considered the task.

This information provides some understanding of the nature of managerial preferences for different FDI location choices, but we need a more statistically valid approach to determine the marginal value of specific investment options. Table 6 presents the logit analysis for the 'consider' and 'invest' choices in the aggregate. What we see in these results is that the likelihood of considering an FDI option is more clear-cut than the likelihood of choosing the final investment, given what was considered. Ignoring the stability of the market and the level of the investment, it appears that production cost matters, as do ROI, access to resources, market size (when large), market growth, established relationships, barriers to trade, exploitation of existing assets, remaining in the same line of business, and strong asset protection. Being in an English-speaking country and not in an Arabic- or Russian-speaking country also appears as part of the criteria. When we adjust for the stability of the market and the level of the investment we find that political instability is not relevant, but small and large investment amounts are related to considering more of the investments presented. Finally, accounting for the FDI experience of the manager (FDI experience) does not matter significantly. FDI experience is defined as the manager having had experience in FDI location choice, FDI establishment or FDI operations. Sixty-four per cent of managers had FDI experience. Overall, those with no FDI experience would consider an investment 28% of the time and those with FDI experience 26% of the time.

When we move to the 'invest' model, the results are less clear-cut. Indeed, one would have to say that there is greater heterogeneity in the choices made, with political stability and the FDI experience of the managers now assuming importance. Managers with less FDI experience are more likely to make any investment choice (16% of the time *vs* 13% of the time for those with experience), and all

managers are less likely to make an investment when the market is politically unstable. In addition, markets with cost increases are more likely to be avoided. All of this indicates that managers are taking a slightly more risk-averse stance when making the actual decision to invest, *vs* just considering an option, and that managers with less FDI experience appear even more risk-averse.

Tables 7 and 8 provide two more illustrative breakdowns in this analysis. Table 7 separates the analysis based on whether or not the manager in question had any prior FDI experience. The prior analysis allows us to see whether or not FDI experience matters to the tendency to accept any given investment, whereas this analysis asks whether or not the models of managers with or without experience are any different. As can be seen, the models for the experienced and inexperienced managers are similar, but do reveal a few differences. First, FDI-experienced managers are more likely to react positively to production cost reductions and market size, and negatively to moving out of their existing line of business. They also prefer smaller investments. However, they are less concerned than inexperienced managers with the existence of established relations. When it comes to the case of the investment model we see that less experienced managers are more affected by market stability and trade barriers, whereas experienced managers prefer large markets with big growth where they can exploit existing resources and lines of business.

Table 8 presents an analysis based on the stability of the market experimental manipulation. What we see is that the models are quite close, particularly in the case of the 'consideration' of investments. In the investment model we see that managers are more likely to engage in avoidance behaviour, putting emphasis on avoiding low-return markets and seeking markets with high growth.

Considering the limited sample size, the choice models indicate a few things of relevance. First, which options a manager is willing to consider is quite consistent with economic-based theoretical thinking about FDI location choice, and seems unaffected by the environment in which the choice is being made. Second, the actual willingness to take on an investment is less likely to match up with the economic models, and appears much more eclectic. Part of this may be due to the stylised form of our experiments. However, it is more likely that the factors that, in the end, swing the decision toward one investment *vs* another are



Table 6 Aggregate consider and invest models

| | <i>Would consider the investment option</i> | | <i>Would invest in the option</i> | |
|--|---|-----------|-----------------------------------|-----------|
| <i>Cost of production</i> | | | | |
| Declines 10% | 0.328*** | 0.330*** | 0.025 | 0.025 |
| Declines 5% | 0.217*** | 0.223*** | 0.051 | 0.054 |
| Increase 5% | 0.023 | 0.025 | -0.168** | -0.166** |
| <i>Return on investment</i> | | | | |
| Less than home market; fails hurdle rate | -0.573*** | -0.576*** | -0.073 | -0.073 |
| Less than home market; meets hurdle rate | -0.148** | -0.149** | -0.091 | -0.092 |
| Greater than home market | 0.278*** | 0.277*** | -0.071 | -0.074 |
| No access to new resources | -0.152*** | -0.154*** | 0.046 | 0.054 |
| Pre-emption important | 0.053 | 0.054 | 0.017 | 0.021 |
| <i>Market size</i> | | | | |
| Smaller than home market | -0.047 | -0.047 | 0.080 | 0.081 |
| Larger than home market | 0.230*** | 0.233*** | 0.109* | 0.110* |
| <i>Market growth</i> | | | | |
| Declining | -0.210*** | -0.208*** | -0.007 | -0.010 |
| Low | 0.177*** | 0.183*** | 0.044 | 0.040 |
| Strong | 0.674*** | 0.680*** | 0.149** | 0.149** |
| No established relations | -0.119*** | -0.121*** | -0.068 | -0.069 |
| Barriers to trade exist | -0.131*** | -0.131*** | 0.048 | 0.048 |
| No exploitation of existing assets | -0.141*** | -0.143*** | -0.109 | -0.112** |
| <i>Language</i> | | | | |
| English | 0.084 | 0.098 | -0.197** | -0.184** |
| Arabic | -0.364*** | -0.354*** | -0.474*** | -0.458*** |
| Chinese | -0.013 | -0.003 | -0.153* | -0.139 |
| French | -0.099 | -0.102 | -0.286*** | -0.283*** |
| Portuguese | -0.182** | -0.173** | -0.143 | -0.132 |
| Russian | -0.233*** | -0.226*** | -0.118 | -0.103 |
| Spanish | -0.063 | -0.068 | -0.265*** | -0.269*** |
| <i>Diversification</i> | | | | |
| Related line of business | -0.104** | -0.111** | -0.182*** | -0.186*** |
| New line of business | -0.322*** | -0.329*** | -0.156** | -0.162** |
| No asset protection | -0.259*** | -0.261*** | 0.007 | 0.005 |
| Unstable political environment | | -0.037 | | -0.127*** |
| <i>Level of investment</i> | | | | |
| Small investment (10%) | | 0.171*** | | 0.017*** |
| Large investment (50%) | | 0.076 | | 0.009*** |
| Manager's FDI experience | | -0.084 | | -0.262** |
| -2LL | 4133.00 | 4117.93 | 3349.14 | 3335.36 |
| ρ^2 | 0.275 | 0.279 | 0.049 | 0.055 |
| Percentage classified correctly | 77.7 | 77.5 | 86.6 | 86.6 |

