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Investment Risk: A comparative study of the perceptions of consumers and advisers

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INVESTMENT RISK: A COMPARATIVE STUDY

OF THE PERCEPTIONS OF CONSUMERS AND ADVISERS

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ABSTRACT

This paper presents the results of a detailed comparison of the perceptions by individual consumers and expert financial advisers of the investment risk involved in various personal financial services, pensions, life insurance and banking products available to individual savers in the United Kingdom. Factor similarity tests are conducted to show that there are significant differences between expert and lay investors in the way financial risks are perceived. Comparison of questionnaire responses indicate that experts may be less loss averse than lay investors, but are prone to affiliation bias (trusting providers and salesmen more than lay investors do), believe that the products are less complex, and are less cynical and distrustful about the protection provided by the regulators.

The traditional response to the finding that experts and non-experts have different perceptions and understandings about risk was to institute risk communication programmes which were designed to re-educate consumers. However this approach is unlikely to be successful in an environment where individual consumers distrust regulators and other experts. It is suggested that the appropriate response is to institute risk communication strategies that supply lay investors with the information they need to make informed, independent judgements about financial risks. A partnership needs to be created between investors, product providers, and regulators whereby lay investors become involved in a two-way process of the management and communication or risk.

INVESTMENT RISK: A COMPARATIVE STUDY OF THE PERCEPTIONS OF CONSUMERS AND ADVISERS

Stephen Diacon[1]

1. Introduction

This paper presents the results of a detailed comparison of the perceptions by individual consumers and expert financial advisers of the investment risk involved in various personal financial services, pensions, life insurance and banking products available to individual savers in the United Kingdom.

Risk perceptions are important in an environment where individual investors have limited information and are only boundedly rational, and where there is no universally agreed understanding of how risk should be conceptualised or measured. The market for personal financial services provides a prime example of such an environment. Conventional theory often assumes that financial risk is objective and measured by the volatility of yields, and that individuals trade-off this risk with investment return in deciding whether to purchase the product. However, Capon et al (1996) and MacGregor, Slovic, Berry & Evensky (1999) found that return and risk comprise only part of the decision process for both individual investors and financial advisers, and that attributes other than return and risk are actively considered in personal investment decisions. This theme was developed in Diacon & Ennew (2001) who identified five different and orthogonal dimensions of the risk perceptions of individual UK investors (which they termed distrust of the product and/or provider, concern

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about the seriousness of adverse consequences, concern about the volatility of returns, poor knowledge and/or observability, and failure of regulation).

Of course the lack of knowledge and understanding of individual investors often means that they turn to a group of expert and qualified professionals for financial advice. The key issue here is whether these expert financial advisers (who may be working as independent financial advisers or as employees or tied agents of an investment provider) think about investment risk in the same way as their clients. The likelihood is that any differences in risk perceptions between expert financial advisers and non-expert lay investors will also be manifest in financial experts (such as actuaries, accountants, lawyers) employed by product providers or working as financial regulators.

The paper proceeds as follows. Section 2 discusses that background to the research, and explores the relatively sparse literature on lay and expert risk perceptions. Differences between expert and lay perceptions have given rise to the development of the study of risk communication, and this has implications for the financial sector too. Section 3 describes the quantification of financial risk perceptions based on the well-known psychometric paradigm and uses psychometric scaling methods to produce quantitative measures of perceived risk for individual and expert investors[2]. The fourth section discusses the main findings and identifies important differences between the risk perceptions of non-expert individuals and their expert financial advisers using the modified Kaiser Hunka Bianchini similarity procedure suggested by Barrett et al (1998). The last section provides a brief discussion of the implications of these results for the personal financial services, and suggests that the sector

needs to institute more modern methods of risk communication in order to redress the imbalance in perceptions.

2. Expert and Lay Risk Perceptions

Experts are people with specialist knowledge or skill and/or experience in a particular domain or in relation to specific, often complex tasks (Fuglseth & Gronhaug, 2000). These skills should make experts better problem-solvers than non-experts, particularly in a complex and dynamic environment. However there is no guarantee that experts will always make the correct choice - if such a thing exists (Fuglseth & Gronhaug, 2000) or indeed agree with each other. Shanteau (2000) is particularly critical of the implicit assumption in behavioural research that 'experts should converge', that is when presented with a common task, true experts should agree with the modal result, which by definition is the single correct answer. Instead he argues that the essential exercise of expertise is to recognise patterns in a complex and dynamic world and to make sense out of this chaos. In such circumstances it is not surprising that there is frequently a lack of consensus: indeed "disagreements between experts are a normal part of their jobs" (Shanteau, 2000, p186)[3].

Although little or no research has been undertaken to compare specifically the risk perceptions of expert and lay investors, the comparison of expert and non-expert understandings about physical and engineering risk has identified some important differences. These differences are so marked that a recent paper on the subject leads with the statement that "Everyone recognises substantial discrepancies between the public's rankings of hazards and those of experts" (Pollak, 2001). Indeed the differences between lay and

[2] For a comprehensive review see Slovic (2000).

expert risk perceptions are likely to reflect their differing understandings, values, and measures since, as Slovic (1987) comments, "'Risk' means different things to different people".

