



# The International Journal of Applied Economics & Finance

ISSN 1991-0886

**science**  
alert

**ANSI***net*  
an open access publisher  
<http://ansinet.com>

## Providing Competitiveness Assessment Model for State and Private Banks of Iran

<sup>1</sup>H.E. Givi, <sup>2</sup>A. Ebrahimi, <sup>1</sup>M.B. Nasrabadi and <sup>2</sup>H. Safari  
<sup>1</sup>Department of Management, Imam Sadiq University, Tehran, Iran  
<sup>2</sup>Department of Management, Tehran University, Tehran, Iran

---

**Abstract:** This study aims to offer a systematic model to measure the banks competitive ability. This study introduces a model which helps the banks to understand their current status in order to do future planning. The model presented in this study, gives main variables affecting banks competitiveness including financial power, market share, human capital, international-exchange activities and the use of technology. Each of these variables can be calculated through their indices. After being approved by experts, this model is confirmed by using factor analysis and Lisrel software. The results show that among model variables, financial power has the most powerful effect on competitiveness of Iranian banks. Next, this model has been used to rank competitive ability of state-run (commercial and professional) and private banks using the TOPSIS technique.

**Key words:** Competitiveness, banking system, structural equation modeling, TOPSIS technique

---

### INTRODUCTION

In management literature, successful companies are those who have an appropriate understanding about the time and place of utilizing their different capitals. In other words, if managers use their processing, institutional, technological, financial, intellectual, innovation and client capitals to increase the company's competitiveness, the key results of their performance will improve significantly (Feurer and Chaharbaghi, 1994; Shurchuluu, 2002). Competitiveness at the enterprise, industrial and national level is defined as a quality that is achieved through market dominance and forming activities based on competitive and comparative advantage; the higher the country's ability to compete globally, the more the benefit that country will receive from integrating in the global economy through easier access to foreign markets. Conversely, the country that has less competitive ability not only will not benefit from integrating in global economic but, it will also have loss (Behkish, 2005).

Increasing the competitiveness at an enterprise level is the first step and the starting point of increasing national competitive ability. Increasing the enterprises' competitiveness e.g., their ability to compete, has led to the development of a competitive stance in society, ultimately promoting a national competitiveness level that provides required contexts to log into globalization process (Chikan, 2008).

Having, sustaining and improving a competitive advantage are essential for competitiveness. Competitive advantages are those features and resources that enable an organization to surpass other competitors (Ling, 2000). In other words, a competitive

---

**Corresponding Author:** Mohammad Bakhtiar Nasrabadi, Department of Management, Imam Sadiq University, Tehran, Iran Tel: (098) 02188094001

advantage is defined as the firm's superiority, in one or more factors, which allows the firm to offer better service and place more value on its customers and therefore, to perform better overall than what the competitors offer (Guan *et al.*, 2004). To be able to stay in business, the company must adapt to the changing business environment by developing the proper adjustment measures. The viable firms are able to face the changes in demand, the hardening of budget constraints and increasing competition by adjusting their activity to a new market requirement, while nonviable firms go bankrupt. Thus, the ability to adjust to the environmental impact is an essential characteristic of company competitiveness (Irina, 2000).

Nowadays, many experts believe that one of the most competitive industries emerging in Iran is the banking sector. So, it is necessary for the firms acting in this sector to identify their competitive advantage sources and then strengthen their competitive position by improving these sources. In recent decades deregulation and employing new technologies in offering services has led to changes and development in the banking industry in Iran. Having growth as a main goal by the banks (mostly state banks) will lead this system to be competitive (Divandari *et al.*, 2008).

Iran's readiness for globalization and entrance into global markets has doubled the importance of achieving superior standards in the field of offering banking services. On the other hand, Iranian banks during these years have attempted to establish units such as customer service, marketing and market research of which all of these actions represent the competitive nature of banking industry in Iran. Besides this, debates such as shifting towards Islamic banking, privatization and accession to the World Trade Organization (WTO) have also intensified competition in this field (Amadeh and Jafarpoor, 2009).

Despite severe restrictions in the past few years, change in governmental and central banking policies-including the permission for the establishment of private and foreign banks in free zones, 50% reduction of banks facilities at the end of Third Development Plan and most importantly, a significant transfer of stock banks to the people during this plan- shows new mutation in the Iranian banking system (Divandari *et al.*, 2008).

Considering these notions, it can be said that increasing competition in the banking system in Iran has forced banks to try to increase or at least maintain their market share. In this context, banks can largely guarantee their success in competition through an emphasis on their competitive advantage and strengthen them. The topic of this research is that What factors affect the competitiveness of commercial, professional and private banks? This study, in addition to identifying the factors that influence competitiveness of commercial, professional and private banks, provides a model for these factors. Finally these banks are ranked base on identified factors.

Some consider competitiveness as a macroeconomic phenomenon and search for its roots in some factors such as exchange rates, interest rates and a country's deficits (Hauner and Peiris, 2005; Fu and Shelagh, 2009; Claessens and Laeven, 2003; Hempell, 2002; Bikker and Groeneveld, 2002). Another approach considers competitiveness as the result of work force abundance and low wages in the country. Another approach considers it as a function of countries richness in natural resources.

Recently, many approaches believe that this competitiveness is strongly influenced by government policies. There is another approach that considers competitiveness due to the difference in managers viewpoints and performance in economic activities, such as their approach to the relationship between worker and employer (Hondroyannis *et al.*, 1999; Yeyati and Micco, 2007; Buchs and Mathisen, 2005; Claessens, 2006; OECD, 2005).

For each approach above, many counter examples are available. Organization competitiveness is presented as a multidimensional concept by many researchers (Ajitabh

and Momaya, 2002). Irina (2000) also, has viewed competitiveness as a multidimensional concept and defines it in the organization level. In fact, this concept can be looked from three perspectives: national, industry and enterprise level.

Many researchers have reviewed the subject of competitiveness in the banking system. Burger and Menon reviewed the relationship between market concentration and bank profitability during 1983 to 1995 in the United States (Fu and Shelagh, 2009). They found no relationship between effects of non-competitive price behavior and high-performance of those companies that had a large market share.

Some research has also studied the effects of regulations, special structure and other factors that may relate to competitive environment of bank performance (Barth *et al.*, 2001). In these studies, legal restrictions of commercial banks in 1999, including limitations and activities of various entry and exit, were reviewed. Using these data, researchers found that stricter entrance requirements has an negative relationship with bank performance that led to overhead costs and higher interest rates while banks with foreign investment demanded more flexibility in the banking system (Barth *et al.*, 2003). The theory of competitive market for a company's freedom to enter and exit the market emphasized that this theory will cause companies to pay similar costs.