* $P < 0.10$, ** $P < 0.05$, *** $P < 0.01$.

less obvious than we are able to discern using the investment attributes we are investigating. Even more interesting is the bias that this may introduce into the decision-making process. If managers are making a 'consideration' cut that takes into

account the dominant criteria of the decision (e.g., ROI) and then choosing their 'investments' conditional on this, it is hardly surprising that the marginal determinants will be the factors that were unimportant in the first stage (as these have the

Table 7 Consider and invest models split by manager's FDI experience

| | <i>Would consider option when FDI experience</i> | | <i>Would invest in option when FDI experience</i> | |
|--|--|-----------|---|-----------|
| | No | Yes | No | Yes |
| <i>Cost of production</i> | | | | |
| Declines 10% | 0.158 | 0.380*** | -0.050 | 0.043 |
| Declines 5% | 0.154 | 0.249*** | -0.074 | 0.075 |
| Increase 5% | 0.000 | 0.046 | -0.187 | -0.155* |
| <i>Return on investment</i> | | | | |
| Less than home market; fails hurdle rate | -0.529*** | -0.604*** | 0.141 | -0.042 |
| Less than home market; meets hurdle rate | -0.300** | -0.124* | 0.046 | -0.024 |
| Greater than home market | 0.318** | 0.260*** | 0.004 | 0.081 |
| No access to new resources | -0.175* | -0.152*** | -0.103 | 0.082 |
| Pre-emption important | 0.150 | 0.028 | -0.077 | 0.036 |
| <i>Market size</i> | | | | |
| Smaller than home market | -0.159 | -0.010 | 0.178 | 0.068 |
| Larger than home market | 0.021 | 0.288*** | -0.041 | 0.145** |
| <i>Market growth</i> | | | | |
| Declining | -0.036 | -0.258*** | 0.062 | -0.006 |
| Low | 0.254* | 0.170** | 0.133 | 0.025 |
| Strong | 0.556*** | 0.711*** | 0.125 | 0.168** |
| No established relations | -0.238** | -0.094* | -0.059 | -0.062 |
| Barriers to trade exist | -0.052 | -0.146*** | -0.276** | 0.002 |
| No exploitation of existing assets | -0.072 | -0.163*** | 0.061 | -0.146** |
| <i>Language</i> | | | | |
| English | -0.057 | 0.114 | -0.357* | -0.161* |
| Arabic | -0.213 | -0.388*** | -0.256 | -0.533*** |
| Chinese | -0.023 | -0.003 | -0.351 | -0.106 |
| French | -0.108 | -0.127 | -0.340 | -0.285** |
| Portuguese | -0.177 | -0.180* | -0.413* | -0.076 |
| Russian | -0.501*** | -0.171* | -0.492** | -0.027 |
| Spanish | -0.109 | -0.080 | -0.389* | -0.255** |
| <i>Diversification</i> | | | | |
| Related line of business | 0.074 | -0.157*** | -0.034 | -0.227*** |
| New line of business | -0.144 | -0.372*** | -0.038 | -0.199** |
| No asset protection | -0.333** | -0.251*** | 0.016 | -0.006 |
| Unstable political environment | -0.069 | -0.022 | -0.456*** | -0.129** |
| <i>Level of investment</i> | | | | |
| Small investment (10%) | 0.067 | 0.177*** | -0.818*** | 0.139** |
| Large investment (50%) | -0.022 | 0.091* | 0.025 | 0.103* |
| -2LL | 751.14 | 3330.22 | 552.94 | 2688.64 |
| ρ^2 | 0.262 | 0.294 | 0.099 | 0.074 |
| Percent classified correctly | 77.5 | 78.4 | 83.0 | 81.6 |

* $P < 0.10$, ** $P < 0.05$, *** $P < 0.01$.

most variance). This is indeed confirmed by Mudambi and Navarra (2003), who show the comparability of many of the shortlists of investments investigated by firms. Third, FDI experience

may be less relevant to the 'what to consider' decision and more relevant to the actual final decision being made. The implication here is that the conclusions of the internationalisation process

