Factors Explaining the Choice of a Finance Major: The Role of Student Characteristics, Personality and Perceptions of the Profession

Andrew Worthington and Helen Higgs

This paper examines the role of student characteristics, personality, and perceptions of the banking and finance profession in determining the choice of an undergraduate finance major. The data employed is drawn from a survey of first-year business students at a large Australian university. Student characteristics examined include gender, secondary school studies in accounting, business and economics, grade point average and attendance mode. Perceptions of the banking and finance profession revolve around questions of overall interest, relationships of persons working within the profession, the manner in which the profession deals with problems and tasks, and the nature of these problems. A binary probit model is used to identify the source and magnitude of factors associated with a student's choice of major. The evidence provided suggests that the choice of a finance major is a function of students' overall interest in the profession, perceptions of how the profession deals with problems and tasks, mode of attendance, and to a lesser extent, gender. The study emphasises the need to incorporate factors associated with students' personality and perceptions in analyses of this type.

In Australia, as elsewhere, there has been a dramatic increase in the number of students undertaking undergraduate business degrees during the 1990s. As detailed in Exhibit 1, enrolments in all Australian business-related degrees (including business, administration and economics) rose by nearly fifty percent between 1990 and 1999. However, this national increase is not evenly distributed across discipline areas within this broad field of study. For example, where economics once accounted for nearly ten percent of all undergraduate business degrees, it now accounts for less than seven percent, representing an annual growth rate (geometric mean) over the period of only 1.09 percent as compared to 5.47 percent for all degrees. The relative decline in economics enrolments has already been well documented in Australia by Lewis and Norris (1997) and Millmow (1995; 2000), as have similar experiences in the US by Siegfried et al. (1991), Bartlett (1995), Salemi and Eubanks (1996), Margo and Siegfried (1996), Becker (1997), Salemi and Siegfried (1999) and Siegfried (2000).

In sharp contrast, Australian undergraduate finance degree enrolments have grown at 15.58 percent during the 1990s, with the number of students increasing from 1,986 in 1990 to 6,459 in 1999. This significantly exceeds the growth rate in both the closely related areas of accounting (2.22 percent) and economics (1.09 percent) and in 'all other' business disciplines (6.83 percent) included in Exhibit 1 (including human resource management, international business, general management and marketing). Unfortunately, almost no empirical evidence exists concerning the factors that actually affect the choice of individual students to major in finance over these alternatives. For example, while a number of reasons have been given for the declining popularity of economics degrees in Australia, including the massive fall in the number of secondary school students taking economics and the rising popularity of competing business study programs, similar sorts of reasoning have not been used to explain the strengthening position of the finance discipline.

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Exhibit 1. Undergraduate enrolments in business majors and degrees at Australian universities, 1990-1999

	Accounting majors and degrees		Economics majors and degrees		Finance majors and degrees		All other business majors and degrees		Total business majors and degrees	
	Number	Change	Number	Change	Number	Change	Number	Change	Number	Change
1990	24097	14.27%	8207	7.93%	1986	30.83%	50546	14.09%	84836	13.86%
1991	25522	5.91%	8549	4.17%	2145	8.01%	55825	10.44%	92041	8.49%
1992	24386	-4.45%	8252	-3.47%	2397	11.75%	59658	6.87%	94693	2.88%
1993	22511	-7.69%	9063	9.83%	2893	20.69%	61211	2.60%	95678	1.04%
1994	24167	7.36%	8280	-8.64%	3113	7.60%	59944	-2.07%	95504	-0.18%
1995	25360	4.94%	8086	-2.34%	3490	12.11%	62994	5.09%	99930	4.63%
1996	26299	3.70%	8122	0.45%	4016	15.07%	71028	12.75%	109465	9.54%
1997	26435	0.52%	8515	4.84%	4825	20.14%	77077	8.52%	116852	6.75%
1998	26242	-0.73%	8408	-1.26%	5687	17.87%	82801	7.43%	123138	5.38%
1999	26253	0.04%	8473	0.77%	6459	13.57%	85754	3.57%	126939	3.09%

Source: Department of Education, Training and Youth Affairs, Selected Higher Education Student Statistics, 1989-1999.

Notes: Presents number of students enrolled and annual percentage change. The percentage change for 1990 is based on 1989 figures (not shown). 'All other business majors and degrees' category includes human resource management, international business, general management, industrial relations, marketing, etc.

One obvious reason for this lack of interest is that finance does not (yet) suffer from the declining enrolments long experienced in economics, and more recently found in accounting. However, there are some disturbing parallels between finance and its most closely related disciplines. For example, one major theme in the economics literature is based on the almost universal observation that "female undergraduates are less likely to take an introductory economics class, to continue in economics after completing the first introductory course, and to major in economics than are male undergraduates" (Jensen and Owen 2000: 466). Several competing hypothesises have been proposed, and duly tested in the literature. These include suggestions that the economics curriculum, along with the pedagogy and types of evaluation instruments, are of less interest to women, and that the evaluation techniques employed favour male learning styles. The gender bias literature also includes suggestions that female students are relatively poorly prepared for introductory economics in terms of maths preparation, and concomitantly have a lower average performance in economics classes than their male counterparts. It is argued that this is then translated into a lower level of interest in the subject matter itself, with a resultant fall in continuations in economics subjects.