Previous studies have used the Panzar and Rosse model, which is called the H-statistic, to evaluate the competitive position in banking markets. In this model, Panzar and Ross have assessed the competitive conditions in the banking system of moderate countries such as Greece. They also have investigated the effects of deregulation and liberalization on competitive conditions (Matthews *et al.*, 2007). In this study the information of average total assets, the number of institutions, the number of branches, the number of employees, revenue, the ratio of net income to average total assets, the ratio of operating costs to gross assets and menu costs to gross income ratio is used to analyze the data.

The model of Degree of Interest Rate Sensitivity (DIRS) was presented. This model measures the effect of interest rate on banks' competitiveness. In this article, consideration of the interest rate risk and its proper management is counted as a vital factor for commercial banks in competing with competitors.

Moutinho and Philips (2002) explained that strategic planning in the banking system is one of the factors that can have great influence on their competitiveness.

Finally, many studies have focused only on financial indicators to assess overall performance of a bank in the banking industry. Mathuva (2009) has explained that the bank regulators and analysts have used Return On Assets (ROA) and return on equity (ROE) to assess industry performance and forecast trends in market structure (Mathuva, 2009). There are some arguments, nevertheless, that financial statement information may not be as useful as it is being suggested. For example some suggest that users prefer that financial information is supplemented by additional, preferably non-financial information as it is inadequate on its own (Kitindi *et al.*, 2007).

It should be mentioned that in Persian sources no special research has ever been found on this subject.

As is clear from any study ever conducted on this subject, no one has coherently provided a comprehensive model for evaluating the competitiveness of banks in Iran. Each of these research projects studied scatteredly one or more competitiveness index in this industry. The main aim of this study is to provide a comprehensive model of banks competitiveness so that it considers all competitiveness indices and determines the significance of each.

## MATERIALS AND METHODS

This research has two main stages. At the first stage in early 2009, a basic research has been done and its data collection method is non-experimental and included correlation- survey research. At this stage, the exploratory factor analysis is used. In the second stage in the same year, the research is a development study and its data collection method is non-experimental or descriptive study, which uses confirmatory factor analysis.

Here, we present the different steps which were followed:

- Step 1:** Developing conceptual model: In this section, based on theoretical study, the conceptual model of competitiveness at the firm level is presented. So, in this section, the competitiveness concept is divided into five constructs including financial power, market share, human capital, international and exchange activities and Information Technology (IT). The previous 5 variables are divided into 27 indicators
- Step 2:** Factor analysis: In this part, indicator and variable primary factoring was performed with SPSS software using exploratory factor analysis. To do this, a questionnaire was designed and distributed between a wide range of respondents in the banking system including university teachers, customers and banking experts
- Step 3:** Developing final competitiveness model: In this section, structured equation modeling is used to confirm the concept of competitiveness. Basic knowledge for this model is extracted from exploratory factor analysis in the previous stage and in this stage; confirmatory factor analysis was performed on it
- Step 4:** Identifying factors influencing competitiveness in Iran's banking system and ranking private and state-run banks (commercial and specialized) : Based on the outputs yielded, the strategies will be provided. In this section, to provide solutions, research outputs have been considered as evidence. Then, based on collected evidence, we tried to extract a logical relationship between this evidence

### Data Collection Method

In this research, the methods of library studies, interview and questionnaire is used to gather information.

### Questionnaire Reliability and Validity

The reliability coefficient shows how a statistical tool can assess stable and temporary characteristics of a subject. The reliability coefficient is defined in the range from zero (no reliability) to 1 (complete reliability). Estimates of reliability can be verified through the methods of test-retest, Cronbach's alpha, parallel forms, split-half and inter-rater reliability respectively (Nardi, 2006). In this study, the following method is used for questionnaire reliability assessment. The following formula shows Cronbach's alpha coefficient:

$$R_{\alpha} = \frac{J}{J-1} \left( 1 - \frac{\sum S_j^2}{S^2} \right) \quad (1)$$

where, J is number of subsets of questionnaire questions, S<sub>j</sub> is jth subtest variance, S<sup>2</sup> is total test variance.

Questionnaire validity shows to what extent a questionnaire measures the specific feature or concept of interest. Without ensuring of the questionnaire validity, accuracy of

the data obtained from research can not be considered valid. The general concept of validity was traditionally defined as the degree to which a test measures what it claims, or purports, to be measuring (Brown, 1996).

Validity was traditionally subdivided into three categories: content, criterion-related and construct validity (Brown, 1996).

Content validity includes any validity strategies that focus on the content of the test. To demonstrate content validity, testers investigate the degree to which a test is a representative sample of the content of whatever objectives or specifications the test was originally designed to measure. First, after developing initial frame of questionnaire, the viewpoints of 10 experts were used to assess it. This evaluation primary emphasize on content validity of provided indicators. Therefore at the initial stage, the content validity method is used for measuring the questionnaire's validity and correcting it if deemed necessary. Criterion-related validity usually includes any validity strategies that focus on the correlation of the validated test with some well-respected outside measure (s) of the same objectives or specifications. Construct validity has traditionally been defined as the experimental demonstration that a test is measuring the construct it claims to be measured (Brown, 1996).

In this part, the exploratory factor analysis-especially the factor analysis index- is used to assess questionnaire validity. Criterion-related validity is a kind of construct validity that is calculated through factor analysis. Factor analysis can determine whether the questionnaire will measure the desired parameters or not. Questions in the factor analysis to evaluate a property index or have a plan have to be a modified factor. The present questionnaire included 27 questions that measure and evaluate five general factors.

The results obtained from this method show that selected indicators can properly measure theoretical constructs of this research.

### **Research Population and Sample**

For the first stage in which we are to prove the proposed model, the study population is composed of groups of expert professors familiar with the concept of competitiveness, researchers who are familiar with the field of competitiveness, as well as managers, deputies and authorities in the field of banking, informed people in the banking field and the bank's main customers.

Finally, the following formula is used to estimate the sample (Senocak, 1997):

$$n_i = \frac{NT^2PQ}{T^2PQ + Nd^2} \quad (2)$$

Where,  $n_i$  is the sample size of  $i$ th floor,  $N$  is total sample size,  $P$  is the ratio of units of population that are in a given category,  $d$  is degree of error,  $Q$  is  $1-p$ ,  $T$  is the value of  $t$ -student statistic:

$$n_i = \frac{(3000 \times 1/96^2) \times 5 \times 5}{1/96^2 \times 5 \times 5 + 3000 \times /07^2} \cong 184 \quad (3)$$

From 230 distributed questionnaires 197 forms were returned. So the sample was considered to have about 197 respondents. The banks studied in this study include: Melli Bank, Sepah Bank, Saderat Bank, Tejarat Bank, Mellat Bank, Refah Bank, Keshavarzi Bank, Maskan Bank, Sanat-o-Madan Bank, Karafarin Bank, Saman Bank, Parsian Bank, Iqtasad

Novin Bank, Pasargadad Bank and Sarmaye Bank. All these banks were among the public and private banks of Islamic Republic of Iran in 1386.