Studies[4] into the differences between the risk perceptions of experts and lay people generally emphasise the following discrepancies:

- Experts will generally think of risk as an objective entity that is measurable in quantitative terms, and their judgement of risk is often correlated with scientific or technical estimates. Experts may also have a narrow interpretation of the physical and social consequences of risk that has implications for their views on how risk should be measured (for example see Toft, 1996). Lay persons on the other hand are more likely to have a complex, multi-attribute subjective definition of risks which encompass much more than just statistical measures of variability or consequence. Some authors suggest that these perceptions are not individual or idiosyncratic – instead they are shared throughout societies via social interaction and inter-communication (Breakwell, 2001).
- Risk perceptions are likely to affected by cognitive biases which arise out of ways of thinking (termed heuristics) that act as short cuts to enable the rapid processing and simplifying of information. These heuristics often lead people to emphasise the fear or dread arising from possible adverse outcomes and lack of information or control (Slovic, Fischoff & Lichtenstein, 1985). Both expert and lay persons are subject to such biases, but

[3] The conclusion that disagreement among experts is fairly commonplace has interesting implications for the concept of 'best financial advice' and also for regulatory auding procedures such as mystery shopping.
[4] See for example Kemp (1993), Krupnick et al (1993), or Pollak (2001)

these are likely to differ[5] because of differences in the ways that decisions are made (for further details, see Pidgeon et al 1992; Slovic, 2001, Taylor, 2000).

- Experts are rarely 'certain' about their judgements, and will usually try to provide an indication of the imprecision of their risk estimates. Non-experts, on the other hand, have a desire for certainty which not only produces frustration with qualified expert opinion but may also lead them to redefine the problem in a way reduces uncertainty.
- An important element of the risk perceptions of non-experts is the degree of personal control that they can exercise over the random outcomes. Risks are perceived as being more severe if an individual has little information or control over what may happen. This lack of information and control also leads to a lack of trust in the motives and behaviour of 'risk generators' and also of the experts themselves (who are often perceived as biased or 'captured' by the organisations or institutions which generate risk)[6]. Experts, on the other hand, have been accused of an 'affiliation bias' which may lead to an underestimation of the risks involved in the industries in which they work.[7].
- Experts will tend to think about the impact of risk on a representative user or consumer whereas individuals naturally tend to personalise such impacts.
- Individual understanding of risk will be affected by the context or frame in which the risk-related decision is made; and this will naturally differ between decision-makers. One common phenomenon is the evaluation of any outcome in relative rather than absolute terms – relative to some status quo or reference point that can differ between people.

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[5] For example, in the updating of risk perceptions in response to the arrival of new information: experts may be slow to update their views (behaviour known as anchoring) while non-experts may be too easily persuaded.

[6] For example, a recent report on consumers' views on risks (National Consumer Council, 2002) noted that "Consumers feel powerless to assess accurately the views of independent advisers and specialists. … Company spokespeople are generally viewed with distrust" (p13).

[7] "Consumers assume that companies will automatically reassure people that their products are safe" (National Consumer Council, p13)

The traditional response to the finding that experts and non-experts have different perceptions and understandings about risk was to institute risk communication programmes which were designed to 're-educate' consumers in order to bring their erroneous perceptions into line[8]. However this approach has been criticised as being inadequate, particularly in situations where the public has lost confidence in experts as credible sources of risk information – and hence no longer know where to go for information. In such circumstances, Fischhoff (1995) suggests that, once they discover that they have a risk problem, organisations, industries and governments need to refine their risk communications strategies by moving rapidly through the following stages:

1. All we have to do is get the numbers right
2. All we have to do is tell them the numbers
3. All we have to do is explain what we mean by the numbers
4. All we have to do is show them that they've accepted similar risks in the past
5. All we have to do is show them it's a good deal for them
6. All we have to do is treat them nice
7. All we have to do is make them partners

(Fischhoff, 1995)

Essentially, the stages start with a situation where experts believe they have risk under control (so that little or no risk communication with the lay public is required). This strategy may be woefully inadequate if the public comes to believe that the risk has been mis-represented. It then becomes necessary to communicate risk information, but in a way which lay-users will understand as intended and accept.

It is now well understood that a sophisticated programme of communication is required in order to bridge the gap between lay and expert understandings about risk. Morgan, Fischhoff,

Bostrom & Atman (2002) suggest that this communication requires experts to understand how the lay public thinks about risk, and to gain an appreciation of which aspects of risk actually matter to the public[9]. Those topics must then be presented in a balanced, credible and comprehensible manner.

3. Measuring Risk Perceptions for Financial Services Products

This analysis of financial risk perceptions uses the so-called psychometric paradigm pioneered by the Decision Research Group in Oregon (Slovic, 1972; Slovic, Fischoff & Lichtenstein 1985). The research attempts to map the 'personality' of financial hazards, and identify the pattern of perceived qualities that characterise particular hazards, and through this identify the relation between these characteristics and the perception of risk.

In order to assess the characteristics of perceived risk and the extent of risk perceptions, the research uses data from a detailed questionnaire administered to a convenience sample of 123 UK individual savers and 41 expert financial advisers between 1997 and 1999 (using a similar sampling methodology to that adopted by Slovic et al, 1985)[10]. Each respondent completed a series of questionnaires covering a range of conventional personal financial services products such as individual personal pensions, equities, bank savings accounts, unit trusts (mutual

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[8] While at the same time, reinforcing the view that experts should be objective. For example, Taylor (2000) concludes (perhaps whimsically) that it might be better if actuaries were not human, in order to avoid the possibility of succumbing to irrational human factors.

[9] "What s risk communication should contain depends on what audience members intend to do with it. Sometimes recipients just want a trustworthy expert to tell them what to do. Sometimes they want to make their own choices but need quantitative details… Sometimes they want help in organizing their thinking" (Morgan et al (2002, p 5).