This is important because the debate on gender bias in finance education has been the subject of increasing attention [see, for instance, Didia and Hasnet (1998), Henebry and Diamond (1998) and Bauer and Dahlquist (1999)]. And the lower participation rate of female students in finance has already been recognised. For example, Bauer and Dahlquist (1999) cite the female percentage of graduating US bachelor's degrees in 1994/95 as 30.8 percent for economics, 33.3 percent for finance, 56.2 percent for accounting, 49.1 percent for international business and 46.8 percent for marketing. Similar conditions hold for Australian female undergraduates. In 1999 the female participation rate in finance degrees was 43.7 percent, as against 41.2 percent for economics, 51.4 percent for management, 53.5 percent for accounting, 55.1 percent for marketing, 69.9 for human resource management and 51.6 percent overall (DETYA 2000). As far as the authors are aware, no study to date has yet linked this purported gender bias with the choice of a finance major.

Several other issues are equally deserving of attention in any study explaining the choice of an undergraduate business major. First, attention should also be paid to measuring what appear to be relatively important factors in the choice of a major, that is, student personality and perceptions of, and interest in, the profession itself. While some business-related studies have used gender, grade

point average, and past studies in the discipline, amongst others, to proxy interest in the subject matter, very few have concerned themselves with directly measuring these important determinants of a choice of major. Second, there has generally been little allowance in studies to date for the complex interaction between the choice of a business major and one in another business-related field. This is particularly important since one of the most common themes identified in the broader literature has been the rise of competing business studies programs and the suggestion that potential majors are funnelled into close substitutes. Rigorous empirical analysis would therefore facilitate greater certainty on the empirical status of students' choice of majors in the context of close competition. It is with these considerations in mind that the present study is undertaken.

Accordingly, the purpose of the present paper is to investigate the role of both student characteristics and perceptions in determining the rate of participation in Australian finance majors. The paper itself is divided into three main areas. The first section explains the empirical methodology and data collection employed in the present analysis. The estimated models are dealt with in the second section. The third section discusses the usefulness of these models for predicting student majors in finance. The paper ends with some brief concluding remarks.

I. Data and Methodology

The data used in this study is based on three hundred and forty first-year students sampled from the more than four thousand students studying for the three-year undergraduate business degree at Australia's fifth largest university. This award consists of a set of core units in conjunction with elective majors, double majors and extended majors in accountancy, finance, economics, human resource management, international business, management and marketing. The degree's tertiary entrance score is common to all majors, and students initially matriculate to a nominated major or majors. However, after the first semester students may apply to change major provided that they satisfy the appropriate unit prerequisites and are able to complete the proposed major within the units remaining in the program.

The analytical technique employed in the present study is to specify students' choice of major as the dependent variable (y) in a regression with student personality, perceptions and other physical and educational characteristics as explanatory variables (x). The nature of the dependent variable indicates discrete dependent variable techniques are appropriate. Accordingly, the following binary probit model is specified:

$$\text{Prob}(y=1) = \int_{-\infty}^{\beta' x} \phi(t)dt = \Phi(\beta' x) \qquad (1)$$

where x comprises a set of student characteristics posited to influence the selection of a finance major, β is a set of parameters to be estimated and the function Φ indicates the standard normal distribution. The coefficients imputed by the binary probit model provide inferences about the effects of the explanatory variables on the probability of the choice of a particular major. The requisite dataset is composed of three sets of information.

The first set of information relates to the choice of major and comprises the dependent variable in the binary probit model specified in Equation (1). Students are categorised as either: (i) those who have not nominated a finance major, whether as a single or extended major, or as part of a double major (y = 0); and (ii) those who have nominated a finance major as part of their program (y = 1). The first group consists of all students undertaking single or extended majors in accountancy, economics, human resource management, international business, management and marketing, excluding double major students combining studies in these areas with a major in finance. Two hundred and fifty-seven students, or seventy-six percent of cases are categorised as non-finance majors. The second group consists of students undertaking at least one major in finance. Eighty-three students, or some twenty-four percent of cases, are identified as finance majors.

The next two sets of information are specified as explanatory variables in the binary probit regression model. The first of these sets of information relates to several student characteristics derived by survey. Information collected includes a personality score and perceptions of the finance profession along a range of criteria. First, much research suggests that students select majors that are seen as compatible with particular personality styles (Saemann and Crooker 1999: 2). Booth and Winzar (1993), for example, showed that students who were initially attracted to accounting displayed personality traits that led them to prefer learning facts and rules applied in concrete ways, and other studies, such as Wolk and Cates (1994) have also linked specific personality traits to particular majors.