**COMPETITIVENESS ASSESSING MODEL IN THE IRANIAN BANKING SYSTEM**

Here, first, the conceptual model pertaining to measurement of competitive ability which is extracted from subject literature and interviews with experts in this field is presented. It is clear that this model should be evaluated to be approved or rejected. According to this model, the competitive capacity of Iranian banks is affiliated to five main factors: financial power, market share, human capital, international and exchange activities and use of technology. Each of these factors is dependent on other variables and indicators.

To identify the questions required for measuring competitive capacity of Iranian banks, different sources in the literature were used. The desired model extracted from the literature is shown in Fig. 1.

In this study, the above model are tested and evaluated as the researcher proposed model of competitiveness in the Iranian banking industry. As it is shown in the model, competitiveness in the banking industry is classified in five main factors. Subsets related to each of this five factor are also specified.

**Assessment of Construct Validity**

The initial measurement model was subjected to Confirmatory Factor Analysis (CFA) to assure convergent and discriminant validity and unidimensionality (Jöreskog and Sörbom,

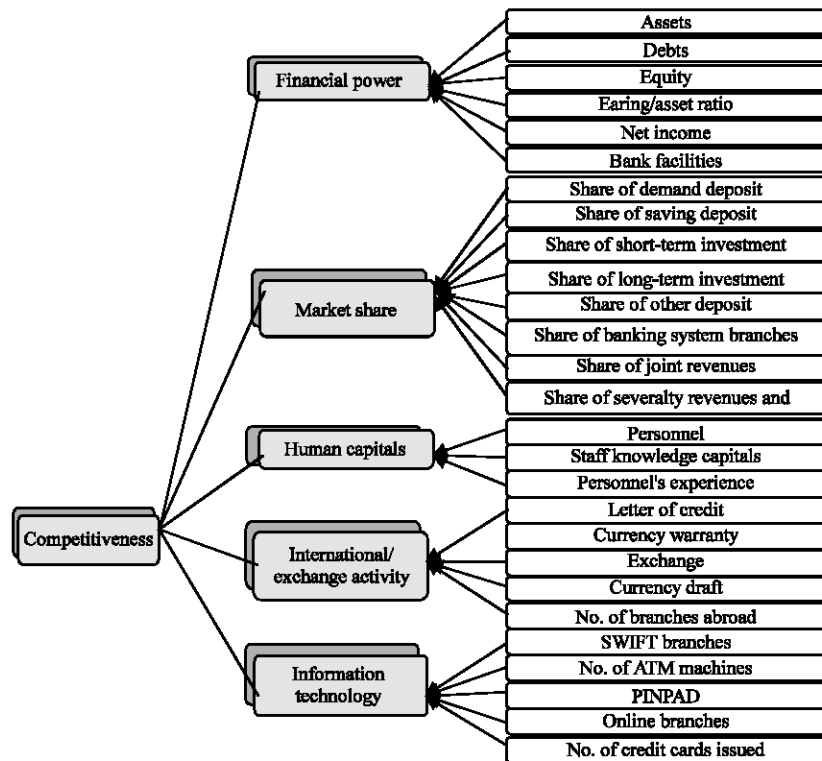


Fig. 1: Research conceptual model

1989). It should be mentioned that validity itself includes convergent and discriminant validity.

A highly mandatory condition for construct validity and reliability checking is the unidimensionality of the measure (Anderson and Gerbing, 1991). It refers to the existence of a single construct/trait underlying a set of measures. The concept of unidimensionality enables us to represent the value of a scale by a solitary number (Venkatraman, 1989). In order to check for unidimensionality, a measurement model was specified for each construct and CFA was run for the entire construct. Every individual item in the model is examined to see how closely they represent the same construct (Ahire *et al.*, 1996).

CFA tests were run to test the convergent and discriminant validity of the constructs in the base model; Convergent validity assesses the degree to which two measures of the same construct are correlated (Hair *et al.*, 1998). Discriminant validity assesses the extent to which a measure does not correlate with other constructs from which it is supposed to differ (Malhotra, 1996). Unlike exploratory factor analysis which assesses the factor loading base on the researcher judgment, CFA assesses model unidimensionality in several indices. Therefore the present study uses CFA to evaluate model unidimensionality.

Maximum likelihood (ML) indices (RMR, GFI,  $\chi^2$ ) were used to evaluate model likelihood as an estimation method. Multivariate normality was investigated and subsequent analyses showed no significant deviances from multivariate normality. Lisrel 8.5 software was used to perform CFA to evaluate construct unidimensionality. The GFI and RMR values (GFI > 0.9, RMR < 0.05) and the  $\chi^2$  value which is significant ( $\alpha = 0.05$ ) show no evidence against model unidimensionality, because their fit indices were above the acceptable thresholds. The outputs of this stage are presented for the factorization of variables. Therefore, in this section exploratory factor analysis should be performed using SPSS 11.5 software.

### Exploratory Factor Analysis

Responses (Extracted from 197 questionnaires) were subjected to exploratory factor analysis to factorization of variables and to determine if the number of factors and the loadings of the measured variables on each factor were consistent with the theoretical expectations and predicted composition of the construct variables (Garson, 2009). Each factor analysis included Bartlett's test of sphericity, in which the determinant of the intercorrelation matrix is converted to a chi-square statistic and tested for significance (the acceptable value of this test is less than 0.05) and with the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO), which measures the degree of common variance among the variables. Hair *et al.* (1998) indicate that a KMO of 0.80 or above is meritorious; between 0.80 and 0.70 is middling; between 0.70 and 0.60 is mediocre; between 0.60 and 0.50 is poor; below 0.50 is unacceptable. Exploratory factor analysis outputs are shown in Fig. 2.

According to Fig. 2, both the KMO test and Bartlett test are placed in the recommended level, therefore both test for this model are acceptable. On the other hand, the community table illustrates the suitability of questions in the process of factor analysis.

