Using a Multivariate Analysis to Determine The Impact of Demographic Factors on Investors' Selection of a Broker in Doha Securities Market

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Abstract

This study uses the results of a survey to determine the effect of demographic characteristics on investors' selection of a brokerage firm in Doha Securities Market. Multiple discriminant analysis was used to find out whether there were any significant demographic differences among the investors who deal with banks , non-bank and Islamic brokers while selling and buying shares. The statistical results indicated that there are some significant demographic differences between the investors in terms of selecting a broker for their stock investment transactions.

Introduction

Doha Securities Market (DSM) which was established in 1997 has achieved remarkable progress in terms of the number of listed companies, value and volume of traded shares, general index and market capitalisation (see Table 1).

Table 1
DSM Main Indicators

	1998	1999	2000	2001	2002	2003
No. of listed companies	20	21	22	23	25	28
Value of traded shares (QR million)	980	1232	869	1504	3215	11,722
No. of traded shares (QR million)	3.1	38.17	31.61	51.02	79.60	189.97
Market capitalisation (QR billion)	13.97	20.31	18.86	26.70	38.25	97.2
General index	1351.3	1341.0	1233.3	1692.0	2324,0	3946.7
Change in general index (%)	35.13	-0.76	-8.03	37.21	37.3	69.8

Source: Doha Securities Market, Annual Report, Different Issues (1998-2003).

The above table shows that the number of companies listed increased from 19 in 1998 to 29 in 2003. The general index has risen by 37.3% and 69.8% in 2002 and 2003 respectively. In addition, market capitalisation has also increased from QR 13,968 million in 1998 to QR 97. 275 million in 2003.

As far as brokerage services are concerned, the number of companies also increased but slightly during this period. The number of brokerage companies increased from 7 in 1997 to only 9 in 2004. Table 2 shows that the Qatar Securities Co. ranked first in terms of market share (23.3%).

Table 2
Certified Brokers at DSM

	Market Share in 2003	
Company	In Million	In Percentage (%)
Qatar National Bank	2531	10.8
Doha Bank	2067	8.8
Doha Commercial Bank	1946	8.2
Group Securities	2786	11.9
Gulf Investment Group	3956	16.9
Qatar Securities Co	5456	23.3
International Financial Securities	2642	11.2
Al-Ahli Bank of Qatar	976	4.2
Islamic Financial Securities	1083	4.7
Total	23447	100.0

Source: unpublished information, DSM

Brokers provide important services to customers at a cheaper price than the investor's own cost of search, and help them in choosing the suitable investment decisions for their portfolios. Other services provided by brokerage firms range from: providing information, offering advice, managing portfolios, financial assessments for share holding companies and performing transactions on behalf of the customer (Al-Sulaiti, 2004).

However, the Qatari investor is free to deal with one or more of the 9 brokerage firms operating in DSM. The investors are aware of the various services provided by these firms. It would be argued that, the type of services provided by these companies differ, to some extent, between different brokerage firms operating in the State of Qatar. They apply price and non-price competition in order to retain their customers and maintain their market shares. It is the aim of this research to examine these services and show the impact of demographic factors on the quality of these services.

A survey was conducted to find out how the investors evaluated brokerage services in Qatar. The questionnaire used in this research was originally developed for a study designed to assess the attribute of Qatari investors in selecting a brokerage firm in DSM (for full detail see Al-Sulaiti, 2004). Before the questionnaire was designed, several in-depth interviews with investors were conducted in order to develop a thorough understanding of their behaviour in trading with shares, and their criteria in choosing brokerage firms. 780

questionnaires were hand-delivered to the DSM customer department. They were distributed randomly to investors who had traded in the market for the past 12 months. 550 questionnaires were returned resulting in a response rate of 70.5%.

Nine active brokerage firms in DSM were included in this research: Qatar National Bank, Doha Bank, Doha Commercial Bank, Group Securities, Gulf Investment Group, Qatar Securities Co., International Financial Securities Co., Al-Ahli Bank of Qatar, and Islamic Financial Securities Co.

For the purpose of this paper, the 9 brokerage firms were divided into three groups: 1. Commercial Banking Firms, 2. Non-Banking Firms , and 3. Islamic Financial Firms.