Second, empirical evidence also suggests that a more basic issue behind students' choice of major may be their level of interest and perceptions of the profession. Dynan and Rouse (1997), Lewis and Norris (1997) and Jensen and Owen (2000) have identified the importance of interest and perceptions of the profession as factors determining the choice of an economics major, and Easterlin (1995) has identified preferences as the key factor in the generational switch to business studies. In a related development, Krishnan et al. (1997) have linked student perceptions and expectations about finance with the debate on the design, structure and delivery of the introductory finance course.

The survey included two instruments to measure students' inherent creativity and perceptions of the banking and finance profession. The first instrument required students to complete Gough's 30-item Creative Personality Scale (Gough 1979). Possible scores on this simple adjective checklist range between –12 and +18 with a higher score indicating a more creative individual. The specification of the personality variable (*PRS*) is identical to that used by Saemann and Crooker (1999) in a recent study of the decision to major in accounting. Appendix A lists the adjectives surveyed and the scoring mechanism applied following the survey. No particular *a priori* sign is hypothesised when finance major is regressed against personality score.

The second measure required students to assign ordered preferences on a 5-point scale between thirty-six opposing adjectives on the basis of their perceptions of the banking and finance profession. Saemann and Crooker (1999) surveyed perceptions of the accounting profession using a similar instrument. These items are arrayed along four dimensions of perceptions relating to the banking and finance profession (number of individual items in brackets); namely, interest (*INT*) (5), the level of individuality (*IND*) (4), precision or thoroughness (*PRE*) (13) and structure or rule-orientation (*STR*) (14). The pairings for 'interest' include boring vs. interesting, dull vs. exciting and monotonous vs. fascinating, while for 'individuality' they embrace solitary vs. people-orientated and introvert vs. extrovert. These terms are thought to capture students' overall perceptions of the profession and the relationships of persons working within the profession.

The items for 'structure' relate to students' perceptions of the way in which financial analysts deal with problems and tasks. Pairings include structured vs. flexible and routine vs. unpredictable. Finally, 'precision' is captured by pairings including accurate vs. imprecise, challenging vs. easy and mathematical vs. verbal. These items address students' perceptions about the nature of the types of problems and their solutions in the banking and finance profession. Appendix B lists the items by dimension and from left to right by increasing strength in each dimension (i.e. less interest to more interest) though in the survey itself these items were randomised by classification and coding.

Exhibit 2. Total Variance Explained by Extracted Principal Components

Variable set	Component	Eigenvalue	Percentage of variance	Cumulative percentage of variance
Interest (5)	INT1	2.465	50.333	50.333
Individuality (4)	IND1	1.669	38.157	38.157
	IND2	1.203	27.512	65.670
Precision (14)	PRE1	3.301	23.673	23.673
	PRE2	2.000	14.345	38.018
	PRE3	1.300	9.326	47.344
	PRE4	1.195	8.572	55.916
Structure (13)	STR1	5.191	36.501	36.501
	STR2	1.400	9.847	46.348
	STR3	1.105	7.772	54.119

Notes: The number of principal components extracted from each set of questions is determined by the latent root criterion where only components having eigenvalues greater than unity are considered significant. The numbers of original variables for each variable set are in brackets.

In order to more accurately examine the underlying patterns of relationships among this large number of variables, and given that the study is primarily concerned with prediction, the items within each dimension are reduced using principal components analysis. The latent root criterion is employed to extract the significant linear combination of items within each dimension of perceptions. Ten factor scores with eigenvalues of the correlation matrix greater than unity are derived from the surveyed items as replacements for the original variables. One factor is selected for the interest dimension, two for individuality, four for precision and three for structure. These account for 50.333, 65.670, 55.916 and 54.119 percent of cumulative variance within each dimension, respectively. Exhibit 2 provides details on the extracted components, eigenvalues, and percentage of variance and cumulative percentage of variance for these factor scores.

The hypothesis underlying the factor score for interest (*INT*) follows the suggestion that students interested in a particular profession are more likely to select a major in that area. A positive coefficient is hypothesised when finance major is regressed against interest. The three remaining sets of factor scores relate to the contention that many non-finance major students generally perceive banking and finance as an individualistic (*IND*), excessively mathematically precise (*PRE*) and highly structured (*STR*) profession, and these are posited to act against the selection of a finance major. Conceptually speaking, the factor scores specified as explanatory variables represent the degree to which each student scores high on the group of items that load high on the factor. Thus, students who score high on the several variables that have heavy loadings on the factor will obtain a high factor score on that factor. Thus the factor scores for interest, individuality, precision and structure can be interpreted as composite measures within each dimension, and therefore the *ex ante* signs on the estimated coefficients will be identical to that hypothesised for the original raw data. Negative coefficients are hypothesised when finance major is regressed against *IND*, *PRE* and *STR*.

The final set of information includes recorded student characteristics that are cross-tabulated with the survey data. Selected descriptive statistics are provided in Exhibit 3. Characteristics recorded include each student's sex, secondary school studies, grade point average to date and attendance mode. The first variable specified is a qualitative variable indicating whether the student is female (*SEX*) (189 cases or 55.59 percent of the sample). There is generally strong evidence to suggest that female undergraduates are less likely to take an introductory finance class, to continue in finance after completing the first introductory course, and to major in finance than are male undergraduates. For example, Sen et al (1997: 69) found that gender along with a number of other factors "…turned out to be statistically significant determinants of student achievement in principles of finance courses", though both Henebry and Diamond (1998) and Didia and Hasnet (1998) found otherwise.