[10] The questionnaire was administered at a time when there was widespread media discussion of personal financial services in the UK, following criticisms of the industry arising from the mis-selling of personal pensions. This criticism intensified in the subsequent years with the advent of the bear stock market, the failure of high-profile insurers such as Equitable Life, and further accusations of mis-selling of endowment mortgages.

funds), investment trusts, life insurance, personal equity plans, tax exempt special savings accounts etc.

Data on the risk perceptions of individual lay consumers was obtained by circulating a questionnaire to members of six organisations based in different parts of England[11]. Questionnaires and a covering letter were distributed to group members at meetings, and taken away to be completed at home. Individual questionnaires were then returned to the researchers by post after two to three weeks, and a donation was made to the relevant organisation for each completed questionnaire. A total of 941 person/product responses was obtained from the 123 individual investors[12]. Data on the perceptions of expert financial advisers was obtained by circulating the same questionnaire (which was to be answered on their own behalf, and not of their clients) and a suitably amended covering letter to financial advisers employed by two UK financial services firms. All the surveyed financial advisers had successfully completed a financial planning professional qualification and were licensed to provide financial advice under the requirements of the then financial regulator[13]. A total of 298 person/product responses was obtained from the 41 expert financial advisers.

Detail on the characteristics of expert and non-expert questionnaire respondents is provided in Table 1. The average age of the individual lay investors was 50.49 years (ranging from 22 to 85), whereas expert financial advisers were generally younger with an average age of 38.85

[11] These groups included parents in a Leeds school PTA (n=20), members of a Leeds-based international exchange programme (n=17), helpers in a local charity in Leicester (n=10), workers at a Leicester junior school (n=13), members of a Nottingham church (n=28), and members of a South London choral society (n=35).
[12] The analysis of individual risk perceptions reported in Diacon & Ennew (2001) uses this dataset.
[13] The vast majority were holders of the CII Financial Planning Certificate Level 3 (the main financial planning professional qualification in the UK) but a small number had professional insurance or pensions qualifications.

(ranging from 25 to 57). While 52.85% of the individual investors were female, the corresponding percentage for experts was lower at 19.51%.

For each of the personal financial services products, respondents were asked to scale the degree of risk associated with holding wealth in that particular form using 25 different 7-point semantic differential scales (ranging from 1 = no or little risk to 7 = high risk). As usual in such studies, a definition of 'risk' was not provided in order to elicit peoples' own understandings of the concept. Respondents were asked about a variety of different aspects of financial risk (such as severity, immediacy of effect, degree of control, knowledge etc) and aspects of the products (such as importance of trust, tangibility, and quality). A copy of the relevant part of the questionnaire is included in Appendix 1.

The sample selection methodology, questions and analysis were based on the existing literature (particularly Slovic et al 1985, with additional questions from Greatorex & Mitchell, 1994). Questions were adapted for personal financial services products using feedback from a series of interviews with individuals who were asked "how would you describe the term 'risk' in connection with financial or savings products?" A trial version of the questionnaire was then piloted on a number of senior managers in the insurance and financial services industry. Although the research covered a total of twenty personal savings products (including both debt and equity investments), each individual respondent was asked to consider a randomly selected group of between seven and nine products. This is consistent with the approach of Slovic et al (1985) and MacGregor et al (1999), where each person performed only a subset of the whole task. The order of products, and the products given to

members of each group were randomised. A full listing of investment products utilised, along with a brief description, is provided in Appendix 2.

4. The Similarity of Expert and Lay Risk Perceptions

Table 2 shows the average and standard deviation of the scores for the 941 and 298 person/product responses for lay (L) and expert (E) respondents. The column 'F' lists the F-statistic for a one-way ANOVA to test the null hypothesis that the expert and lay means are equal. The table shows that in fourteen out of 25 questions, the mean responses of lay and expert investors differ significantly at the 5% level providing reasonable evidence that the size, if not the structure, of expert risk perceptions differs from that of lay investors. Futhermore, the responses to question 22 on the perceived benefit of the investment products (where 1=high and 7=low) also shows a significant average difference, with lay investors perceiving higher benefits than experts.

For the vast majority of questions where the difference is significant, the qualified financial advisers report a lower average score than lay investors, suggesting that they perceive financial services products to be less risky than do lay investors[14]. This result confirms the findings of previous studies (for example, Kemp, 1993) which find that experts are more sanguine than non-experts. Although they report much the same findings (in relation to the physical risks of nuclear power) Krupnick et al (1993) and Pollak (2001) are reluctant to come the conclusion that it is the lay risk assessors who are overly cautious[15].

[14] The three exceptions relate to Question 2 where experts perceive more uncertainty than lay investors; Question 19 concerning inflation risks, and Question 21 about differences in brands.

[15] Instead the researchers recommend a process of risk communication in an attempt to reconcile the conflicting view through a process of mutual enlightenment.