It is worth mentioning that most of the recent studies in this field have been conducted in Western Countries and centred on portfolio management, financial market structuring, and trading of shares and bonds (Bowles et. al., 2001; Gilmore, and McManus, 2003). Other studies have conducted to investigate factors affecting investors' behaviour and attitude towards brokerage firms (Al-Sulaiti, 2004; Chan et. al. 1991).

However, the impact of demographic factors on investors' choice of a particular brokerage firm within the securities market has never been assessed. To the best of the author's knowledge, this research is the first to consider this subject and to bridge the gap in the literature. Therefore, the aim of this research is to find out whether there are any significant demographic differences among the investors who deal with bank, non-bank and Islamic brokers while selling and buying shares.

This research is divided into four sections: Section one, introduction, section two examines the main characteristics of the sample, sections three deals with the statistical results of the multiple discriminant analysis, while the main conclusions and implications of the research are pointed out in section four.

Sample Characteristics

A description analysis of the data shows the following:

1. The median age category (20-39) years group were more than 93.5% of the respondents.
2. As far as educational level of the respondents is concerned, it was found that more than 98% of the respondents have received at least an under graduate degree.
3. Results also revealed that 81% of the respondents had an average monthly income of 10,000-20,000 QR. ($1=3.65 QR.).

4. Approximately 71% of the respondents were males and only 28.9% were females.
5. The vast majority of the respondents (67.3%) were Qatar nationals. The sample suggested that only 32.7% of the respondents who deal with stock markets in Qatar were non-Qatar nationals.

The survey results were subjected to a multiple discriminant test. The demographic variables obtained by the survey (age, education, income, sex, and nationality) were introduced as the predictors. It is worth mentioning that investor's location is an important demographic variable to be included in the study. Because of the small geographic size of the state (about 90% of population live in Doha and its suburbs), this variable was neglected in the study. On the other hand, the type of brokerage firms were divided into three groups, representing the dependant variables. Group one comprised bank brokerage firms. Group two referred to non-bank brokerage firms, while group three consisted of Islamic brokerage firms.

Results of Multiple Discriminant Analysis

Since results indicated three groups and five predictors, we can estimate two discriminant functions (Klecka, 1980; Hair et al., 1998). Table 3 presents the results of estimating three-group discriminant analysis. The following comments can be made about these results.

1. An examination of group means indicates that variable age, income, nationality, and sex separate the three groups more widely than the other three groups.
2. It is shown that the differences in the standard deviation were largest for variable income and sex.
3. The pooled within-groups correlation matrix, computed by averaging the separate covariance matrices, for the three groups shows low correlation coefficient between predictors. Therefore, there is no serious problem of multi-collinearity.
4. The significance attached to Univariate F ratios shows that when the predictors are considered individually, all predictors are significant in discriminating between all groups with the exception of variable education.
5. The eigenvalue for functions one and two were 0.420 and 0.012 respectively. The first function had the largest between-groups variability (as is usually the case, Metwally, 1999; Johnson and Wichern, 2002). This function accounted for 97.1% of the variability whereas function two accounted for the only 2.9% of the between-groups variability.
6. The Wilks' Lambda associated with function one was 0.696. This led to a Chi-square value of 197.728 which is statistically significant at less than or equal to 5% level. On the other hand, the Wilks' Lambda of function two after function one has been removed, was 0.988. The significant level associated with the second function was .0149 indicating that it does contribute significantly to group differences (Morrison, 1969). These results suggested a simultaneous Wilks' Lambda (.696 x .988 = 0.6876).
7. Since the value of Chi-square of each function is statistically significant at less than or equal to 5% level, we reject the null hypothesis that the mean of both functions was equal. Hence, function one and two contributed to group separation.
8. The canonical correlation for function one was .0544; while for function two, the correlation is 0.111. Hence, the proportion of total variability explained by differences between groups was 29.6% for function one, and 1.23% for function two.
9. The standardised canonical discriminant function coefficients reported a large positive coefficient for nationality and sex variables and a large negative coefficient for age on function one. Whereas, function two had relatively larger coefficients for variables income and age. Similar conclusions were found by an examination of the structure matrix (Manly, 1994; Metwally, 1999).
10. The un-standardised canonical discriminant function coefficient reported the following two discriminant functions:
    Z1= -1.584-.450age-.376education-.237income+1.653nationality+1.074sex
    Z2= -1.815+.865age-1.688education+.948income+.820nationality+.395sex
11. The allocation of groups to functions can be done with the assistance of the "territorial map". Therefore, a case with a positive score on one and two functions will belong to group three.
12. The canonical discriminant functions evaluated at group mean (group centroid) showed that group one, "bank brokerage firms," had a positive sign on function one. Since the variable nationality and sex had a large positive sign on function one, and the variable income had a large positive coefficient on function two, it was suggested that those investors who chose to deal with bank brokerage firms were Qatari males with high income. Group two investors on the other hand, had a negative coefficient on function one for age, education and income. Results suggested that investors who elect to deal with non-bank brokerage firms tended to be relatively young with moderate level of education and income. Group three (Islamic brokerage firms) had a large negative sign value on function one since age, education, and income variables had a negative sign on this function. This revealed that investors who elect to deal with this group of brokerage firms were again, young with moderate level of income and education.