Kaiser-Meyer-Olkin measure of sampling Adequacy.		.843
Bartlett's test of Sphericity	Approx. Chi-square	1249.887
	df	351
	Sig.	0.000

Fig. 2: Outputs of the KMO and Bartlett test for inside resources of the firm



**Total Variance Explained**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.201	17.38	17.38	6.201	17.38	17.38	3.073	17.38	17.38
2	1.870	14.86	32.24	1.870	14.86	32.24	2.663	14.86	32.24
3	1.582	12.88	44.12	1.582	12.88	44.12	2.397	12.88	44.12
4	1.389	11.84	54.97	1.389	11.84	54.97	2.363	11.84	54.97
5	1.263	11.40	66.36	1.263	11.40	66.36	1.808	11.40	66.36
6	.994	8.02	73.38						
7	.960	3.79	77.38						
8	.970	2.59	78.97						
9	.946	2.50	80.48						
10	.900	2.33	80.81						
11	.862	2.16	85.97						
12	.831	2.08	69.05						
13	.785	1.91	71.95						
14	.767	1.84	74.79						
15	.685	1.74	77.53						
16	.647	1.70	80.03						
17	.595	1.68	82.41						
18	.583	1.68	84.61						
19	.565	1.66	86.75						
20	.534	1.66	88.84						
21	.498	1.65	90.81						
22	.465	1.65	92.65						
23	.455	1.64	94.36						
24	.439	1.63	96.04						
25	.382	1.42	97.45						
26	.368	1.36	98.61						
27	.320	1.19	100.00						

Extraction Method: Principal Component Analysis

Fig. 3: Total variance explained

The Table of Total Variance explained (Fig. 3) shows that these questions indicate a total of five factors. These five factors explained about 66.36% of the competitiveness variances which illustrates the acceptable validity of the questions.

Then rotated component matrix in this field is presented. This matrix shows which questions with what level of factor loading are related to five factors. According to Fig. 4, the following five factors were found. In Fig. 4, the questions related to every factor are defined.

Figure 4 shows the rotated component matrix. Based on the data in Fig. 4 and level of factor loading for each question, five variables were identified: Variable 1: Market share, Variable 2: Financial power, Variable 3: The use of technology, Variable 4: Exchange and international activities, Variable 5: Human resources.

Finally, we can say that according to the above analyses, the proposed model was confirmed.

**Confirmatory Factor Analysis**

After performing exploratory factor analyses, confirmatory factor analyses (CFAs) were conducted with LISREL 8.5. Following Anderson and Gerbing (1991), the measurement model (relationships between observed items and latent constructs) was analyzed before the structural model (relationships between latent constructs). The logic behind this argument is that it is essential to understand what one is measuring prior to testing relationships (Vandenberg and Lance, 2000).

Confirmatory Factor Analysis (CFA) is a set of more complex and sophisticated statistical techniques used later in the research process to confirm the hypotheses or theories concerning the underlying structure generated by EFA. It is a hypothesis testing approach used to test the model. Confirmatory Factor Analysis tests the correlation structure of a data set against the hypothesized structure and rates the goodness of fit. CFA tests

Rotated Component Matrix <sup>a</sup>

	Component				
	1	2	3	4	5
ASSET	4.522E-02	.579	.239	.176	.214
DEBT	.195	.728	.115	3.353E-02	9.994E-02
EPS	8.553E-02	.674	.126	.127	3.997E-02
PTOA	.258	.621	2.426E-02	.161	-4.985E-02
PROFIT	4.962E-02	.418	6.584E-03	.334	.293
CONVENIE	8.494E-02	.576	.184	.139	8.746E-02
CDEPOSI	.619	3.874E-02	.115	.195	.154
BDEPOSI	.616	2.422E-02	.151	1.198E-02	.147
SHR.DEP	.596	-2.878E-02	.117	.238	-9.405E-02
L.R.DEPO	.572	.112	4.532E-02	.116	.293
OTH.DEPO	.595	.224	9.497E-02	7.749E-02	4.275E-02
INT.BRAN	.387	.166	1.983E-02	.265	.165
MOSHAE	.623	8.873E-02	.172	-3.165E-02	-5.025E-02
MOSHAGH	.516	.150	2.483E-02	.268	.324
YEAR.SER	.331	.177	1.510E-02	-5.543E-02	.604
EDUC	6.269E-02	8.195E-02	.247	.132	.620
EMPLOYEE	.114	7.839E-02	9.931E-02	6.283E-02	.758
L.C	9.599E-02	.209	.271	.584	1.487E-03
GUARANTY	.238	.177	7.604E-02	.576	-1.871E-02
EXCHANSE	.198	.169	6.534E-02	.677	5.368E-02
ASSIGNME	-6.851E-03	.266	8.609E-02	.483	8.064E-02
EXT.BRAN	.172	-7.751E-02	3.804E-02	.650	8.885E-02
SWIFT.BR	2.265E-02	.195	.591	.256	.274
A.T.M	5.284E-02	8.098E-02	.766	6.423E-03	.113
PINPAD	.183	.112	.650	.152	8.546E-02
ONLBRANC	.273	.115	.593	.162	2.809E-02
CREDCARD	.172	.245	.562	-2.480E-02	-1.017E-02

Extraction Method: Principal Component Analysis  
 Rotation Method: Varimax with Kaiser Normalization.  
 a. Rotation converged in 7 iterations.

Fig. 4: Rotated component matrix

hypotheses that state the number of factors representing data and the items comprising each factor. In CFA, the researcher specifies a certain number of factors, the factors are correlated and the observed variables measure each factor.

CFA seeks to determine if the number of factors conform to what is expected on the basis of pre-established theory. Indicator variables are selected on the basis of prior theory and factor analysis is used to see whether they load as predicted on the expected number of factors (Pallant, 2007).

Here, the main model will be tested and evaluated. Therefore, confirmatory analysis will be performed by LISREL 8.5 software. Finally, the measurement model related to competitive capacity of Iranian banks, which are a function of five main factors, will be studied.