Table 2 demonstrates that expert financial advisers are significantly *more* likely than lay investors to believe that:

- Any investment losses would be known immediately rather than delayed
- Risks are known to financial experts and losses are observable
- The investment product is simple, and any associated risk is controllable
- Providers &/or salesmen will not indulge in unacceptable sales pressure or biased advice or unethical behaviour[16]
- The investor is protected by regulation[17]

As previously reported Diacon & Ennew (2001) used exploratory factor analysis to reduce the number of risk perception variables, and concluded that the financial risk perceptions of individual lay investors could be represented by five principal component factors[18]. A preliminary indication of whether or not this structure can be applied to experts can be obtained by constructing an approximation to the Diacon & Ennew factors (using a simple unweighted sum of the main relevant question scores) and then comparing the average responses of expert and lay investors. The results in Table 3 provide more evidence that the risk perceptions of lay and expert investors are unlikely to be the same. Although individuals and financial advisers seem to be similar in their dislike for volatility, there are significant differences in terms of the other factors: as noted above, experts are less inclined to distrust providers and salesmen, believe that the products are less complex, and are more confident in

[16] This may be interpreted as an example of affiliation bias.
[17] The finding that consumers are sceptical about the efficiency of government regulation is reinforced by the survey findings reported by the National Consumer Council (2002).

the regulators than are individual investors. There is also weaker evidence that financial experts are less inclined than lay individuals to be concerned about the adversity of consequences.

A more rigorous insight into the difference between lay and expert risk perceptions can be obtained by applying factor similarity tests in order to determine whether an interpretable factor defined for one 'target' group (non-expert investors) is present in the factor structure obtained from the same set of variable but from another group. The history of factor similarity tests has been fairly chequered and established methods such as the congruence coefficient and the KHB index[19] have been criticised recently as incorrect or biased, particularly when comparing factor structures with an unequal number of factors (for example, see ten Berge, 1996; Paunonen, 1997, Barrett et al, 1998). The approach adopted here is to extract the same number of principal component factors from the expert and non-expert data sets, and then compare both the orthogonal and oblique rotated factor patterns using 'modified' similarity measures suggested by Barrett et al, 1998 (utilising the program of Barrett, 2002): the results are provided in Tables 4 and 5.

Table 4 illustrates the rotated factor pattern matrices from expert and lay investors utilising a principal components factor extraction and an oblique oblimin rotation over three factors[20]. The loadings for non-expert investors are similar, although not identical to those reported by Diacon & Ennew ("DE"): factor 1 loads on variables/questions principally relating to investors' dislike of volatility (DE factor 3), factor 2 is an amalgam of distrust and poor

[18] Namely distrust of the product and/or provider, concern about adverse consequences, concern about the volatility of return, poor knowledge and/or observability, and failure of regulation
[19] See Tucker (1951) and Kaiser, Hunka and Bianchini (1971).

knowledge (DE factors 1 and 4), and factor 3 appears to reflect their dislike of adversity (DE factor 2),. It is immediately apparent that the pattern matrix for expert financial advisers is substantially different: in this case, factor 1 loads on questions expressing dislike of both volatility (such as 2, 26 and 27) and adversity (3, 9, 25), factor 2 is an amalgam of distrust and poor knowledge as before, but factor 3 is completely unlike the corresponding one for non-expert investors.

Table 5 shows the Pearson correlation coefficients and Tucker congruence coefficients for factor similarity tests based on comparisons of orthogonal rotated factor matrices and oblique factor pattern matrices (with the matrices for non-experts used as 'targets'). Barrett et al (1998) suggest that strong evidence of factor similarity is provided if the diagonal coefficients are near to unity and the non-diagonal coefficients are near to zero[21]. The results in Table 5 confirm earlier impressions of the lack of similarity in the factor patterns of expert and lay investors. Although both groups appear share a concern about trust and knowledge in their perceptions of risk (factor 2), the diagonal elements indicate a marked lack of similarity between their respective attitudes in relation to factors 1 and 3.

5. Conclusion

This paper presents the results of a detailed comparison of the perceptions by individual consumers and expert financial advisers of the investment risk involved in various personal financial services, pensions, life insurance and banking products available to individual savers

[20] Questions 4, 8 and 21 were omitted to maintain parity with Diacon & Ennew (2001). Only loadings exceeding 0.3 are reported.

[21] Barrett et al (1998) reported high degrees of factor similarity based on diagonal coefficients ranging from 0.74 to 0.99, and non-diagonal coefficients between 0.03 and 0.28.

in the United Kingdom. The evidence suggests that there are indeed significant differences between expert and lay investors in the way financial risks are perceived, both in their unobservable attitudes and in their responses to specific risk-related questions about financial services products. In comparing unobservable attitudes, factor similarity measures seem to indicate that expert and lay investors share a concern about the trustworthiness of product providers (in an environment of poor knowledge about providers and products). However expert financial advisers do not appear to make such as keen distinction between dislike of adversity and dislike of volatility as is evident in the responses of non-expert investors. In terms of specific replies to risk-related questions, experts may be prone to affiliation bias (trusting providers and salesmen more than lay investors do), believe that the products are less complex, and are less cynical and distrustful about the protection provided by the regulators.

The existence of differences between the risk perceptions of individual and expert (financially-qualified) investors raises some important questions about the operation of the personal financial services sector:

- If opinions on the risks involved in personal financial services differ, then whose beliefs should guide the policy of the government and financial services regulator? Furthermore, how can financial regulation operate adequately if staff working for the regulator (who have an element of education if not expertise) do not perceive risk from an individual consumer's perspective[22] and are distrusted by the very people they are trying to protect (National Consumer Council, 2002)?
- Will the process of offering expert financial advice be undermined if expert financial advisers (by virtue of their experience and training) think about risk in a radically different

way to their clients? This problem is exacerbated if individual investors, perhaps distrusting the judgment of both advisers and regulators, are unwilling to delegate the process of risk assessment.