**Table 8** Consider and invest models split by market stability

| | <i>Would consider option when market is</i> | | <i>Would invest in option when market is</i> | |
|--|---|-----------------|--|-----------------|
| | <i>Stable</i> | <i>Unstable</i> | <i>Stable</i> | <i>Unstable</i> |
| <i>Cost of production</i> | | | | |
| Declines 5% | 0.323*** | 0.345*** | 0.041 | -0.027 |
| Increases 5% | 0.196** | 0.253*** | 0.047 | 0.073 |
| Increases 10% | -0.054 | 0.118 | -0.234** | -0.101 |
| <i>Return on investment</i> | | | | |
| Less than home market; fails hurdle rate | -0.390*** | -0.919*** | 0.112 | -0.207* |
| Less than home market; meets hurdle rate | -0.192** | -0.121 | 0.032 | -0.119 |
| Greater than home market | 0.217*** | 0.366*** | 0.078 | 0.058 |
| No access to new resources | -0.156*** | -0.196*** | 0.035 | 0.059 |
| Pre-emption important | 0.022 | 0.078 | 0.005 | 0.033 |
| <i>Market size</i> | | | | |
| Smaller than home market | -0.041 | -0.055 | 0.073 | 0.111 |
| Larger than home market | 0.165** | 0.341*** | 0.110 | 0.121 |
| <i>Market growth</i> | | | | |
| Declining | -0.190** | -0.255*** | 0.114 | -0.237** |
| Low | 0.148* | 0.229** | 0.085 | -0.035 |
| Strong | 0.599*** | 0.852*** | 0.087 | 0.265** |
| No established relations | -0.199** | -0.047 | -0.108 | -0.007 |
| Barriers to trade exist | -0.122** | -0.167** | 0.034 | 0.091 |
| No exploitation of existing assets | -0.181*** | -0.102 | -0.103* | -0.116 |
| <i>Language</i> | | | | |
| English | 0.042 | 0.156 | -0.213* | -0.251 |
| Arabic | -0.224** | -0.509*** | -0.372** | -0.593** |
| Chinese | 0.091 | -0.129 | -0.226* | -0.072 |
| French | -0.049 | -0.170 | -0.306** | -0.257* |
| Portuguese | -0.174 | -0.181 | -0.018 | -0.354** |
| Russian | -0.148 | -0.359*** | -0.026 | -0.246 |
| Spanish | -0.160 | 0.047 | -0.266** | -0.352** |
| <i>Diversification</i> | | | | |
| Related line of business | -0.081 | -0.162** | -0.259*** | -0.111 |
| New line of business | -0.328*** | -0.317*** | -0.213** | -0.092 |
| No asset protection | -0.304*** | -0.229*** | 0.042 | -0.039 |
| FDI experience | -0.009 | -0.204 | -0.139 | -0.681*** |
| <i>Level of investment</i> | | | | |
| Small investment (10%) | 0.445*** | -0.067 | 0.462*** | -0.441*** |
| Large investment (50%) | 0.378*** | -0.285*** | 0.475*** | -0.639*** |
| -2LL | 2326.97 | 1676.03 | 1945.62 | 1262.62 |
| ρ^2 | 0.261 | 0.367 | 0.092 | 0.118 |
| Percent classified correctly | 76.2 | 79.7 | 85.0 | 88.1 |

* $P < 0.10$, ** $P < 0.05$, *** $P < 0.01$.

model are less relevant for the complete investment choice decision, as even managers without much experience can make fairly rational evaluations of available alternatives.

Indeed, these conclusions appear to be the same ones that the managers involved in the experiments come to themselves. In debriefing interviews managers were shown the models that were based

on their own choices (as well as the aggregate models). Invariably they reacted in two ways. One was to indicate that there are many more factors going into their decisions than our experiments capture. However, when queried about this, it turned out that the attributes we used covered almost everything they brought up. What seemed to matter to them was that the number of levels in many of the attributes was broader than we used. The second was that they felt their fiduciary responsibility to their firms was to generate broad sets of options that their board of directors could discuss in line with their overall strategy. Hence their final decision was much more one of fit with their overall strategy. This would imply that the heterogeneity seen in the 'investment' choice may be reflective of the heterogeneity of the strategies of the firms involved in the study.

BW results

The BW experiment allows for a simpler means of capturing preferences, although in a situation that is less robust than the DCM experiments presented earlier. A key methodological question we need to address is whether or not the BW experiments generate conclusions in line with the DCMs. If this is the case, then we have a means of gathering much more information from managers more quickly and for less expense than is normally the case with preference elicitation methods. Theoretically, we want to know what information these experiments reveal about the nature of managerial preferences with respect to FDI options that adds to what we have gathered from the DCMs. The BW experiment used here incorporated the 12 factors in the DCM experiment along with four additional FDI determinants:

- (1) investment assistance (loans, grants, rebates, etc.);
- (2) the fact that the government of the country is elected in democratic fair and free elections;
- (3) political stability – essentially adding in the political stability condition of the DCM experiment – and;
- (4) the existence of currency depreciation.

Figure 3 presents the aggregate scores for the BW experiment with the 16 factors arranged from 'most important' to 'least important'. The most important items factors are (from best to worst):

- (1) ROI;
- (2) market growth;

- (3) market size;
- (4) remaining in the same line of business;
- (5) market stability;
- (6) exploitation of assets;
- (7) asset protection; and
- (8) the cost of production.

The least important factors (from worst to best) are:

- (16) culture;
- (15) having a democratic government;
- (14) investment incentives;
- (13) currency depreciation;
- (12) access to new resources;
- (11) pre-emption of competition;
- (10) barriers to trade; and
- (9) having established relations in the market.

These factors fit nicely into the picture presented in the consideration models presented earlier.

Table 9 provides a simple mean comparison between managers with FDI experience and those without such experience. As in the case of the DCM analysis, we see that both groups have similar preference orderings, with a slight preference on the part of those with FDI experience to stick to the same line of business and to be slightly less concerned about asset protection, whereas those with less FDI experience favour countries with democratic governments.

Table 10 is perhaps the most interesting analysis as it compares the results from the BW experiment with individual-level model estimates from the DCM experiment. For each individual, the 32 'option A' and 32 'option B' responses for the 'would consider the investment' question were aggregated to form 64 pooled observations (a similar analysis could have been conducted for the 'would invest' decision but is excluded). Multivariate ordinary least squares (OLS) regressions were estimated for each individual (estimating what is called a 'linear probability model': see Aldrich and Nelson, 1984), with the investment features used as predictors. These estimates were then correlated with the BW score from the appropriate measure. What we see is that the two sets of estimates are indeed quite well related, although in a complex way. In the case where we can make direct one-on-one comparisons (e.g., barriers to trade and existence of established relations) all the variables are correlated, with the exception of the pre-emption of competition measure (which was not significant in any of the choice models). For measures with