### Evaluation of Structural Model of Competitive Capacity

As expressed in various parts of this study, the structural model includes five variables that affect the company competitiveness. Figure 5 shows the outputs in this field:

Figure 5 shows the structural model of competitive capacity of banks as for mentioned five variables. In Fig. 4, the amount of coefficients of each of five main variables related to competitiveness is presented. The calculated coefficient for each factor is 0.77, 0.75, 0.69, 0.75 and 0.74. Considering the above Figure we can measure bank competitiveness using a five-variable equation as indicated below:

$$\text{Banks competitiveness} = 0.77 \times (\text{financial power}) + 0.75 \times (\text{market share}) + 0.69 \times (\text{human capital}) + 0.75 \times (\text{international/exchange activities}) + 0.74 \times (\text{technology})$$

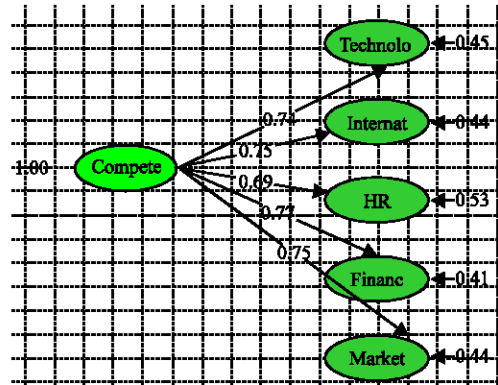


Fig. 5: Structural model of competitive capacity of banks as for mentioned five variables

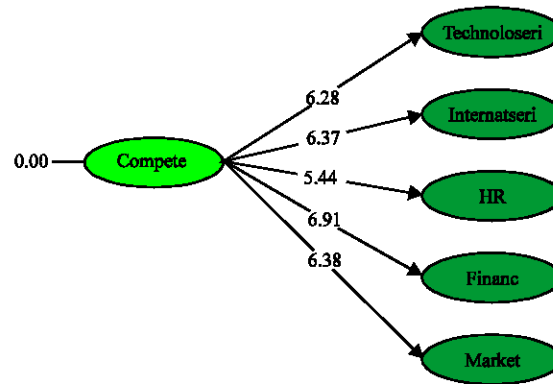


Fig. 6: t-values obtained for the research structural model

Table 1: Path coefficients of structural model

Variables	Symbol in software	R <sup>2</sup>	Path coefficient	t-value
Financial power	FINANC	0.59	0.77	6.91
Market share	MARKET	0.56	0.75	6.38
Human capital	HR	0.47	0.69	5.44
International/exchange activities	INTERNAT	0.56	0.75	6.37
Use of Technology	TECHNOLO	0.55	0.74	6.28

Sources: Author's computation

After computing the values of correlation and coefficient of determination, the significant level of these coefficients should be considered. In structural equation modeling a t-value is used for this assessment. While the obtained t-value is above 1.96, the coefficients and impacts are significant. Figure 6 shows the extracted t-values.

As Fig. 6 shows t-values obtained for the research structural model are Table 1 provides summary of above calculation.

### Evaluating the Measurement Model of Competitive Capacity

To evaluate indices that effect Iranian bank competitiveness, it is also necessary to evaluate the amount of sub-indices. As expressed in various parts of this study 27 indicators in 5 variables are categorized.

Table 2: Summary of data analysis

Variables	Index	Symbol	Correlation $\beta$		
			coefficient	coefficient	t-value
Financial power	Assets	Asset	0.39	0.85	Above 1.96
	Debts	Debt	0.37	0.81	6.54
	Equity	EPS	0.36	0.77	6.46
	Earning/Asset	PTOA	0.31	0.71	6.15
	Net income facilities	PROFIT	0.24	0.68	5.58
Market share		CONVENIE	0.31	0.76	6.16
	Share of demand deposit	C.DEPOSI	0.33	0.74	Above 2
	Share of saving deposit and like these	B.DEPOSI	0.29	0.69	5.76
	Share of short-term investment deposit	SH.R.DEP	0.26	0.65	5.48
	Share of long-term investment deposit	L.R.DEPOSI	0.30	0.72	5.83
	Share of other deposits	OTH.DEPOINT	0.33	0.58	6.01
	Share of banking system branches	INT.BRAN	0.24	0.66	4.86
	Share of joint revenues	joint	0.24	0.66	5.36
Human capital	Share of Severalty revenues and honorarium	severalty	0.38	0.86	6.29
	Share of banking system personnel	YEAR.SER	0.34	0.82	Above 2
	Staff knowledge capitals	EDUC	0.25	0.63	4.59
International activities	Personnel's experience	EMPLOYEE	0.36	0.85	4.98
	Letter of credit	LC	0.36	0.79	Above 2
	Currency warranty	GUARANTY	0.34	0.74	5.81
	Exchange	EXCHANSE	0.36	0.81	5.95
	currency draft	ASSIGNME	0.22	0.59	4.79
Use of information technology	Number of branches abroad	EXT.BRAN	0.20	0.59	4.82
	SWIFT branches	SWIFT.BR	0.34	0.78	Above 2
	Number of ATM machines	A.T.M	0.35	0.82	5.94
	PINPAD	PINPAD	0.40	0.86	6.22
	Online branches	ONLBRANC	0.38	0.82	6.10
	Number of credit cards issued	CREDCARD	0.25	0.66	5.34

Sources: Author's computation

Table 3: Fit measurement results

Index	Recommended level	Calculated value
$\chi^2/df$	<3.00	0.930
AGFI	>0.90	0.900
GFI	>0.90	0.900
RMR	<0.05	0.048
RMSR	<0.05	0.042
RMSEA	<0.05	0.000
NFI	>0.90	0.900
CFI	>0.90	1.000

Sources: Author's computation

This summary consists of statistical t-value,  $\beta$  coefficient and correlation coefficient. The analyzes of this variable are provided in the next phases (Table 2).

### Evaluating of Model Fitness

The fit of the CFA models were assessed on a number of fit indices, including chi-square, relative chi-square, Goodness-of-Fit (GFI), Adjusted Goodness of Fit Index (AGFI), Normed Fit Index (NFI) (Hu and Bentler, 1995), Comparative Fit Index (CFI) (Bentler, 1990), Standardized Root Mean Square Residual (SRMR) and Root Mean Square Error of Approximation (RMSEA) (Bollen, 1989). For detailed discussion of these fit indices, (Hair *et al.*, 1998). These indices were used to estimate whether the hypothesis model can react to observed data. Table 3 fit measurement results, shows that this research model has a fairly decent fitness.

In Fig. 7 some calculations related to the conceptual model is shown.