13. The level of significance of *Box's M* suggested that we should not reject the null hypothesis that the covariance matrices are equal (Bartholomew et al., 2002; Metwally, 1999).

14. The classification results based on the analysis sample reported a hit ratio equal to 80%. These results suggested 80% of the cases were correctly classified. Since we had three groups of equal size, a chance hit ratio would be 1/3 = 33.3%. The improvement over chance was more than 25% indicating at least satisfactory validity (Zwick, 2004). The Press's Q statistic is provided by:

    Press's Q= {550-(3) (338)} ^ 2 / {550(2)} =195.7

    This value exceeded by far the critical value at a significant level of .01 which is 6.63, suggesting that the predictions were significantly better than chance (Metwally, 1999).

Table 3
Results of Discriminant Analysis

Number of cases by group			
Type of Firm	Unweighted	Weighted	Label
1	296	296.0	Commercial Bank Firms
2	130	130.0	Non-Bank firms
3	124	124.0	Islamic Firms
Total	550	550.0	

Group Means					
Type of Firm	Age	Education	Income	Nationality	Sex
1	1.5642	1.9122	2.0169	1.5135	1.4426
2	1.6769	1.9846	2.1923	1.1846	1.2000
3	1.9113	1.9677	2.4839	1.0323	1.0161
Total					

Group Std. Deviation					
Type of Firm	Age	Education	Income	Nationality	Sex
1	.57866	.34795	.63490	.50066	.49753
2	.61273	.43105	.80787	.38949	.40155
3	.62485	.38117	.70404	.17740	.12648
Total					

Pooled within-groups correlation matrix					
	Age	Education	Income	Nationality	Sex
Age	1.00000				
Education	.10295	1.00000			
Income	.20073	.24987	1.00000		
Nationality	.06057	.06731	-.02568	1.00000	
Sex	-.15598	.10408	-.29664	.18497	1.00000

Wilks' Lambda (U-statistic) and univariate F-ratio			
Variable	Wilks' Lambda	F	Significance
Age	.94878	14.7641	.0000
Education	.99255	2.0516	.1295
Income	.93223	19.8823	.0000
Nationality	.80424	66.5726	.0000
Sex	.84745	49.2320	.0000

Analysis number	
Direct method: all variables passing the tolerance test are entered.	
Max. tolerance level	.00100
Canonical discriminant functions	
Max. number of functions	2
Min. cumulative % of variance	100.00
Max. Significance for Wilks' Lambda	1.0000

Classification function coefficients			
(Fisher's linear discriminant functions)			
Group =	1. Bank brokers	2. Non-bank brokers	3. Islamic brokers
Age	3.549	3.772	4.318
Education	9.584	10.309	10.019
Income	3.959	3.966	4.407
Nationality	6.150	4.438	3.671
Sex	8.934	7.853	7.311
(Constant)	-28.128	-26.179	-26.164

Canonical Discriminant Functions								
Fun	Eigenvalue	% of Variance	Cum %	Canonical Correlation	Wilks' Lambda	Chi-Square	df	Sig.
1*	.4196	97.1	97.1	.544	.696	197.728	10	.0000
2*	.0125	2.9	100.0	.111	.988	6.754	4	.0149

Standardized Canonical Discriminant Functions Coefficients		
Factors	Function 1	Function 2
Age	-.269	.517
Education	-.142	-.636
Income	-.165	.659
Nationality	.698	.346
Sex	.450	.165

Structure Matrix		
Factors	Function 1	Function 2
Nationality	.759*	.348
Sex	.655*	-.113
Age	-.344	.579*
Income	-.405	.546*
Education	-.117	-.377*