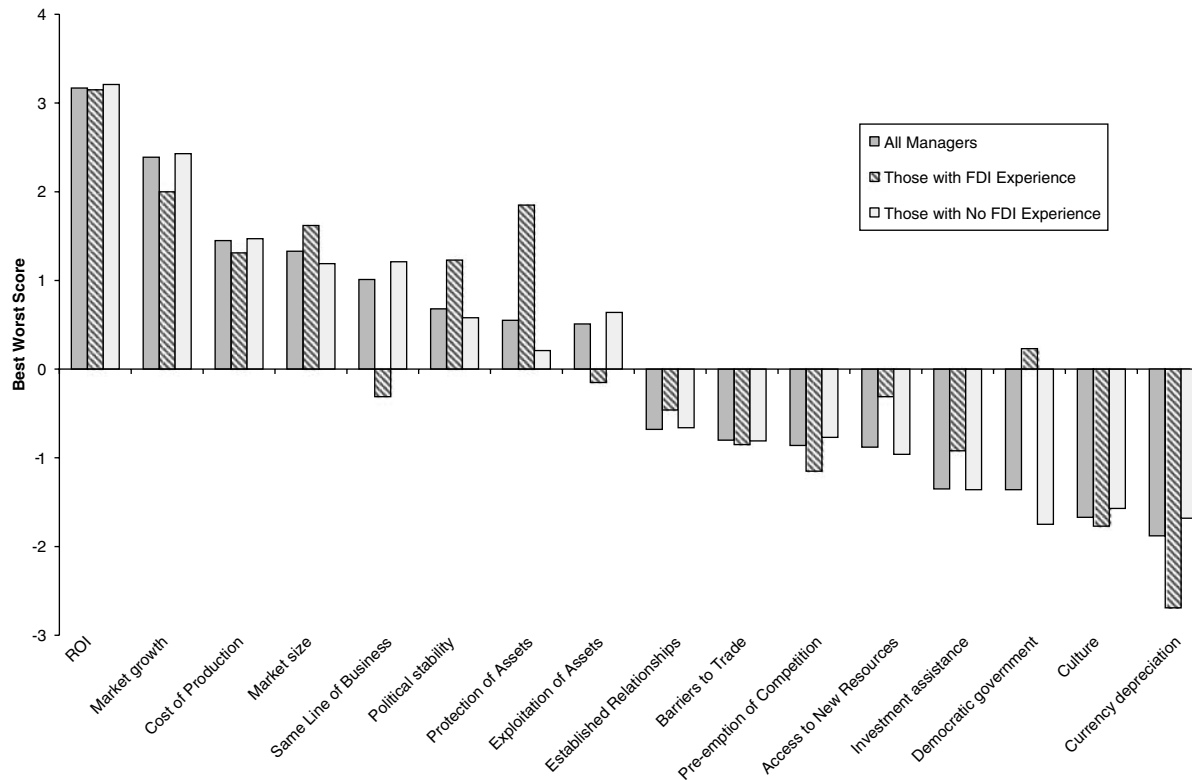


Figure 3 Aggregate best-worst experiment results.

Table 9 Differences in individual BW scores split by manager's FDI experience

| | Manager's FDI experience | | | | | | F |
|----------------------------|--------------------------|------|----------|------|----------|------|---------|
| | No | | Yes | | Total | | |
| | BW score | Rank | BW score | Rank | BW score | Rank | |
| ROI | 3.15 | 1 | 3.21 | 1 | 3.17 | 1 | 0.008 |
| Market growth | 2.00 | 2 | 2.43 | 2 | 2.39 | 2 | 0.652 |
| Cost of production | 1.31 | 5 | 1.47 | 3 | 1.45 | 3 | 0.173 |
| Market size | 1.62 | 4 | 1.19 | 5 | 1.33 | 4 | 0.376 |
| Same line of business | -0.31 | 10 | 1.21 | 4 | 1.01 | 5 | 5.528** |
| Political stability | 1.23 | 6 | 0.58 | 7 | 0.68 | 6 | 0.807 |
| Protection of assets | 1.85 | 3 | 0.21 | 8 | 0.55 | 7 | 5.529** |
| Exploitation of assets | -0.15 | 9 | 0.64 | 6 | 0.51 | 8 | 2.053 |
| Established relationships | -0.46 | 11 | -0.66 | 9 | -0.68 | 9 | 0.082 |
| Barriers to trade | -0.85 | 12 | -0.81 | 11 | -0.80 | 10 | 0.004 |
| Pre-emption of competition | -1.15 | 14 | -0.77 | 10 | -0.86 | 11 | 0.330 |
| Access to new resources | -0.31 | 10 | -0.96 | 12 | -0.88 | 12 | 1.470 |
| Investment assistance | -0.92 | 13 | -1.36 | 13 | -1.35 | 13 | 0.707 |
| Democratic government | 0.23 | 8 | -1.75 | 16 | -1.36 | 14 | 6.821** |
| Culture | -1.77 | 15 | -1.57 | 14 | -1.67 | 15 | 0.171 |
| Currency depreciation | -2.69 | 16 | -1.68 | 15 | -1.88 | 16 | 2.039 |

*P<0.10, **P<0.05, ***P<0.01.

multiple levels we see that there is always some component that is correlated with the BW measure, but normally it is the most extreme measure (e.g.,

production cost decreasing 10%, size greater than home market or operating in a new line of business). In the case of the culture measure it is