- Will the offerings of financial services providers - in terms of products with risk, return and liquidity characteristics – fail to meet investor expectations if those individual investors differ in their perceptions of the financial risks involved in comparison with, say, the investment managers and actuaries (ie financial experts) who designed the products in the first place?
- The decisions of investors in the marketplace (in terms of their willingness to pay for the investment product, or for financial advice, or indeed for regulation) will of course depend on their risk perceptions. Will perceptions which differ from those of the service providers lead to an element of market failure?

The finding that lay investors perceive higher risks in investing in financial services products than do their financial advisers (coupled with an inherent optimism about likely benefits) has substantial ramifications in the light of recent reports such as the 'Sandler Review' (HM Treasury, 2002) which may have the effect of encouraging consumers to deal direct with providers rather than via independent financial advisers. Dispensing with the services of financial advisers is likely to lead consumers to make more conservative investment choices: for example, by investing too little in equities and too much in fixed-income assets when saving for retirement[23]. As a result, consumers may find themselves with surprisingly inadequate levels of savings to meet future commitments such as a pension on retirement.

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[22]Pollak (2001) provides an interesting discussion of the ensuing regulatory dilemmas.

[23] Benartzi & Thaler (1999) come to broadly the same conclusion, and attribute such behaviour to a form of consumer loss aversion.

The traditional response to the finding that experts and non-experts have different perceptions and understandings about risk was to institute risk communication programmes which were designed to 're-educate' consumers in order to bring their erroneous perceptions into line. However this approach is unlikely to be successful in an environment where individual consumers distrust regulators and other experts, and where the super-abundance of financial information is part of the problem (Diacon & Ennew, 2000). Instead, it might be sensible to include a discussion of individual risk perceptions and behavioural finance in the training provided to financial experts (financial advisers, actuaries, financial regulators) so that they can better understand actual consumer behaviour.

Furthermore the existence of a risk perceptions gap is likely to generate the type of problems that have bedevilled the primary and secondary industrial sectors for many years in relation to the public's misperception of health, safety and environmental risks. In such circumstances, it is suggested that the appropriate response is to institute risk communication strategies[24] which supply lay investors with the information they need to make informed, independent judgements about financial risks. Morgan et al (2002) recommend that effective risk communication should focus on the issues that recipients most need to understand, should ensure that the message is understood as intended, and should emanate from authoritative and trustworthy sources. The ultimate objective of risk communication in personal financial services should be to establish what Fischhoff (1995) terms a 'partnership'

[24] See Knights & Vurdubakis (1997) for a justification in relation to financial services.

whereby lay investors become involved in the two-way process of the management and communication or risk[25].

[25] One possible agenda has recently been set out by the National Consumer Council (2002).

References

Bayerische Rűck (1993), *Risk in a Construct: Perceptions of Risk Perceptions*, Knesebeck Gmbh, Munich

Barrett, P., Petrides, K., Eysenck, S. and Eysenck, H. (1998) 'The Eysenck Personality Questionnaire: an Examination of the Factorial Similarity of P, E, N, and L Across 34 Countries', *Personality and Individual Differences*, 25, 805-819

Barrett, P. (2002) PsWin, Release 2.0.1 22 August 02 (Factor Similarity Analysis), www.liv.ac.uk/~pbarrett/

Bernartzi, S. and Thaler, R. (1999) 'Risk Aversion or Myopia? Choices in Repeated Gamble and Retirement Investments', *Management Science*, 45, 3, 364-381

Breakwell, G. (2001) 'Mental Models and Social Representations of Hazards: The Significance of Identity Processes', *Journal of Risk Research*, 4, 4, 341-351

Capon, N., Fitzsimons, G. J. and Prince, R. A. (1996) 'An Individual Level Analysis of the Mutual Fund Investment Decision', *Journal of Financial Services Research*, 10, 59-82

Diacon, S. R. and Ennew, C. (2001) 'Consumer Perceptions of Financial Risk', *Geneva Papers on Risk and Insurance: Issues and Practice*, 26, 3, 389-409

Fischhoff, B. (1995) 'Risk Perception and Communication Unplagged: Twenty Years of Process', *Risk Analysis*, 15, 137-145

Fuglseth A.M. and Gronhaug K. (2000) 'Task Characteristics and Expertise' in Green (2000) ed, 176-186

Greatorex, M and Mitchell, V.W. (1994) 'Modelling consumer risk reduction preferences from perceived loss data', *Journal of Economic Psychology,* 15, 669-685

Green, B (2000) *Risk Behaviour and Risk Management in Business Life*, Kluwer Academic Press, Dordrecht

HM Treasury (2002) *Medium and Long-Term Retail Savings in the UK: A Review*, July, London

Hood, C. and Jones, D. (1996) *Accident and Design: Contemporary Debates in Risk Management*, UCL Press, London

Kemp, R (1993) 'Risk Perception: The Assessment of Risks by Experts and by Lay People – a Rational Comparison?' in Bayerische Rűck (1993), 103-118

Kleindorfer, P. R. and Kunreuther, H. C. (1987) *Insuring and Managing Hazardous Risks: From Seveso to Bhopal and Beyond*, Springer-Verlag

Knights, D. and Vurdubakis, T. (1997) 'Risk Communication in Financial Services', Research Report prepared for the Office of Fair Trading, London

Krupnick, A. J., Markandya, A. and Nickell, E. (1993) 'The External Costs of Nuclear Power: Ex Ante Damages and Lay Risks', *American Journal of Agricultural Economics*, 75, 1273-1279

MacGregor, D.G., Slovic, P., Berry, M. and Evensky, H.R. (1999) 'Perception of Financial Risk: A Survey Study of Advisors and Planners', *Journal of Financial Planning*, September, 68-86

Morgan, G., Fischhoff, B., Bostrom, A. and Atman, C. (2002) *Risk Communication: A Mental Models Approach*, Cambridge University Press, Cambridge

National Consumer Council (2002) *Running Risks: Summary of NCC Research into Consumers' Views on Risk*, London.