Nevertheless, a negative sign is hypothesised when finance major is regressed against student gender.

Exhibit 3. Descriptive Statistics for Explanatory Variables

	Description	Variable	Non-finance majors		Finance majors	
			Mean	Standard deviation	Mean	Standard deviation
Personality and perception characteristics	Personality score	PRS	1.7549	3.0794	2.5904	3.6192
	Interest factor score (1)	INT1	-0.1353	0.9812	0.4190	0.9452
	Individuality factor score (1)	IND1	0.0116	1.0317	-0.0359	0.8995
	Individuality factor score (2)	IND2	0.0677	0.9907	-0.2096	1.0055
	Precision factor score (1)	PRE1	0.0528	0.9931	-0.1634	1.0096
	Precision factor score (2)	PRE2	-0.0845	0.9485	0.2617	1.1108
	Precision factor score (3)	PRE3	0.0646	0.9484	-0.2000	1.1280
	Precision factor score (4)	PRE4	-0.0055	1.0439	0.0171	0.8552
	Structure factor score (1)	STR1	0.1372	0.9583	-0.4249	1.0125
	Structure factor score (2)	STR2	-0.0066	1.0248	0.0206	0.9245
	Structure factor score (3)	STR3	0.0224	1.0106	-0.0692	0.9692
Other characteristics	Female	SEX	0.5953	0.4918	0.4337	0.4986
	Secondary accounting studies	ACC	0.4630	0.4996	0.5301	0.5021
	Secondary business studies	BUS	0.1440	0.3517	0.1084	0.3128
	Secondary economics studies	ECO	0.3502	0.4780	0.4578	0.5012
	Part-time attendance	ATT	0.1946	0.3966	0.0723	0.2605
	Grade point average	GPA	4.6418	0.9411	4.4859	1.0355

The second set of student characteristics specified relate to experiences in secondary education. It is generally acknowledged that secondary school preparation for university study is linked with the choice of a major. One dimension of this work relates to mathematical preparation, especially in regard to the purported gender bias in finance majors. For instance, Didia and Hasnat (1998) included the highest math grade at college as an indicator of student preparation and aptitude for a finance major, along with the grade obtained in accounting and economics. An alternative dimension of this work, especially in Australia, relates to students continuing studies first taken up in secondary school (Harvey-Beavis and Elsworth 1998). For example, Lewis and Norris' (1997: 9) survey of academic departments reflected a consensus opinion that "school students are taking 'easier' courses such as business studies and legal studies rather than economics" and this was eventually reflected in declining enrolments in undergraduate economics degrees and majors. Anderson and Johnson (1992) touched upon this argument with an analysis of economics in Australian secondary schools. They found that while the number of students taken secondary-level economics had declined in all Australian states and territories, the decline had been less in those states where "economics has few alterative business-related courses with which to compete".

In order to examine the interaction between studies in business-related disciplines at the secondary level and the choice of a finance major, three qualitative variables are specified. These are whether the students undertook elective secondary studies in accounting (*ACC*) (163 students or 47.94 percent of cases) and/or business studies (*BUS*) (46 or 13.53 percent of cases) and/or economics (*ECO*) (128 or 37.65 percent of cases). Finance is not offered in Australia as a secondary school subject. Irrespective of this, as business-related studies all three variables could potentially be associated with an increase in the probability of selecting a finance major if the sample included non-business related disciplines. However, within the narrower context of a business degree it is expected that secondary school studies in any of these disciplines may be associated with a higher probability of selecting a finance major. As an alternative, previous study in accounting and economics may lead students to select a major in accounting or economics as against embarking upon the study of finance. The *ex ante* sign on *ACC*, *BUS* and *ECO* may therefore be positive or negative depending on the relative strength of these competing factors.

The final two variables specified in the analysis relate to additional student characteristics concerned with current attendance and performance. These are whether the student is attending on a part-time basis (*ATT*) (56 cases or 16.47 percent of the sample) and their grade point average to date (*GPA*). To start with, little is known about any systematic difference between a student's attendance pattern and the choice of major. However, as finance is generally regarded as being a relatively difficult subject it is hypothesised that part-time students may avoid a major in finance due to resource (time) constraints. A negative coefficient is hypothesised when finance major is regressed against attendance pattern. And second, a number of studies have hypothesised a link between student performance at the tertiary level and the choice of the (more difficult) finance major. For example, Didia and Hasnat (1998) included the cumulative GPA in their analysis of performance in introductory finance, and this could be logically extended to persistence in a finance major. A positive coefficient is hypothesised.