In the following section, some model fitness indicators are described:

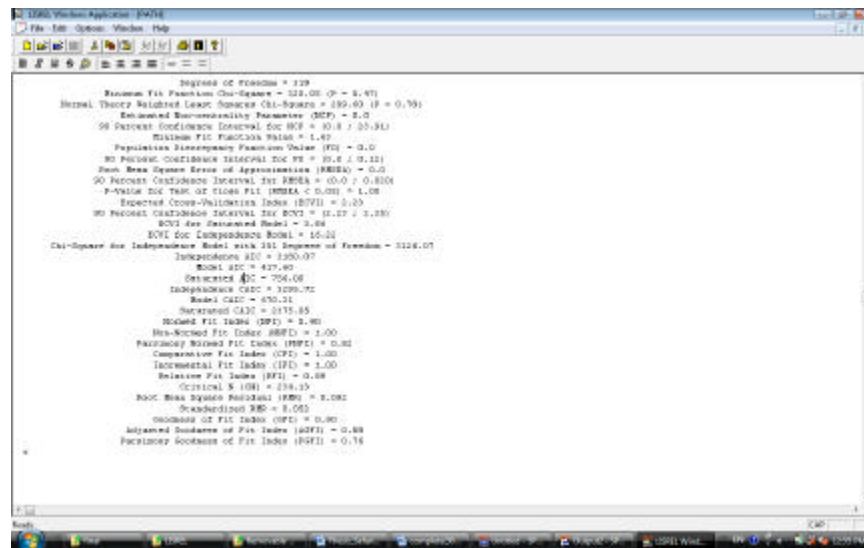


Fig. 7: Conceptual model related tests

- The chi-square statistic showed that the models were significant ( $p < 0.05$ ), indicating that the specification of the factor loadings, factor variances/co-variances and error variances for the models under study are not valid (Diamantopoulos and Siguaw, 2000; Hair *et al.*, 1998). Due to the sensitivity of the chi-square statistic, other overall measures have been proposed, such as the normed chi square (Byrne, 2001), the ratios of the chi-square to the degrees of freedom were beneath the recommended level of 3.00 (Byrne, 2001)
- The CFI measures the relative improvement of fit of the hypothesized models compared to the independence model. Although, a value of  $> 0.90$  was initially considered representative of a well-fitting model, more recently a revised cutoff value close to .95 is recommended (Hu and Bentler, 1999)
- There are some other indicators such as: GFI, AGFI, RMR, RMSR, NFI

It is only in the standard estimation mode that the effects of model variables can be compared. In fact, in standard estimation, all numbers convert to scale-free numbers so as to make the numbers to be compared with each other. Table 3 model fit indices related to Iranian banks are presented.

Model fitness indices are listed in the first column. In the second column recommended level of each index are shown. Calculated value for each index in column 3 shows that all the indices set in the recommended level. Therefore the model fitness is confirmed (Table 4).

## RESULTS

In this stage, the data pertaining to determined criteria and indicators in the selected banks are gathered. Documentation, financial statements and various reports in the Central Bank of Iran have been used for collecting required data for this study. Due to extensive calculation, in the early stages only the financial index data is analyzed.

**Phase 1-Formation of the Data Matrix (D) and Making them Scale Free**

Table 4 shows the data matrix of all banks:

The following: Melli, Sepah, Saderat, Tejarat, Mellat and Refah are state banks. Professional banks include Keshavarzi, Maskan and Tosee-saderat banks. Finally, Karafarin, Saman, Parsian, Eghtesad Novin, Pasargad and Sarmaye banks are private banks. Therefore, the data matrix table of financial power of these three types is shown in Table 5.

Table 5 regard to financial criteria shows the relative superiority of state-commercial banks than other banks. First, the data in the table above were changed to scale-free data. For this purpose, the following equation is used:

$$x_i^+ \Rightarrow A_{ij} = \frac{a_{ij}}{\sum a_{ij}} \quad (4)$$

The following table shows scale-free data of the Table 5.

Table 6 shows homogeneous data related to financial power criteria of state, professional and state banks.

In the next step, the mean of each index has been calculated. Table 6 shows the average of financial index data. In this table, the final score of financial power is calculated using

Table 4: Data matrix of all banks

Financial power						
Bank name	Assets	Debts	Equity	Earning/asset	Net income	Facilities
Melli	511036	474278	36,758	14	701	273936
Sepah	230717	218310	12407	12	302	154451
Saderat	381368	357849	23519	8	1289	168294
Tejarat	294754	278460	16294	77	2256	146738
Mellat	383822	365248	18574	66	2332	251423
Refah	62840	61566	1274	72	455	41586
Keshavarzi	170167	160870	9297	2	38	107880
Maskan	172027	161897	10130	157	2694	428510
Tosee saderat	35320	14951	20369	229	809	5178
Karafarin	25985	23928	2057	286	744	17605
Saman	34620	33256	1364	87	302	19147
Parsian	163087	153752	9355	201	3274	101424
Eghtesad novin	74501	71146	3355	144	1076	52290
Pasargad	56965	49869	7096	285	1626	38956
Sarmaye	11271	6042	4129	429	484	10464

Sources: Annual central bank report, Banking industry report, 2009

Table 5: Data matrix of state, professional and state banks

Financial power						
Bank name	Assets	Debts	Equity	Earning/asset	Net income	Facilities
State-commercial	1864537	1755711	108826	0.351438	7335	1036428
State-professional	377514	337718	39796	0.938690	3541	541568
Private	233332	200776	32556	2.047397	4247	451293

Sources: Author's computation

Table 6: Homogeneous data related to financial power criteria

Financial power						
Bank name	Assets	Debts	Equity	Earning/asset	Net income	Facilities
State-commercial	0.97282	0.97586	0.904165	0.15416	0.79852	0.826858
State-professional	0.19696	0.18771	0.330639	0.41178	0.38548	0.432061
Private	0.12174	0.11159	0.270487	0.89814	0.46234	0.36004

Sources: Author's computation

Table 7: Average of normalized banks data

Average	Financial	Market share	Human capital	Technology	International activities
State-commercial	0.7720	0.94136	0.9822	0.9833	0.890543
State-professional	0.3241	0.23089	0.1703	0.1528	0.216016
Private	0.3707	0.14353	0.0746	0.0910	0.267552

Sources: Author's computation

Table 8: Calculating indices weights

Variables	Financial	Market share	Human capital	Technology	International activities	Total
$\beta$ -value	0.7700	0.7500	0.690	0.7500	0.74	3.7
Weighted value	0.2081	0.2027	0.186	0.2027	0.20	1.0
$\beta$ -value	0.7700	0.7500	0.690	0.7500	0.74	3.7
Weighted value	0.2081	0.2027	0.186	0.2027	0.20	1.0

Sources: Author's computation

Table 9: Weighted means of indices

	Financial	Market share	Human capital	Technology	International activities
State-commercial	0.1606	0.1908	0.18310	0.1993	0.1781
State-professional	0.0674	0.0468	0.03177	0.0309	0.0432
Private	0.0771	0.0290	0.01392	0.0184	0.0535

Sources: Author's computation

Table 10: Calculating the positive and negative ideal

	Final Score of				
	Financial	Market share	Human Capital	Technology	International activities
Positive ideal	0.1606	0.1908	0.1831	0.1993	0.1781
Negative ideal	0.0674	0.0290	0.01392	0.0184	0.0432

Sources: Author's computation

averages amount of subset Criteria. Considering the above logic, the score of each financial power indices is shown in Table 7.