Paunonen, S. (1997) 'On Change and Factor Congruence Following Orthogonal Procrustes Rotation', *Educational and Psychological Measurement*, 57, 1, 33-59

Pidgeon, N., Hood, C., Jones, D., Turner, B. and Gibson, R. (1992) 'Risk Perception', Chapter 5 in The Royal Society (1992) *Risk Analysis, Perception and Management*, London

Pollak, R. (1995) 'Regulating Risks', *Journal of Economic Literature*, 33, March, 179-191

Pollak, R. (2001) 'Imagined Risks and Cost-Benefit Analysis', *American Economic Review*, 88, 2, 376-380

Shanteau, J. (2000) 'Why Do Experts Disagree?' in Green (2000), 186-196

Slovic, P. (1972) 'Psychological Study of Human Judgement: Implications for Investment Decision Making', *Journal of Finance,* 27, 779-799

Slovic, P. (1987) 'Informing and Educating the Public about Risk', in Kleindorfer & Kunreuther (1987), Chapter 10, 307-333

Slovic, P. (1993) 'Perceived Risk, Trust and Democracy', *Risk Analysis,* 13, No 6, 675-682

Slovic, P. (2000) *The Perception of Risk*, Earthscan Publications, London

Slovic, P., Fischhoff, B. and Lichtenstein, S. (1985) 'Characterising Perceived Risk', in Kates, R. Hohenemser, C. and Kasperson, J.(Ed) *Perilous Progress: Managing the Hazards of Technology*, Westview Press, Colorado.

Taylor, N. (2000) 'Making Actuaries Less Human: Lessons from Behavioural Finance', Staple Inn Actuarial Society, 18 January 2000.

ten Berge, J. (1996) 'The Kaiser, Hunka, and Bianchini Factor Similarity Coefficients: A Cautionary Note', *Multivariate Behavioral Research*, 31, 1, 1-6

Toft, B. (1996) 'Limits to the Mathematical Modelling of Disasters' in Hood & Jones (1996), 99-110

Appendix 1: Questionnaire

INVESTMENT PRODUCT: **PERSONAL EQUITY PLAN (PEP)**

Please answer *all* the following questions. Your opinions are valuable whether or not you own this product (and even if you know little or nothing about it). Please circle one of the numbers on the 1 to 7 scale to indicate your response.

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1. Do you own/have owned this product? Yes [ ] No [ ]

2. How much uncertainty is there in terms of the expected return for this product?
(No uncertainty) 1 2 3 4 5 6 7 (Very high uncertainty)

3. How serious could the consequences of owning this product be, should it prove unsatisfactory?
(Not at all serious) 1 2 3 4 5 6 7 (Very serious)

4. Do people using this investment product face the risks voluntarily?
(Risks are voluntary) 1 2 3 4 5 6 7 (Risks are involuntary)

5. To what extent are any losses from this product known immediately?
(Losses known immediately) 1 2 3 4 5 6 7 (Knowledge delayed substantially)

6. Would a typical investor know about the risks involved in this investment?
(Risks known precisely) 1 2 3 4 5 6 7 (Risks not known at all)

7. Are the risks from this investment product known to financial experts?
(Risks known precisely) 1 2 3 4 5 6 7 (Risks not known at all)

8. Could a typical investor control the risks involved in this investment?
(Full control) 1 2 3 4 5 6 7 (No control)

9. How great is the risk of losing all the money you put into this investment product?
(No risk) 1 2 3 4 5 6 7 (Substantial risk)

10. Could large losses or failure of this product have effects for the UK economy?
(No effects on economy) 1 2 3 4 5 6 7 (Big effects on economy)

11. To what extent can any losses from this product be observed by individual investors?
(Losses observable) 1 2 3 4 5 6 7 (Losses not observable)

12. Do you think this investment product is easy or complex to understand?
(Very Easy) 1 2 3 4 5 6 7 (Very Complex)

13. Would you experience unacceptable sales pressure if you were considering this investment?
(No risk of pressure) 1 2 3 4 5 6 7 (High Risk of Pressure)

14. Is there a risk of receiving unsound and biased advice from those who sell or recommend this product?
(No risk) 1 2 3 4 5 6 7 (High risk)

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15. Is there a risk that you will be unable to cash in your investment at short notice without a substantial penalty?

(No risk) 1 2 3 4 5 6 7 (High risk)

16. How easy is it to observe the charges levied by the investment provider?

(Charges are clear) 1 2 3 4 5 6 7 (Charges are hidden)

17. To what extent will the Government protect investors if something goes wrong with the investment?

(Full protection) 1 2 3 4 5 6 7 (No protection)

18. To what extent is the investment provider regulated to protect individual's investments?

(High regulation) 1 2 3 4 5 6 7 (No regulation)

19. Is there a risk of losing money because the value of the investment may not rise in line with inflation?

(No risk) 1 2 3 4 5 6 7 (High risk)

20. Is there a risk that the company providing this product may behave unethically?

(No Risk) 1 2 3 4 5 6 7 (High risk)

21. To what extent do you think there are differences in the risks of this product between different brands?

(No difference) 1 2 3 4 5 6 7 (Substantial differences)

22. How do you perceive the benefit/return on this product, relative to the return on a building society current account?