II. Estimated Models

The estimated coefficients, standard errors and *p*-values of the parameters detailed above are presented in Exhibit 4. To facilitate comparability, marginal effects are also calculated. These indicate the marginal effect of each outcome on the probability of the choice of a finance major. In order to provide the marginal effects for the continuous variables, the standard normal density function is used with the index predictions evaluated at the sample means. Also included in Exhibit 4 are statistics for joint hypothesis and likelihood ratio (LR) tests, the McFadden R^2 as an analogue for that used in the linear regression model, and the Hannan-Quinn (HQ) model specification criterion. Four separate models are estimated. The estimated coefficients and standard errors employing the entire set of student personality, perceptions and other characteristics are shown in Exhibit 4 columns 1 to 4. The results of estimations using first, the set of personality and perception variables and then the set of other characteristics alone are detailed in columns 5 to 8 and 9 to 12 respectively. A final specification incorporating selected variables from both of these sets of characteristics and personality and perceptions is detailed in columns 13 to 16.

The estimated models are all highly significant, with likelihood ratio tests of the hypotheses that all of the slope coefficients are zero rejected at the 1 percent level or lower using the chi-square statistic. The results in these models also appear sensible in terms of both the precision of the estimates and the signs on the coefficients. In the full specification, the estimated coefficients for interest (*INT1*), independence (*IND1*), structure (*STR1* and *STR3*), gender (*SEX*) and attendance (*ATT*) are significant at the 10 percent level of significance or lower and conform to *a priori* expectations with the exception of *IND1*. The estimated coefficients in the full specification indicate that students with a higher level of interest in the banking and finance profession and who perceive work relations within it as fairly independent are more likely to select a finance major, while students who perceive the profession as excessively structured are less likely to select a finance major. The three greatest marginal effects on the decision to undertake a finance major are gender (*SEX*), such that female students are associated with a 7.95 percent reduction in the probability of choosing a finance major, part-time attendance (*ATT*) where there is a 16.80 percent fall in the probability of selecting a finance major, and finally, students who perceive the banking and finance profession as highly structured (*STR1*) are 10.19 percent less likely to select a corresponding finance major.

These results are generally consistent with the estimated coefficients in the second regression where only the set of personality and perception characteristics are included. The estimated coefficients for the interest, independence and structure parameters found to be significant in the initial specification are also significant (at higher levels) in the nested model. In addition, in the second regression the estimated coefficient for personality (*PRS*) is significant at the 10 percent level of significance and the sign conforms to *a priori* expectations. As with the full specification, students' perceptions of the finance profession as being excessively precise appear to bear no relation to the choice of a finance major.

The results in the third regression where the model is re-estimated with only the set of other student characteristics also conform to the fully specified model. Gender and attendance are significant at the .05 level and the signs on these coefficients are consistent with *a priori* expectations. An incremental contribution of variables *F*-test is used to reject the null hypotheses that the finance major model could be estimated on the basis of either the nested 'no other characteristic effect' [F = 2.7042] or 'no personality/perception effect' [F = 3.2648] models at the .05 level, and we may conclude that students' choice of a finance major is a function of both student personalty and perceptions of the finance profession, along with the more readily observed student characteristics such as past secondary studies, GPA, gender and attendance pattern.

In order to further refine the overall specification, *F* tests were used to test combinations of coefficients for redundancy and on this basis the variables for *PRE* (F = 0.3577, p-value = 0.8386), *ACC*, *BUS* and *ECO* (F = 0.5161, p-value = 0.6715) were excluded from the final specification. We may conclude that perceptions of the degree of precision in the banking and finance profession and secondary studies in related business areas exert no significant influence on the probability of selecting a finance major. Each of the remaining variables was tested in a similar manner, though failing to be excluded from the final specification. The refined model is presented in columns 13 to 16 of Exhibit 4. The likelihood ratio for the refined model is significant at the 1 percent level of significance, and we may conclude that the explanatory variables as a group can be used to investigate the choice of a finance major. While the R^2 of the final specification (0.1390) is lower than that of the full specification (0.1495) the Hannan-Quinn (HQ) criteria, reflecting the trade-off between goodness of fit and model complexity, suggests that the final specification is more appropriate (a lower HQ value).

It would appear from the final specification that the primary influences on students' selection of a major in finance are level of interest, and perceptions of independence and structure in the banking and finance profession, gender and mode of attendance. Of these variables, the largest negative marginal effect on the probability of choosing a choice of a finance major is the mode of attendance, followed perceptions of the profession as excessively structured, and finally gender. As could be expected, the primary positive influence on the choice of a finance major is the level of interest in the finance profession. However, an emphasis on the significance of individual coefficients in this regression model is likely to obscure the complex and important interaction of a number of other factors on the decision to major in finance. For example, while several other variables are individually insignificant, including additional dimensions of structure in finance, student personality and grade point average, they could not be excluded from the model under any conventional criteria.