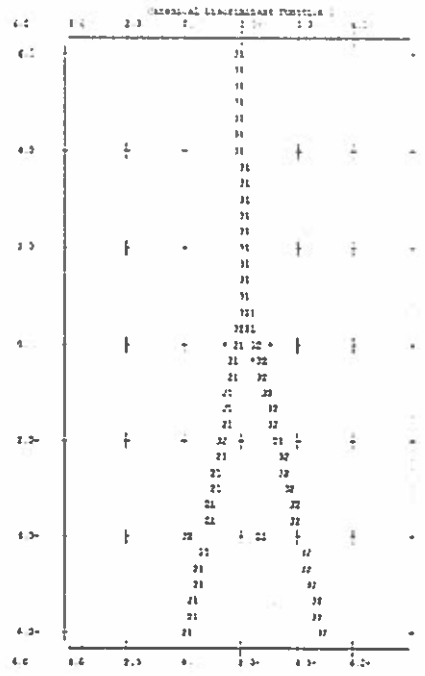
Un-standardised Canonical Discriminant Functions Coefficients		
Factors	Function 1	Function 2
Age	-.450	.865
Education	-.376	-1.688
Income	-.237	.948
Nationality	1.653	.820
Sex	1.074	.395
(Constant)	-1.584	-1.815

Function at Group Centroids		
Group	Function 1	Function 2
Bank Brokers	.566	.335
Non-Bank Brokers	-.358	-.190
Islamic Brokers	-.976	.120

Test of Equality of Group Covariance Matrices Using Box's M			
Group	Label	Rank	Log Determinant
1	Bank Firms	5	-7.177
2	Non-Bank Firms	5	-7.405
3	Islamic Firms	5	-12.110
Pooled within-group		5	-7.477
Box's M	471.904		
Approx. F	15.4852		
Df1	30		
Df2	438126.7		
Significance	.0000		

TERRITORIAL MAP

* Indicates a group centroid



Symbols used in territorial map

Symbol	Group	Label
1	1	Bank Brokers
2	2	Non-bank Brokers
3	3	Islamic Brokers

Classification Results				
	Predicted Group Membership			
Actual Group	Bank	Non-Bank	Islamic	Total
Group 1	206(69.6%)	47(15.9%)	43(14.5%)	296
Group 2	33(25.4%)	44(33.8%)	53(40.8%)	130
Group 3	4(3.2%)	32(25.8%)	88(71.0%)	124
80% of original grouped cases correctly classified				

Summary and Conclusions

Demographic factors were examined in order to understand how each attribute affected the behaviour of investors dealing with DSM and to show the importance of each factor in deciding whether to choose bank versus non-bank brokers or to shift to an Islamic broker. Multiple discriminant analysis was used to determine the impact of demographic factors on investor's decisions in dealing with each type of brokerage firms.

Findings showed that more than 53% of the respondents dealt with commercial bank brokerage firms, as compared to 24% and 23% using non-bank brokerage firms and Islamic firms respectively. Significant demographic differences were reported using multiple discriminant analysis. The main conclusions of this analysis may be summarised as follows:

1. Islamic brokerage firms were favoured by older people (group mean = 1.91) as compared to other types of brokerage firms (group mean = 1.67 and 1.56 for non-bank firms respectively).
2. Differences among investors were reported by education factor. This was evidenced by the degree of significance in the Univariate F-ratio and Wilk's Lambda (or U-statistics). It could be concluded that investors who elected to deal with bank brokerage firms tended to be of high education and high brackets incomes.
3. Findings suggested that investors who elect to deal with non-bank brokerage firms tended to be relatively young with moderate level of education and income. This finding could also be applied to investors dealing with Islamic brokerage firms.
4. Differences among respondents were reported in sex variable. It could be argued that those investors who chose to deal with bank brokerage firms were Qatari males.

The above results should have some serious policy implications for brokerage firms in DSM. These policy implications are as follows:

1. Non-bank brokerage firms and Islamic brokerage firms must pay attention to the quality of services provided to customers particularly in offering advice, internet services and offering discounts in commission.
2. Although Islamic brokerage firms are able to attract customers on a religious basis, this does not mean that these firms should target others groups of customers and compete with other institutional firms. This could be done by offering high quality brokerage services and paying more attention to he demographic characteristics of their clients and plan their marketing mix accordingly.

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