(Much higher than building society) 1 2 3 4 5 6 7 (Much lower than building society)

23. Do individual investors spend a lot of time monitoring this investment?

(No time) 1 2 3 4 5 6 7 (A lot of time)

24. To what extent do individuals assess information on the product prior to purchase?

(No information used) 1 2 3 4 5 6 7 (Much information used)

25. How great is the risk that you will be ruined as a result of this investment?

(No risk) 1 2 3 4 5 6 7 (Substantial Risk)

26. How great is the risk that the return from this investment might fall below expectations?

(No risk of lower expected return) 1 2 3 4 5 6 7 (High risk of lower than expected return)

27. How great is the risk that the value of this investment will go down as well as up?

(No risk) 1 2 3 4 5 6 7 (Substantial risk)

Appendix 2: Investment Products

Product	Explanation
1. Personal Equity Plan (PEP)	1.Equity investment scheme with annual limits and tax advantages. Offered by most types of financial firm
2. Tax Exempt Special Savings Account (TESSA)	2. Five-year savings account offered by banks and building societies with maximum limit and tax advantages
3. Bank Current Account	3. Cheque account, paying little or no interest
4. Bank Deposit Account	4. Bank savings account
5. Building Society Current Account	5. Cheque account offered by mutual savings society. Does not confer membership
6. Building Society Deposit Account	6. Savings account offered by mutual savings society. Does not confer membership
7. Premium Bonds	7. Government lottery tickets for monthly 'draw'. Tickets are permanent.
8. Personal Pension	8. Private individual pension, purchased by the self-employed or by those who have opted-out of either the higher tier of the State scheme or of their employer's scheme
9. Shares In Blue Chip Company	9. Equity of largest, most established public companies
10. Property	10.Equity investment in physical property, most commonly via home ownership
11. Shares In Privatised Utilities	11. Equity investment in former State-owned utility companies (gas, electricity, water, telecoms)
12. Endowment Policy	12. Life insurance policy, paying benefits either on survival for a fixed period or on earlier death
13. National Savings	13. Government savings schemes
14. Investment Bonds	14. Medium-term single premium life insurance contracts with benefits linked to equity values
15. Unit Trust Units	15. Mutual funds. Closed-end fund in form of trust invested principally in equities. Operated by most types of financial firm.
16. Building Society Share Account	16. Savings account offered by mutual savings society, giving membership
17. Guaranteed Bonds	17. Medium-term single premium life insurance contracts with guaranteed minimum return
18. Venture Capital Trust	18. Investment trust specialising in shares of unquoted companies, with special tax advantages
19. Individual Savings Account (ISA)	19. Special savings accounts offering tax advantages to small savers proposed in November 1997 Budget. Not yet operable
20. Investment Trust Shares	20. Public open-end investment company with assets invested principally in equity

Table 1: Sample Characteristics – Lay and Expert Investors

	Lay Investors (n=123)		**Expert Investors (n=41)**	
	Mean	*Std. Dev.*	*Mean*	*Std. Dev.*
Age	50.49	15.00	38.85	9.07
% Female	52.85	50.12	19.51	40.12
% Married	79.67	40.41	75.61	43.48
% With Children	83.74	37.05	58.54	49.88
% Homeowner	92.68	26.15	97.56	15.62
% Pension Holder	80.49	39.79	100.00	0.00
% Paid Employment	60.98	48.98	100.00	0.00
% Retired	28.46	45.30	0.00	0.00