Exhibit 4. Binary Probit Model Maximum-Likelihood Estimates

	Full specification				No other characteristic effect				No personality/perception effect				Final specification			
Variable	Estimated coefficient	Standard Error	*p*-value	Marginal effect	Estimated coefficient	Standard Error	*p*-value	Marginal effect	Estimated coefficient	Standard Error	*p*-value	Marginal effect	Estimated coefficient	Standard Error	*p*-value	Marginal effect
CONS.	-0.0466	0.4384	0.9153		-0.8545	0.0977	0.0000		-0.2092	0.3922	0.5937		0.0117	0.4180	0.9777	
PRS	0.0408	0.0254	0.1085	0.0109	0.0454	0.0245	0.0635	0.0127					0.0385	0.0251	0.1253	0.0104
INT1	0.2555	0.1086	0.0186	0.0681	0.2447	0.1049	0.0197	0.0683					0.3027	0.0963	0.0017	0.0819
IND1	0.1814	0.0984	0.0653	0.0484	0.1950	0.0928	0.0357	0.0545					0.1950	0.0969	0.0442	0.0528
IND2	-0.1408	0.0875	0.1076	-0.0376	-0.0886	0.0825	0.2825	-0.0248					-0.1318	0.0860	0.1255	-0.0357
PRE1	0.1214	0.1144	0.2884	0.0324	0.0351	0.1115	0.7532	0.0098								
PRE2	-0.0408	0.1038	0.6940	-0.0109	-0.0213	0.1032	0.8365	-0.0059								
PRE3	-0.0645	0.0795	0.4168	-0.0172	-0.0591	0.0805	0.4626	-0.0165								
PRE4	0.0441	0.0859	0.6077	0.0118	0.0182	0.0865	0.8338	0.0051								
STR1	-0.3820	0.1354	0.0048	-0.1019	-0.3675	0.1306	0.0049	-0.1026					-0.2993	0.1098	0.0064	-0.0810
STR2	-0.1089	0.0839	0.1944	-0.0290	-0.0894	0.0842	0.2886	-0.0250					-0.1167	0.0748	0.1187	-0.0316
STR3	-0.1387	0.0813	0.0880	-0.0370	-0.1156	0.0771	0.1336	-0.0323					-0.1191	0.0797	0.1351	-0.0322
SEX	-0.2981	0.1651	0.0710	-0.0795					-0.3495	0.1560	0.0250	-0.1045	-0.2741	0.1632	0.0931	-0.0741
ACC	0.1932	0.1663	0.2451	0.0515					0.1968	0.1543	0.2022	0.0588				
BUS	-0.1152	0.2567	0.6538	-0.0307					-0.2535	0.2343	0.2793	-0.0758				
ECO	0.0971	0.1680	0.5636	0.0259					0.1372	0.1562	0.3800	0.0410				
ATT	-0.6302	0.2609	0.0157	-0.1680					-0.5617	0.2452	0.0220	-0.1679	-0.5995	0.2610	0.0216	-0.1622
GPA	-0.1506	0.0919	0.1012	-0.0402					-0.0756	0.0830	0.3627	-0.0226	-0.1398	0.0889	0.1160	-0.0378
l	160.7235				168.6981				179.9796				162.6902			
l(0)	188.9652				188.9652				188.9652				188.9652			
LR	56.4835		0.0000		40.5341		0.0000		17.9712		0.0063		52.5499		0.0000	
HQ	1.1321				1.1168				1.1313				1.0711			
R^2	0.1495				0.1073				0.0476				0.1390			

Notes: *l* – log-likelihood, *l*(0) – restricted slopes log-likelihood, *LR* – likelihood ratio statistic; *p*-value of *LR* calculated using χ^2(p) where *p* = number of explanatory variables; *HQ* – Hannan-Quinn model selection criterion; R^2 – McFadden R-squared; marginal effects calculated at sample means.

III. Predicting Student Majors

As a final requirement, the ability of the various models to accurately predict outcomes in each student's choice of major is examined. Exhibit 5 provides the predicted results for each model specification and compares these to the probabilities obtained from a constant probability model. The probabilities in the constant probability model, which are constant across individuals, are the values computed from estimating a model that includes only an intercept term, and thereby correspond to the probability of correctly identifying finance and non-finance majors on the basis of the proportion of finance and non-finance majors in the sample.

Exhibit 5. Observed and Predicted Values for the Binary Probit Models

		Non-finance majors		Finance majors		Total		Hosmer-Lemeshow	
		Number	Percent	Number	Percent	Number	Percent	Statistic	p-value
Constant probability model	Correct	194.26	75.59	20.26	24.41	214.52	63.10	NA	NA
	Incorrect	62.74	24.41	62.74	75.59	125.48	36.90		
	Absolute gain	NA		NA		NA			
	Relative gain	NA		NA		NA			
Full specification	Correct	204.44	79.55	30.78	37.09	235.23	69.18	7.6833	0.4650
	Incorrect	52.56	20.45	52.22	62.91	104.77	30.82		
	Absolute gain	10.18	3.96	10.52	12.68	20.71	6.09		
	Relative gain		16.22		16.77		16.50		
No other characteristic effect	Correct	201.81	78.53	28.19	33.97	230.01	67.65	7.7731	0.4559
	Incorrect	55.19	21.47	54.81	66.03	109.99	32.35		
	Absolute gain	7.55	2.94	7.93	9.56	15.49	4.55		
	Relative gain		12.04		12.65		12.34		
No personality/ perception effect	Correct	197.45	76.83	23.51	28.32	220.96	64.99	14.2308	0.0759
	Incorrect	59.55	23.17	59.49	71.68	119.04	35.01		
	Absolute gain	3.19	1.24	3.25	3.91	6.44	1.89		
	Relative gain		5.09		5.17		5.12		
Final specification	Correct	203.68	79.25	30.24	36.44	233.93	68.80	5.4298	0.7108
	Incorrect	53.32	20.75	52.76	63.56	106.07	31.20		
	Absolute gain	9.42	3.67	9.98	12.02	19.41	5.71		
	Relative gain		15.02		15.91		15.46		