Table 10 Comparison between BW and individual level DCM estimates of preference ordering (absolute correlations)

| <i>Individual estimate variable</i> | <i>Correlation with BW variable</i> | |
|--|-------------------------------------|-------------------|
| | <i>Pearson</i> | <i>Rank order</i> |
| <i>Cost of production</i> | | |
| Declines 10% | 0.329*** | 0.268** |
| Declines 5% | 0.096 | 0.082 |
| Increase 5% | 0.042 | 0.054 |
| <i>Return on investment</i> | | |
| Less than home market; fails hurdle rate | -0.057 | -0.088 |
| Less than home market; meets hurdle rate | -0.161* | -0.226** |
| Greater than home market | 0.401*** | 0.406*** |
| No access to new resources | -0.454*** | -0.458*** |
| Pre-emption important | 0.046 | 0.051 |
| <i>Market size</i> | | |
| Smaller than home market | 0.063 | 0.101 |
| Larger than home market | 0.158 | 0.207* |
| <i>Market growth</i> | | |
| Declining | -0.201* | -0.129 |
| Low | 0.067 | 0.085 |
| Strong | 0.177* | 0.244** |
| No established relations | -0.217** | -0.138 |
| Barriers to trade exist | -0.176* | -0.120 |
| No exploitation of existing assets | -0.142* | -0.145* |
| <i>Language</i> | | |
| English | -0.177* | -0.158 |
| Arabic | -0.280** | -0.296** |
| Chinese | -0.242** | -0.293** |
| French | -0.094 | -0.142 |
| Portuguese | -0.298*** | -0.279** |
| Russian | -0.249** | -0.281** |
| Spanish | 0.128 | -0.153 |
| <i>Diversification</i> | | |
| Related line of business | -0.145 | -0.198* |
| New line of business | -0.313** | -0.392*** |
| No asset protection | -0.347*** | -0.305** |

* $P < 0.10$, ** $P < 0.05$, *** $P < 0.01$.

related to the more extreme DCM variables, Arabic, Portuguese and Russian language countries.

Discussion

Most observational research on FDI uses actual stocks and flows and is unable to examine actual managerial decision-making because latent data (locations not chosen) are unobserved. This paper is an exception, because it explicitly considers hypothetical investments where we control the

options being evaluated. Although this is highly stylised, it provides a unique and different window on the characteristics of managerial decision-making with respect to FDI. It also reveals the veracity of using experimental methods where previously only econometric panel data and case-theoretic methods were thought appropriate.

Our results are able to distinguish firm-focused rationality (rational from the point of view of the firm's interest as a whole) from individual-manager-focused rationality, and show an interesting interplay between these two 'rationalities'. Although it is possible that the hypothetical decision-making exercise we employed is less likely to show managerial self-interest than in actual choice situations, it does reveal a complexity that could not arise simply from managers gaming the exercise. For example, the effect of experience itself may make managerial choices more rational, and we see glimpses of this in the fact that more experience managers do indeed make different decisions. The strength of our approach is that the managers were presented with a quite complex combination of investment attributes presented in an orthogonal design. If they simply based their decisions on an overtly simple rule (choose the one with highest ROI) this would be immediately obvious in the results. Similarly, if they did not take the experiment seriously we would have found that few if any of the variables of interest were significant. Instead, we see clear, consistent patterns, both at the individual level and in the aggregate, which are confirmed by two different experimental approaches.

Our results support recent literature that has moved beyond the contrast between 'rational' and 'process' approaches to decision-making. This literature emphasises the complexity of the choices being made with respect to FDI, and we show one mechanism that may help in furthering our understanding of what managers do when faced by that complex environment. In addition, we suggest that 'when?' is as important as 'what?' in determining the outcomes of managerial decisions and their choice set. Even so, there are clearly regularities in the decision-making systems, as we suggest in the next section.

Conclusions and research implications

Our research method enables us to examine different stages of the process associated with the decision to engage in FDI (Aharoni, 1966). The first stage is the establishment of a set of potential investment destinations from a profile of attributes



of alternative foreign locations that can be compared with each other across these pre-prescribed criteria. The second stage is the actual choice of an investment, either as a new investment or as an alternative to existing investments. A key conclusion from our preliminary analysis is that managers follow fairly rational rules from the point of view of the firm's interests in creating sets of investments to 'consider'. However, the choice of 'investments' in which to engage is less easy to reconcile with existing theory. One interesting conclusion that arises is that the manner in which IB researchers have analysed FDI may have introduced artefacts into their results. For example, as noted before, if managers are following a staged approach, where they narrow down investments into a smaller set and then make their final choice within that set, then it is important to understand the point in this process that is being examined. By just looking at the consideration set formation, it is likely that an investigator will walk away thinking that the rationalist theory of the firm approach is confirmed (hence rejecting Hypothesis 1 and Hypothesis 2). If one looks only at the choices within the investment model one is likely to think that the internationalisation process model is confirmed (hence accepting Hypothesis 1 and Hypothesis 2). In reality, neither is fully confirmed, because the nature of the decision-making process itself implies that factors considered in stage 1 are not going to be as relevant in stage 2.

Our results show that basic fundamental operational factors serve as the screening mechanism to determine a consideration set of investments. More country-specific factors enter the decision with higher priority when we move from 'consider' to 'invest' (a good example is host country language). Experience with FDI also figures more importantly in the 'invest' than the 'consider' decision, and perhaps this is an indication of the confidence that comes from repeating the FDI process (see also Buckley *et al.*, 1988). In addition, one can show that the models for managers with more FDI experience are more stable and have less variance around the estimates than those for less experienced managers. Variables related to host country culture play a much greater role in the 'invest' than the 'consider' decision. These are considerations that rise to prominence in the manager's mind at a late but crucial stage in the FDI process when all the more functional attributes of the investment have been accounted for.

We began this work attempting to get a better understanding of the causal mechanism by which

FDI investment choice is made, and to alleviate some of the biases associated with the application of secondary data. What we see is that, just as Dunning (1981) showed that one could not understand trade without understanding the multinational enterprise, it is the case that we cannot understand FDI location choice without understanding the process used to make such choices at the level of the individual manager. Much work remains to get a fuller picture of the process by which these decisions are made and the role that the external environment plays in policing such decisions. Hence we are left with the dubious conclusion that Hypotheses 1 and 2 are both rejected and accepted. At one level our results are a 'ringing endorsement of orthodoxy' – that is, managers make investment choices among a set of investments that are fundamentally driven by market characteristics, firm-specific advantages and return on investment. At another level these results indicate that managers' final investment decisions are highly idiosyncratic, and subject to biases that they might not be aware of themselves when making those decisions.