Table 7 shows the average of normalized banks data.

### Phase 2-Calculating Scale-Free Weighted Matrix

In this stage, the weights of each five factors were specified and then scale-free weighted matrix was calculated using these weights. Lisrel software is used in order to weigh selected indices. The outputs are based on expert viewpoints, thus beta ( $\beta$ ) coefficients obtained for the five indicators are homogenized using weighted mean. The outputs are used as the weights of indices. Table 8 and 9 calculations of indices weights and weighted means of indices are presented.

Results of Table 8 and 9 are used in the next phase and in conclusion.

### Phase 3-Calculating Positive Ideal Option $A_i^+$ and Negative Ideal Pption $A_i^-$

Table 10 shows positive and negative ideal options.

Calculation of the positive and negative ideal is used in the next phase and in conclusion.

### Phase 4-Measuring The Amount of Euclidean Distance

In this stage, options Euclidean distance to positive and negative ideal was calculated.

Euclidean distance calculation (Table 11) is used in the next phase and in conclusion.

### Phase 5-Immediacy Index Calculation and Options Ranking

Based on the following equation, the distance of each option to the ideal positive and negative ideal was calculated.

Table 11: Euclidean distance calculation

	Financial	Market share
State-commercial	0.0000000	0.316914
State-professional	0.31446971	0.022129
Private	0.33169045	0.010401

Sources: Author's computation

Table 12: Immediacy index calculation and banks ranking

	Index value	Ranking
State-commercial	1.000000	1
State-professional	0.065743	2
Private	0.030405	3

Sources: Author's computation

$$C_i = \frac{d_i^-}{d_i^- + d_i^+} \quad (5)$$

The value of this index and the final banks rating are shown in Table 12.

Base on the above table, state-commercial banks have the highest value in the immediacy index calculation and therefore rank first. After it, immediacy index for state professional banks is equal to 0.06, so rank after state-commercial banks in the second place. At the end private banks is third in this ranking with index value of 0.03.

## DISCUSSION

Based on these research indices for bank competitiveness, it was found that commercial state-run banks came first in the ranking. This group of Iranian banks has excelled other banks in many indicator studied in this research, especially in the financial power index that has the greater impact on bank competitiveness. These banks have the first rank among other banks in terms of assets and equity, which are subsets of financial power. Unlike the present study, Hauner and Peiris (2005) introduced the bank size as the bank competitiveness and performance factor. In the study of Efficiency and Competition in Low-Income Countries that was done in Uganda, they found that large banks and private banks are more effective, while smaller banks in exposure to competitive pressure are less effective (Hauner and Peiris, 2005). It should say that unlike the Uganda's banks, Iranian largest banks are those that are related to the government (state banks). Bikker and Groeneveld (2002) also explain that unlike the large banks, small banks have weak competitive conditions.

Undoubtedly, in order to prioritize improvement areas, the influence coefficient of each index is the most important factor which leads banks to appropriate required strategies.

After financial power, market share plays the next most important role in a bank's competitiveness. Analysis performed in state-run and private banks shows that the current status of these two groups can be influenced by two main factors: a) bank life; b) number of bank branches and their distribution. But here we're looking for upgrading banks' competitive ability not studying the whys of their current status or lifetime or number of bank branches.

Considering this point and the comparison between state-run and private banks, some suggestions are offered: private Iranian banks should improve their ability in dimensions of market share and international activity. They should also consider effective indices in these two dimensions to develop a plan necessary for increasing competitiveness. In contrast, state commercial banks should focus more on financial power and the dimension of international activity to maintain their current position. Claessens and Laeven in the research entitled: Competition in the Financial Sector and Growth: A Cross-Country Perspective found



that the effect of competition on access to finance (and growing) can affect on the development of the financial system (Claessens and Laeven, 2003). This effect is also confirmed by this study.

Other researches in this field were conducted to rank the banks in different countries based on various factors of competitiveness. None of these researches provided any special result about state and private banks, but in most cases the factors that used to rank the banks were similar to this study ranking factors. These include:

- The banker magazine in England publishes rankings of banks every year since 1970s. Its rankings are based on capital, with secondary rankings by assets, capital/asset ratio, real profit growth, profit on average capital and return on assets (Jun-Yang and Wei-Jiang, 2002). However, these rankings do not consider various sorts of subjective factors (like environment and market conditions), thus cannot fully reflect the subjective portion of competitiveness
- Another study is competitiveness of Chinese commercial banks. Claessens (2006) divided competitiveness indicators into two classes: current competitiveness indicators (including market size, capital adequacy, asset quality, return on equity, liquidity and internationalization) and potential competitiveness indicators (including human resources, information technology, financial innovation, service delivery, corporate governance and internal control) (Wang, 2006)

#### **ACKNOWLEDGMENT**

The authors would like to thank the faculty of management of Imam sadiq (a.s) university this research activities.

#### **REFERENCES**

- Ahire, S.L., D.Y. Golhar and M.A. Waller, 1996. Development and validation of TQM implementation constructs. *Decision Sci.*, 27: 23-56.
- Ajitabh, A. and K. Momaya, 2002. Competitiveness of firms: Review of theory, frameworks and models. *Singapore Manage. Rev.*, 26: 45-58.
- Amadeh, H. and M. Jafarpoor, 2009. Specification of obstacles and solutions of electronic banking development within the framework of Iran at 1404 prospective. *J. Knowledge Dev.*, 26: 1-43.
- Anderson, J.C. and D.W. Gerbing, 1991. Predicting the performance of measures in a confirmatory factor analysis with a pretest assessment of their substantive validities. *J. Applied Psychol.*, 76: 732-740.
- Barth, J.R., G. Jr. Caprio and R. Levine, 2001. The Regulation and Supervision of Banks around the World: A New Database. In: *Integrating Emerging Market Countries into the Global Financial System*, Litan, R.E. and R. Herring (Eds.). World Bank, Development Research Group, Canada.
- Barth, J.R., G. Jr. Caprio and R. Levine, 2003. Bank supervision and regulation: What works best?. *J. Financial Intermediation Forthcom.*, 13: 205-248.
- Behkish, M.M., 2005. *Iranian Economy: In the Context of Globalization*. Ney Publishing House, Tehran.
- Bentler, P.M., 1990. Comparative fit indexes in structural models. *Psychol. Bull.*, 107: 238-246.