Put differently, and as detailed in Exhibit 5, 75.59 percent of the 340 students in the sample are categorised as non-finance majors and 24.41 percent as finance majors. On the basis of these probabilities, the constant probability model would correctly predict 194.26 students as non-finance majors (75.59 percent) and 20.26 students (24.41 percent) as finance majors, and incorrectly identify 62.74 non-finance majors (24.41 percent) and 62.74 finance majors (75.59 percent) as finance majors and non-finance majors respectively. Combined together, the constant probability model would therefore correctly predict the major of 214.52 students (63.10 percent) and incorrectly predict the major of 125.48 students (36.90 percent).

The constant probability model provides a basis of comparison for the four models estimated in Exhibit 4: namely, the full or initial specification, a specification incorporating only personality and perception effects, a specification excluding these psychological effects in favour of readily observed physical and educational characteristics, and the final or refined specification. The correct and incorrect percentage figures for the estimated models are in terms of the observed (or actual) value of finance and non-finance majors, total percentages for correct and incorrect percentages are in terms of total observations. The absolute gain is the percentage change of correct predictions of the estimated models over the percentage of correct predictions in the constant probability model. The relative gain is the absolute gain as a percentage of the incorrect predictions in the constant probability model. Together, these values provide a measure of the predictive ability of the estimated models.

To start with, on the basis of the 257 non-finance majors in the sample, the full model specification identifies 204.44 cases as non-finance majors and 52.56 cases as finance majors. That is, 79.55 percent of cases for non-finance majors were correctly predicted as non-finance majors as against 20.45 percent of cases who were incorrectly identified as finance majors. These figures represent a 3.96 percent absolute gain or improvement over the constant probability model, as judged by the increase in correct predictions, and a relative gain of 16.22 percent, or improvement in the incorrect predictions, once again as compared to the constant probability model.

Turning to the 83 students in the sample who selected a finance major, the full specification correctly identifies 30.78 (37.09 percent) as finance majors and 52.22 (62.91 percent) as non-finance majors, representing a 12.68 percent absolute gain and a 16.77 relative gain over the constant probability model. Overall, the full specification correctly identifies 235.23 students (69.18 percent) as either finance or non-finance majors and incorrectly identifies 104.77 (30.82 percent) students as either finance or non-finance majors. This reflects an absolute improvement of 6.09 percent over the constant probability model (in terms of correct predictions) and a relative improvement of 16.50 percent over the constant probability model (in terms of incorrect predictions). The Hosmer-Lemeshow goodness-of-fit test statistic (HL = 7.6833, p-value = 0.4685) in Exhibit 5 fails to reject the null hypothesis of no functional misspecification for the full specification.

These results are broadly comparable to the number and percentage of correct predictions for the 'no other characteristic effect', 'no personality/perceptions effect' and 'final specification' models. However, one interesting difference concerns the percentage of correct predictions in the 'no personality/perception effect' as compared to the three specifications that incorporate at least some personality and perception effects. Across these specifications the percentage of correct predictions for non-finance majors range from 78.53 to 79.55 while for finance majors the percentage of correct predictions range from 33.97 to 37.09. This stands in contrast to the 'no personality/perception effect' model where the corresponding figures are 76.83 percent for non-finance majors and 28.32 percent for finance majors. In fact, the full specification incorporating personality and perception effects provides an absolute gain of 3.54 percent over the 'no personality/perception effect' model for non-finance majors and 30.92 percent for finance majors, and a relative gain of 11.73 and 12.22 percent respectively. This suggests that the predictive abilities of choice of major models are substantially improved by the incorporation of explanatory variables relating to student personality and perceptions of the corresponding profession. This reinforces the findings of the Hosmer-Lemeshow statistic for the 'no personality/perception effect' where the null hypothesis of no functional misspecification is rejected at the .05 level.

These findings would also initially suggest that the choice of major model employed might be more useful in identifying non-finance majors than finance majors. And at first impression, the actual number of correct predictions across all majors appears relatively small. However, it should be noted that the amount of variability in the explanatory variables across all majors is also relatively low (see Exhibit 2), given they are related to very closely related disciplines. Put differently, we would expect that perceptions of and interest in the banking and finance profession would be much closer for, say, an accounting or economics major and a finance major than that between finance and a non-business related discipline in, say, the humanities or physical sciences. Indeed, accounting and economics are regarded as close substitutes for finance in terms of entry into the banking and finance profession. This would suggest that an equivalent model applied to a sample of finance majors and non-business related majors would likely yield a higher proportion of correct predictions.