However, what our results do reveal is that structured experimentation can help to understand the complex decision-making underlying FDI. But this does not mean there are no limitations to what we have done. DCM and BW experiments are based upon random utility theoretic thinking, and suffer from all the limitations to that approach. Hence, if there are serious biases in the models used by managers – for example, if managers suffer from overconfidence bias (Camerer and Lovallo, 1999) – or are using decision models that we have not designed the experiment to investigate – such as elimination by aspects (Tversky, 1972; Manrai and Sinha, 1989) – our findings may have less predictive validity than we would hope (although, as McFadden (2001) notes, the models are remarkably predictive in the aggregate even in this case). Also, although our designs allow us to test interaction effects, our sample size restricts the analysis to mostly main effects. Hence, if managers are erroneously assuming related interactive structures (e.g., wanting to go only into countries with high growth *and* high ROI *and* in the same line of business, but not being able to do so with the options they are given in the experiments) we would not be able to discern this with the data available here. Similarly, we have not embedded our experiments in an environment that accounts for the managers' fiduciary responsibilities. We



have no way of knowing, based upon this study, how the managers' choices seen here would translate into a firm's final decision in reality, where all the complexity of ego, bonuses, financial analyst reports, institutional investment pressures and boards of directors comes into play.

Finally, our results have less than positive implications for the set of empirical findings seen in Appendix A. An examination of this research, plus much more that we could have included, shows significant sample domain issues. Most of the research examines country-out or country-in investment (e.g., Taiwanese inward investment in China, or outward investment from Japan or the USA), in limited numbers of industries (e.g., R&D or semiconductors), with specific rationales that may be idiosyncratic to the circumstances being investigated. Although one can argue that 'revealed preference' data are more relevant because they represent real investment choices, they are also biased in that they may not be predictive in the sense of 'stated preference' data because they do not span the domain of possible investment options. Hence developing a generalisable theory of FDI location choice may have been slowed by our failure to understand the extent to which we have restricted the domain of both our independent and dependent variables. However, we do not know the degree to which this is true until we attempt to re-test our findings in domains specifically structured to deal with this issue.

Future research implications

This paper examined only one set of decisions – FDI location choice by managers. However, it also was an attempt to bring into international business an alternative approach to testing theory. In doing so, we feel there are some implications for other areas of international business research from this work. We can speculate about a few of these.

The first and most obvious implication is that other areas of firm choice behaviour can be investigated in a manner similar to what we have done. For example, the approach here can be modified to study not only entry mode type – e.g., greenfield, joint venture, exporting – but also the facets of the choice of joint venture partner and the nature of the contracts with those partners. Hence we would argue that any area of location and mode choice could be studied experimentally. Furthermore, following from Roth and Kostova (2003), who argued quite elegantly that the MNE is an underutilised domain in which to study many

new and interesting management phenomena, we believe that the domain of the management decision-maker is an underutilised domain in which to discover, validate and test existing and new international business theories and phenomena. However, unlike Roth and Kostova, we believe this potentially requires new theorising and new methodologies. In this regard, we are undoubtedly in line with Sullivan's (1998) call for a broader vision and more 'comprehensiveness, connectedness and complexity' (and we would add creativity) in international business research.

Second, it is clear that context matters considerably to decision-making, and this is no different and perhaps even more important in international business decisions. Indeed, the more research that is conducted, the more it is realised that simple economic rationalist vs behavioural internationalisation distinctions fall by the wayside. However, experimental approaches are sufficiently robust to allow for consideration of different contexts. In our experiments we examined simple issues of political stability and investment level. However, many experiments now utilise what are known as information acceleration approaches (e.g., Urban *et al.*, 1997) that directly vary the context in which complex decisions are made. Although these have to date been used only in the case of technology products, there is no reason to believe that they cannot be used in more direct business contexts. Hence experiments can be conducted that look at the effects of coups, currency devaluations, and other socio-political scenarios.

Third, because experimental approaches can be designed to address issues of scale inequivalence, they are in general going to be more effective at studying cross-cultural phenomena than simple surveys. Indeed, any survey can be rewritten in a manner that mimics our BW approach, implying that one can theoretically remove all scale inequivalence from a survey instrument. For example, it would not be difficult to redevelop the Hofstede dimensions or any similar scale using this approach, theoretically generating purer measures than Likert-scale approaches alone (Hofstede, 2001).

Fourth, and most controversially, international business research has generally been limited in the approaches it has brought to bear on the phenomena under investigation. We have, to date, borrowed heavily from economics, sociology, social psychology and management but little from cognitive psychology or the rising field of experimental economics. This has limited the field in many ways,



but most clearly in the study of the role of the individual decision-maker (manager, regulator, consumer). Our application shows that there are opportunities to utilise new and different methods to add insight to 'old' questions.

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Appendix A

See Table A1.