- Bikker, J.A. and J.M. Groeneveld, 2002. Competition and Concentration in the EU Banking Industry. De Nederlandsche Bank, Netherlands.
- Bollen, K.A., 1989. Structural Equations with Latent Variables. John Wiley and Sons, New York, ISBN: 0-471-01171-1.
- Brown, J.D., 1996. Testing in Language Programs. Prentice Hall, New Jersey.
- Buchs, T. and J. Mathisen, 2005. Competition and Efficiency in Banking: Behavioral Evidence from Ghana. International Monetary Fund, Washington.
- Byrne, B.M., 2001. Structural Equation Modeling with AMOS: Basic Concepts, Application and Programming. 1st Edn., Lawrence Erlbaum Associates, Mahwah, NJ.
- Chikan, A., 2008. National and firm competitiveness: General research model. *Competitiveness Rev.*, 18: 20-28.
- Claessens, S. and L. Laeven, 2003. Competition in the financial sector and growth: A cross-country perspective, November 2003. [http://www.eu-financial-system.org/fileadmin/content/Dokumente\\_Events/symposium\\_2004/S.Claessens-L.Laeven.pdf](http://www.eu-financial-system.org/fileadmin/content/Dokumente_Events/symposium_2004/S.Claessens-L.Laeven.pdf).
- Claessens, S., 2006. Competitive implications of cross-border banking. World Bank Policy Research Working Paper No. 3854. [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=922980](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=922980).
- Diamantopoulos, A. and J.A. Siguaw, 2000. Introducing LISREL: A Guide for the Uninitiated. Sage Publications Ltd., London.
- Divandari, A., S.R. Syedjavadeyn, M. Nahavandian and H. Aghazadeh, 2008. Assessing the relationship between market orientation and the performance of Iranian commercial banks. *J. Econ. Res.*, 83: 17-40.
- Feurer, R. and K. Chaharbaghi, 1994. Defining competitiveness: A holistic approach. *Manage. Decision*, 32: 49-58.
- Fu, M. and H. Shelagh, 2009. The effects of reform on China's bank structure and performance. *J. Bank. Finance*, 33: 39-52.
- Garson, G.D., 2009. Factor Analysis from Statnotes: Topics in Multivariate Analysis. American Psychological Association, USA.
- Guan J.C., R. Yam, C.K. Mok and N. Ma, 2004. A study of the relationship between competitiveness and technological innovation capability based on DEA models. *Eur. J. Operat. Res.*, 4: 24-38.
- Hair, J.F., R.L. Tatham, R.E. Anderson and W. Black, 1998. Multivariate Data Analysis. 5th Edn., Prentice Hall International, Englewood Cliffs, New Jersey, London, ISBN-13: 978-0138948580.
- Hauner, D. and S.J. Peiris, 2005. Bank efficiency and competition in low-income countries: The case of Uganda. IMF Working Paper WP/05/240. International Monetary Fund. <http://www.imf.org/external/pubs/ft/wp/2005/wp05240.pdf>.
- Hempell, H.S., 2002. Testing for Competition among German Banks. Economic Research Centre of the Deutsche Bundesbank, Germany.
- Hondroyannis, G., L. Sarantis and P. Evangelia, 1999. Assessing competitive conditions in the Greek banking system. *J. Int. Financial Markets Inst. Money*, 9: 377-391.
- Hu, L. and P.M. Bentler, 1995. Evaluating Model Fit. In: Structural Equation Modeling Concepts Issues and Applications, Hoyle, R.H. (Eds.). Sage, Thousand Oaks, CA, pp: 76-99.
- Hu, L. and P.M. Bentler, 1999. Cutoff criteria for fit indexes in covariance structural analysis: Conventional criteria versus new alternatives. *Structural Equation Model.*, 6: 1-55.
- Irina, A., 2000. Development of market orientation and competitiveness of Ukrainian firms. *Eur. J. Market.*, 34: 1128-1148.

- Jun-Yang, X. and L. Wei-jiang, 2002. Banks in China from the world rankings of international competitiveness. *J. Shanghai Finance*, Vol. 12.
- Jöreskog, K.G. and D. Sörbom, 1989. LISREL 7: A Guide to the Program and Applications. 2nd Edn. SPSS., Chicago, IL.
- Kitindi, E.G., B.A.S. Magembe and A. Sethibe, 2007. Lending decision making and financial information: The usefulness of corporate annual reports to lenders in Botswana. *The Int. J. Applied Econ. Finance*, 1: 55-66.
- Ling, L.X., 2000. An analysis of sources of competitiveness and performance of Chinese manufacturers. *Int. J. Operations Product. Manage.*, 20: 299-315.
- Malhotra, N.K., 1996. *Marketing Research: An Applied Orientation*. Prentice-Hall, New Jersey.
- Mathuva, D.M., 2009. Capital adequacy, cost income ratio and the performance of commercial banks: The Kenyan Scenario. *Int. J. Applied Econ. Finance*, 3: 35-47.
- Matthews, K., V. Murinde and T. Zhao, 2007. Competitive conditions among the major British banks. *J. Banking Finance*, 31: 2025-2042.
- Moutinho, L. and P.A. Philips, 2002. The impact of strategic planning on the competitiveness, performance and effectiveness of bank branches: A neural network analysis. *Int. J. Bank Market.*, 20: 102-110.
- Nardi, P.M., 2006. *Doing Survey Research: A Guide to Quantitative Methods*. Allyn and Bacon, Boston, MA.
- OECD, 2005. *Bank Profitability*. Organisation for Economic Co-operation and Development, Paris.
- Pallant, J., 2007. *SPSS Survival Manual*. McGraw-Hill Education, New York.
- Senocak, M., 1997. *Biyoistatistik*. Istanbul University Publications, Turkey.
- Shurchuluu, P., 2002. National productivity and competitive strategies for the new millennium. *Integrated Manuf. Syst.*, 13: 408-414.
- Vandenberg, R.J. and C.E. Lance, 2000. A review and synthesis of the measurement invariance literature: Suggestions, practices and recommendations for organizational research. *Organ. Res. Methods*, 3: 4-70.
- Venkatraman, N., 1989. Strategic orientation of business enterprises: The construct, dimensionality and measurement. *Manage. Sci.*, 35: 942-962.
- Wang, S., 2006. *Report on the Competitiveness of Chinese Commercial Banks-the Financial Blue Book Series*. Social Sciences Academic Press, Beijing.
- Yeyati, E.L. and A. Micco, 2007. Concentration and foreign penetration in Latin American banking sectors: Impact on competition and risk. *J. Bank. Finance*, 31: 1633-1647.