IV. Conclusions

The present study uses a binary probit model to investigate the role of student personality, perceptions and other characteristics in determining the choice of major for Australian business students. The current paper extends empirical work in this area in at least two ways. First, and as far as the authors are aware, it represents the first attempt to apply qualitative statistical models of choice of business major in Australia. In fact no comparable study is thought to exist elsewhere in terms of the focus on the finance discipline. The evidence provided suggests that the choice of a finance major is a function (at least in the context of models of this type) of students' perceptions of structure in the banking and finance profession, interest in the finance profession, and mode of attendance, and to a lesser extent, gender.

Second, the study analyses in detail the varying influences of personality/perception and other student characteristics. The results indicate that students' physical and educational characteristics, whilst in themselves useful indicators of a student's choice of major, may be supplemented by factors associated with student personality and perceptions of the profession. On the basis of the explanatory variables specified, the major of some 69 percent of students can be correctly identified. Unfortunately, from a policy perspective the results do more to identify likely non-finance majors, than to present possible ways to increase the likelihood of students selecting a major in finance. For example, the level of student interest in the profession is seen as a major factor in the choice of a finance major. This is important because any policy designed to shift enrolment patterns will need to recognise that interests remain relatively stable over time, are not amenable to change, and probably weigh heavily in the decisions of most students. Nevertheless, some avenues for increasing interest in the profession are possible, including the promotional activities of professional associations and a more concerted effort to stimulate the interest of students in introductory classes.

Of course, the study does suffer a number of limitations, all of which suggest directions for future research. To start with, while the results of the study are suggestive of policy changes, they are not sufficiently developed to provide an empirically feasible guide to finance departments. It may be possible that other analytical techniques could be used to predict students' choice of major. For example, some promising advances have been made in the use of neural network models to predict other qualitative outcomes. However, in many cases these have not yet been shown to exhibit any advantage over well-known statistical methods.

A second limitation is that the data used contains no information concerning the large number of other factors likely to impact upon a given student's choice of major. For example, some surveys have included specific questions about expected career financial remuneration, promotional opportunities, career path, compatibility with family commitments and the availability of role models. Rumberger and Thomas (1993) examined future returns to the choice of college major, while Henebry and Diamond's (1998) study considered the interaction between students' experiences in finance and the teaching environment. And in a broader context, Pearson and Dellman-Jenkins (1997) investigated the role of parental influence on a student's selection of a college major. A final limitation is that studies of students' choice of major need to incorporate more fully economic models of occupational choice. For example, Easterlin (1995) examined the switch to business majors in the 1980s in the context of preferences and the relative returns from alternative occupations. A comparable analysis could potentially be made within alternative business-related disciplines. Regrettably, detailed information of this type was not available.

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Appendices

Appendix A. Personality Score Checklist

_____ clever	_____ capable	_____ cautious^
_____ commonplace^	_____ confident	_____ conservative^
_____ conventional^	_____ dissatisfied^	_____ egotistical
_____ honest^	_____ humorous	_____ individualistic
_____ informal	_____ insightful	_____ intelligent
_____ inventive	_____ mannerly^	_____ narrow interests^
_____ original	_____ pompous^	_____ reflective
_____ resourceful	_____ self-confident	_____ sexy
_____ sincere^	_____ snobbish	_____ submissive^
_____suspicious^	_____ unconventional	_____ wide interests

^ Denotes items given a score of –1 if checked by the subject; all other items were scored +1 if checked.

Appendix B. Perceptions of the Banking and Finance Profession

Interest	Boring	1…5	Interesting
	Dull	1…5	Exciting
	Monotonous	1…5	Fascinating
	Ordinary	1…5	Prestigious
	Tedious	1…5	Absorbing
Independence	Benefits Society	1…5	Profit-Driven
	Extrovert	1…5	Introvert
	People-Oriented	1…5	Number Crunching
	Interaction With Others	1…5	Solitary
Precision	Ambiguity	1…5	Certainty
	Analytical	1…5	Conceptual
	Dynamic	1…5	Stable
	Easy	1…5	Challenging
	Imprecise	1…5	Accurate
	Intuition	1…5	Facts
	Novelty	1…5	Methodical
	Originality	1…5	Conformity
	Overview	1…5	Details
	Spontaneous	1…5	Planned
	Superficial	1…5	Thorough
	Theoretical	1…5	Practical
	Variety	1…5	Repetition
	Verbal	1…5	Mathematical
Structure	Abstract	1…5	Concrete
	Adaptable	1…5	Inflexible
	Alternative Views	1…5	Uniform Standards
	Changing	1…5	Fixed
	Creative Solutions	1…5	Cut & Dry
	Decision Making	1…5	Record Keeping
	Effectiveness	1…5	Efficiency
	Flexible	1…5	Structured
	Imagination	1…5	Logic
	Innovation	1…5	Compliance
	New Ideas	1…5	Established Rules
	New Solutions	1…5	Standard Procedures
	Unpredictable	1…5	Routine