Table A1 Recent literature on FDI location decisions

| <i>Author(s)</i> | <i>Method</i> | <i>Data and sample</i> | <i>Key variable(s)</i> | <i>Major results</i> |
|------------------------------|-------------------|---|---|--|
| Davidson (1980) | Survey | Foreign operations of 180 US multinationals from inception to 1975. Over 13,000 FDIs (70% of FDI by US MNEs at the time). | Entry frequencies explained by market size, corporate experience, prior presence. | Corporate experience affects location decisions in two ways: (1) firms prefer nations in which they are active to those in which they are not, and (2) firms with extensive experience exhibit less preference for near, similar and familiar markets. Markets that others might perceive as less attractive because of high uncertainty levels are given increased priority as the firms experience rises. <i>As firms gain experience, the location of foreign activity will increasingly represent an efficient response to global economic opportunities and conditions.</i> |
| Woodward and Rolfe (1993) | Panel | 187 manufacturing investments of US companies in the Caribbean 1984–1987. | Location of export-oriented US manufacturing FDI determinants. | FDI location positively influenced by: per capita GNP, exchange rate devaluation, length of income tax holidays, size of free trade zones, and manufacturing concentration. Negative effects from wage rate, inflation rate, transport costs and restrictions on profit repatriation. |
| Barkema <i>et al.</i> (1996) | Panel Compiled | 225 foreign entries of 13 Dutch firms. | Longevity of foreign entry. | Cultural distance is a prominent factor in foreign entry whenever this involves another firm. |
| Burgel and Murray (2000) | Survey | 398 <i>export</i> decisions of 246 UK technology-based start-ups. | <i>Entry</i> mode of export. | Direct export or selling through intermediaries. Choice is a trade-off between resources available and support requirements of the customer. |
| Mudambi (1998) | Survey | MNEs in West Midlands of UK: 70 valid responses. | Length of duration of operation at a particular location (after accounting for portfolio risk). | Firms with a longer tenure of operations are significantly more likely to invest in any given period. |
| Brush <i>et al.</i> (1999) | Survey | 209 responses from plant managers of US MNEs. | Contrast of manufacturing strategy: integrated or independent plant versus international strategy: locate home or abroad. | Manufacturing choices benefit from international issues more than vice versa. Managers rank determinants associated with manufacturing strategy higher than those associated with IB. |
| Kuemmerle (1999) | Survey | FDI in R&D 32 large MNEs in 4 countries. | Motives for FDI in R&D. | FDI in R&D both to augment knowledge basis and to exploit it. R&D investment at home in multiple sites before venturing abroad. |
| Chandprapalert (2000) | Survey | 100 US companies with FDI in Thailand. | Determinants of FDI in Thailand. | Firm size, market potential, investment risk key variables. |

Table A1 *Continued*

| <i>Author(s)</i> | <i>Method</i> | <i>Data and sample</i> | <i>Key variable(s)</i> | <i>Major results</i> |
|---------------------------------|-------------------|---|---|--|
| Henisz (2000) | Panel | Sample of 3389 overseas manufacturing operations of 461 firms in 112 countries. | Political and contractual hazards in host countries. | Joint ventures preferred where hazards highest. Host institutions matter. |
| Chung (2001) | Panel | US manufacturing 1987–1991 at 4-digit SIC level. | Technology transfer, competition, productivity. | FDI may both transfer and access technology in the host country. |
| Feinberg and Keane (2001) | Panel | US individual foreign affiliate level data from the US Bureau of Economic Analysis. | Tariff reductions (US–Canada). | Canadian affiliate sales to US negatively correlated with Canadian tariffs, but US parent sales to Canadian affiliates have little association with Canadian tariffs. Substantial heterogeneity to tariff changes within narrowly defined manufacturing industries. |
| Chung and Alcacer (2002) | Panel | 1784 FDI transactions entering US 1987–1993 from OECD countries. International Trade Administration reports | Knowledge seeking (access technical capabilities in host). | Location within USA – greater market size, lower factor costs, better access to surrounding station <i>and</i> knowledge seeking limited to firms in research-intensive industries – manufacturing firms may seek this not only through laboratories but also through manufacturing facilities. |
| Mitra and Golder (2002) | Panel Compiled | 19 MNEs with 722 entry operations. | Operations in similar markets on subsequent entry decisions. | Cultural distance from domestic market is <i>not</i> a significant factor. ‘Near-market knowledge’ and economic knowledge have significant effects. |
| Zhou <i>et al.</i> (2002) | Panel | 2933 Japanese investments in 27 provinces of China. | Influence of special economic zones and opening coastal cities on inward FDI. | SEZs and OCCs have exerted periodic influences on location of Japanese FDI in China. |
| MacCarthy and Attirawong (2003) | Survey Delphi | Academics, consultants and government officials. | Motivations of firms to invest in manufacturing. | Top five influences: costs, infrastructure, labour characteristics, government and political factors and economic factors. |
| Henisz and Macher (2004) | Panel | 44 semiconductor firms making 69 foreign investments in new manufacturing plants. (1994–2002). | Explanation of foreign investment in new manufacturing facility. | Firms with more advanced technological capabilities more likely to invest in countries with greater technological sophistication but not in politically hazardous countries. Less advanced technology firms more willing to trade off political hazards and technological sophistication. Firms also trade off other own versus other firms’ experience as sources of critical knowledge on foreign investment environments. |

Table A1 *Continued*

| <i>Author(s)</i> | <i>Method</i> | <i>Data and sample</i> | <i>Key variable(s)</i> | <i>Major results</i> |
|------------------------------|---------------|--|--|---|
| Pedersen and Petersen (2004) | Survey | 485 firms: 201 Denmark; 168 Sweden; 116 New Zealand. | Familiarity with local markets development over time. | 'Shock effect' of foreign market entry develops over time (lowest level of market familiarity 8 years after entry), supports 'psychic distance paradox' that adjacent countries provide high levels of shock. |
| Ambos (2005) | Survey | HQ R&D managers. Establishment of laboratory sites of 49 German MNEs survey. | Internationalisation motives of R&D. | Resource seeking rather than market seeking is predominant. Mission affects location. |
| Enright (2005) | Survey | 1100 MNE managers in Asia Pacific. | Regional strategies and establishment of regional management centres. | Regional structures are important in Asia-Pacific. |
| Nachum and Zaheer (2005) | Panel | US inward and outward FDI 1990–1998 from the US Bureau of Economic Analysis. | Cost of distance differentially affects investment motivation across industries. | Industries with different levels of information intensity are driven by different investment motivations: knowledge and efficiency seeking at high levels; market seeking at low levels. |
| Cheng (2006) | Survey | 466 Taiwanese investors in China. | FDI mode choice (includes brownfield ventures). | FDI mode choice influenced by resources owned by investor, resources specific to host firm and risk. Incorporates brownfield investment as a choice. |

Appendix B

A simple model for BW judgements

Best–worst scaling (hereafter, BWS) is a fairly general scaling method that extends Thurstone's (1927) random utility theory-based model for paired comparison judgements to judgements of the largest/smallest, best/worst, most/least, etc., items, objects or cues in a set of three or more multiple items. Specifically, BWS assumes that there is some underlying subjective dimension, such as 'degree of importance', 'degree of concern', 'degree of interest', etc., and the researcher wishes to measure the location or position of some set of objects, items, etc., on that underlying dimension. We refer to the process of assigning numerical values that reflect the positions of the items on the underlying scale as 'scaling'. The BWS approach is based on the view that such measurement arises from theory, and that theory and associated measurement are inseparable. Thus the scale values derived from BWS are those that best satisfy a theory about the way in which individuals make BW judgements.