Table 2: Expert (E) and Lay (L) Risk Perceptions of Financial Services Products				
Question	**Mean**	**S.D.**	**F**	**Sign.**
2. How much uncertainty is there in terms of the expected return for this product?	L 3.92 E 4.40	1.96 1.92	13.23	0.00
3.How serious could the consequences of owning this product be, should it prove unsatisfactory?	L 4.30 E 4.31	1.88 1.86	0.00	0.96
4. Do people using this investment product face the risks voluntarily?	L 2.70 E 2.77	1.87 1.76	0.26	0.61
5. To what extent are any losses from this product known immediately?	L 3.81 E 3.51	1.88 1.99	5.69	0.02
6. Would a typical investor know about the risks involved in this investment?	L 3.35 E 3.25	1.66 1.65	0.88	0.35
7. Are the risks from this investment product known to financial experts?	L 2.39 E 1.83	1.50 1.18	34.64	0.00
8. Could a typical investor control the risks involved in this investment?	L 5.29 E 4.47	1.78 2.05	44.56	0.00
9. How great is the risk of losing all the money you put into this investment product?	L 3.23 E 3.11	1.83 1.95	0.96	0.33
10. Could large losses or failure of this product have effects for the UK economy?	L 4.49 E 4.26	1.82 1.96	3.62	0.06
11. To what extent can any losses from this product be observed by individual investors?	L 3.43 E 2.80	1.73 1.69	30.42	0.00
12. Do you think this investment product is easy or complex to understand?	L 3.60 E 3.02	1.91 1.79	20.98	0.00
13. Would you experience unacceptable sales pressure if you were considering this investment?	L 3.48 E 3.17	1.90 1.70	6.19	0.01
14. Is there a risk of receiving unsound and biased advice from those who sell or recommend this product?	L 4.25 E 3.89	1.87 1.78	8.80	0.00
15. Is there a risk that you will be unable to cash in your investment at short notice without a substantial penalty?	L 4.27 E 4.20	2.15 2.10	0.26	0.61
16. How easy is it to observe the charges levied by the investment provider?	L 3.85 E 3.80	1.87 2.05	0.13	0.72
17. To what extent will the Government protect investors if something goes wrong with the investment?	L 5.08 E 4.59	1.84 2.03	14.92	0.00
18. To what extent is the investment provider regulated to protect individual's investments?	L 3.57 E 2.55	1.70 1.69	80.82	0.00
19. Is there a risk of losing money because the value of the investment may not rise in line with inflation?	L 4.68 E 4.98	1.73 1.72	6.93	0.01
20. Is there a risk that the company providing this product may behave unethically?	L 3.81 E 3.46	1.71 1.68	9.34	0.00
21. To what extent do you think there are differences in the risks of this product between different brands?	L 4.26 E 4.53	1.79 1.90	5.18	0.02
22. How do you perceive the benefit/return on this product, relative to the return on a building society current account?	L 3.42 E 2.90	1.57 1.56	25.11	0.00
23. Do individual investors spend a lot of time monitoring this investment?	L 3.57 E 3.54	1.66 1.73	0.05	0.82
24. To what extent do individuals assess information on the product prior to purchase?	L 4.57 E 4.29	1.57 1.53	7.35	0.01
25. How great is the risk that you will be ruined as a result of this investment?	L 3.41 E 3.23	1.73 1.79	2.23	0.14
26. How great is the risk that the return from this investment might fall below expectations?	L 4.43 E 4.40	1.68 1.60	0.64	0.80
27. How great is the risk that the value of this investment will go down as well as up?	L 4.29 E 4.06	1.90 2.28	2.93	0.09

Table 3: Do Lay Risk Perceptions Apply to the Experts?				
Approximate Factor	**Mean**	**Std. Dev.**	**F**	**Sign.**
Distrust	L 19.66 E 18.52	L 7.37 E 6.49	5.67	0.02
Dislike of Adversity	L 15.43 E 14.91	L 5.26 E 5.67	2.14	0.14
Dislike of Volatility	L 17.32 E 17.84	L 5.60 E 5.36	1.99	0.16
Poor Knowledge	L 9.17 E 7.88	L 3.73 E 3.29	28.65	0.00
Regulatory Failure	L 8.65 E 7.15	L 2.95 E 2.95	58.33	0.00

Distrust = sum of scores from Questions 13, 14, 15, 16, 20
Dislike of Adversity = sum of score from Questions 3, 9, 10, 25
Dislike of Volatility = sum of scores from Questions 2, 19, 26, 27
Poor Knowledge = sum of scores from Questions 6, 7, 11
Regulatory Failure = sum of scores from Questions 17, 18

Table 4: Oblimin Rotated Factor Pattern Matrices (3-Factor Solutions)							
	Non-Expert (n=941)				Expert (n=298)		
Question	**FAC. 1**	**FAC. 2**	**FAC. 3**		**FAC. 1**	**FAC. 2**	**FAC. 3**
2	0.614				0.734		
3			-0.59		0.671	0.307	
5		0.711				0.738	
6		0.781				0.659	
7		0.473				0.386	
9	0.429		-0.362		0.801		
10			-0.549				
11		0.744				0.729	
12	0.37	0.457			0.453	0.501	
13		0.436	-0.361		0.343	0.599	
14	0.349	0.408	-0.338			0.539	
15		0.39	-0.449		0.324	0.608	0.31
16	0.308	0.536				0.642	-0.328
17	0.572				0.496		
18	0.56						-0.482
19	0.737						-0.789
20	0.445						-0.601
23			-0.63		0.738		
24			-0.733		0.628		
25			-0.545		0.744		
26	0.775				0.531		
27	0.686				0.837		
Variance Explained	4.198	3.521	3.134		5.301	3.780	1.893

Source: Barrett (2002) PsWin 2.0.1, Factor Similarity Analysis

Table 5: Factor Similarity Coefficients for 3-Factor Solutions
(Rows = Non-Experts; Columns = Experts)

Pearson Correlation Coefficients based on KHB Orthogonal Factor Matrices

	FAC. 1	FAC. 2	FAC. 3
FAC.1	0.557	-0.042	-0.218
FAC.2	-0.110	0.926	-0.097
FAC.3	-0.260	-0.091	0.381

Tucker Congruence Coefficients based on KHB Orthogonal Factor Matrices

	FAC. 1	FAC. 2	FAC. 3
FAC.1	0.974	-0.013	0.077
FAC.2	-0.015	0.926	-0.094
FAC.3	0.085	-0.090	0.393

Pearson Correlation Coefficients based on Oblique Factor Pattern Matrices

	FAC. 1	FAC. 2	FAC. 3
FAC.1	0.330	-0.512	-0.449
FAC.2	-0.594	0.944	0.206
FAC.3	-0.569	0.237	-0.421

Tucker Congruence Coefficients based on Oblique Factor Pattern Matrices

	FAC. 1	FAC. 2	FAC. 3
FAC.1	0.688	0.219	-0.596
FAC.2	0.128	0.967	-0.135
FAC.3	-0.773	-0.290	0.011

Source: Barrett (2002) PsWin 2.0.1, Factor Similarity Analysis