To begin, we assume that there is a master set of K items to be scaled, $\{I_1, I_2, \dots, I_K\}$. The items are to be placed in C subsets, $\{i_1\}, \{i_2\}, \dots, \{i_C\}$, and some sample of individuals of interest is asked to identify, respectively, the best and worst items in each of the subsets (or in each of some subset of the subsets). If there are K total items to be scaled, then the total number of subsets that could be presented to the individuals is 2^K , minus all subsets that are null (1), singles (K) or pairs ($K(K-1)/2$), which grows exponentially with K . Thus one needs some systematic way to pick the subsets that makes sense and, as noted by Finn and Louviere (1992), constructing the sets from a 2^K orthogonal main effects design or some higher-resolution design in the 2^K family of designs is a good approach, and one that coincides nicely with previous design theory for the case of only 'best' choices (Louviere and Woodworth, 1983). There are other ways to construct appropriate sets, such as balanced incomplete block designs (BIBDs), and we illustrate the use of such designs in this paper.

Thus BWS assumes that there is some underlying dimension of interest, and one wants to

assign scale values to the K items on that single underlying dimension. It assumes that the choice of a pair of items from any subset is an indicator of that pair of items in that subset that are the farthest apart on the underlying dimension. That is, in any subset, say the c th subset, if there are P items, then there are $P(P-1)/2$ pairs of items that could be chosen best and worst, and an additional $P(P-1)/2$ pairs of items that could be chosen worst and best. Thus, for any given subset presented to an individual like the c th subset, the individual implicitly chooses from $2 \times P-1(P-1)/2$ pairs. Let us denote the quantity $2 \times P(P-1)/2$ as M , and for ease of exposition (and because it reflects the case in this paper) we assume that P is constant in every subset (e.g., balanced incomplete block designs lead to subsets of fixed size, M). Now, we can formulate this choice process as a random utility model as follows:

$$D_{ij} = \delta_{ij} + \varepsilon_{ij} \quad (\text{B.1})$$

where D_{ij} is the latent or unobservable true difference in items i and j on the underlying dimension; δ_{ij} is an observable component of the latent difference that can be observed and measured; and ε_{ij} is an error component associated with each ij pair.

Because of the presence of the ε_{ij} component, the choice process of any individual is stochastic when viewed by the researcher, because we cannot know what the individual is thinking. Thus we can formulate the model as a probability model to capture the probability that the individual chooses the ij pair in each subset:

$$P(ij|C) = P[(\delta_{ij} + \varepsilon_{ij}) > \text{all other } M - 1(\delta_{ik} + \varepsilon_{ik}) \text{ pairs}] \quad (\text{B.2})$$

where all terms are as previously defined. This problem can be solved by making assumptions about the distribution and properties of ε_{ij} . A simple assumption that leads to a tractable model form that has seen many applications in the social and business sciences is that ε_{ij} is distributed independently and identically as an extreme value type 1 random variate (equivalently, as a Gumbel, Weibull or double exponential). It is well known that these assumptions lead to the multinomial logit (MNL) model, which is the form of analysis used in this paper. That is, the choice probabilities can be expressed as

$$P(ij|C) = \frac{\exp(\delta_{ij})}{\sum_{ik} \exp(\delta_{ik})} \quad \text{for all } M \delta_{ik} \text{ in } i_C \quad (\text{B.3})$$

We can express δ_{ij} as a difference in two scale values, say s_i and s_j , or $s_i - s_j$. Hence we can rewrite the model as

$$P(ij|C) = \frac{\exp(s_i - s_j)}{\sum_{ik} \exp(s_i - s_k)} \quad (\text{B.4})$$

for all $M\{s_i, s_k\}$ pairs in i_C

Thus the scale values of interest are s_i and s_j , which reflect the location of each item on the underlying scale.

If the subsets are constructed in such a way that the joint probability of choosing items i and j across all subsets can be estimated independently of the marginal probabilities (e.g., by using a 2^k orthogonal main effects design + its foldover, or a BIBD + its complement), then the model implied by Eq. (B.4) can be estimated directly from the observed counts associated with each best–worst, worst–best pair summed over all subsets in the experiment. If the experiment does not allow one to calculate the total choices of all implied best–worst, worst–best pairs across the subsets (e.g., if one uses only the orthogonal main effects design or only the BIBD, as discussed by Finn and Louviere, 1992), one can approximate the desired scale values by taking differences in the marginal best and worst counts for each item. That is, the simple score $\delta(b_i w_i) = \text{total best } i - \text{total worst } i$ approximates the unknown difference $s_i - s_j$ for each individual or subset of individuals who exhibit the same underlying ordering of the items (apart from judgemental errors). We state this without proof, but note that one can easily see that this must be true by constructing an experiment that permits the joint choice probabilities for all the implied pairs to be estimated independently of the marginal probabilities, assuming an ordering of the items in that experiment, and simulating choices of the items with the highest and lowest rank in the order in each subset. It is easy to show that the total choices over all subsets for the implied pairs will be consistent with MNL, and once one obtains the MNL estimates, one can easily see that the best–worst _{i} differences are perfectly proportional to the MNL estimates.

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