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To Find Appropriate Regression Pattern for Estate Bank's Deposits of Isfahan by Panel Data

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Abstract: For every country, economy is one of the most important factor of development and financial part of every country can show us economic situation of that country. In Iran deposits interests are high and people usually trust in banks. So to review and compare banks with each other and to find out how they absorb deposits is important. Depositing in banks depends on fixed factors such as the reputation of banks, number of branches and randomized factors such as gold and housing market, economic situation of the city, etc. This study is carried out to review effective factors to absorb deposits. The statistics of the current study is estate banks of Isfahan including Bank Melli, Saderat, Sepah, Keshavarzi, Maskan, Refah and Tejarat from 2002-2011. Gathered data were analyzed by statistical software. Firstly, an appropriate model was fit by panel data method and then accuracy of the model was studied by test set.

Key words: Estate banks, panel data, number of bank deposits, economic, appropriate

INTRODUCTION

In all countries, there have been studies carried out on financial incomes annually and they can be used for further prediction and decision making. In Iran after establishment of Bank Melli in 1928 and after establishment of statistical office of the bank in 1935 to review financial income became important and in 1960 coincides with central bank of Iran establishment, the duty was assigned to the central bank. From 1974, the central bank gathers financial incomes information. One of the most important information of banks is information about loans as banks desire to absorb deposits. In this competitive world what factors can affect deposit absorption?

Experts believe that facilities limitation is a negative factor which decreases deposits absorption while annual interests is a positive factor. But now the interest rates of all banks are same and it can't be a positive factor to absorb clients. On the other the reputation of banks and their condition in financial markets can be really important. Experts believe banks with more branches in various cities may be able to absorb more clients than banks with fewer branches. So, in the current study we aim to find an appropriate panel regression model to absorb clients and deposits with regard to bank reputation, number of branch and number of deposits.

THEORIES

Time series data are data which check number of one or more variables in a period of time. But cross-sectional data, one or more variables are gathered for one or multi-unit at a specified time. Panel data is combination of time series data and cross-sectional data. It means panel data check cross-sectional data in over time. Such data includes two dimensions. A dimension is related to different units in every specified time (N) and the other dimension is related to time (T). So, T×N data we will have in panel data model.

Panel data have advantages compared to cross-sectional data or time series data. Advantages like more accurate information and lower linearity and more variability. With panel data we can check some effects which could not be checked by cross-sectional data and time series data. Generally, it can be said that panel data is more suitable to study dynamic of changes rather than other data.

HISTORY OF STUDY

There are many studies carried out on this issue in different cities of the country such as Isfahan. Azarbayjani and Kuhi studied on evaluation and analysis of efficiency of estate banks of Isfahan with DEA Method from 2003-2005. Many researchers have used panel data in their studies such as Gudarzi and Zobeydi (2008) they

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studied on effects of electronic banking development on profitability of commercial banks. Keshavarz and Babaie (2011) studied on volatility of stock returns in Tehran and he used panel data and garch model. In Gilan, Gholizadeh studied on effective factors to equip sources and to absorb deposits in estate banks. Akrami proposed several solutions to absorb bank deposits. Past studies have been carried out by information from Iran information center, sets of paper's summery and summery of conferences and research journals about banking. Most statistical tests and description of past studies had no consideration of time factor and panel data have not been applied properly. One of the most important problems of national researches is not to do similarity tests for panel data. So, in this study we decided to fit estate banks of Iran (Melli, Saderat, Mellat, Sepah, Keshavarzi, Maskan, Refah,Tejarat) by panel data which brings us a new perspective.

PANEL DATA MODEL AND ESTIMATION METHOD

The general figure of panel data is as follows:

$$Y_{it} = \beta_i + \sum_{j=1}^{k} \beta_j X_{jit} + \sum_{p=1}^{s} \gamma_p Z_{ip} + e_{it}$$

Where:

- Y = Dependant variable
- X = Descriptive variable
- Z = Unseen effective variable on dependant variable for every section
- i = Sections or units
- t = Time
- p and j = Differences between seen and unseen variables in the model
- e_{it} = Error of panel data estimation

The model which we consider for estate banks of Isfahan is as follows:

$$MSB_{it} = \beta_i + \beta_i TSB_{it} + \beta_\gamma TVB_{it} + e_{it}$$

Where:

- MSB_{it} = Deposits to the i bank in t time
- TSB_{it} = Number of deposits to i banks in t time
- TVB_{it} = Number of i bank units in t time

Balanced panel data model was used as we access to all bank data during the research period. The first step to estimate panel data model is to determine considered constrained to the econometrics model. In the other words, we should determine if the regression relation of the model has latitudes from heterogeneous and homogeneous slope or the theory of latitudes from common origin and common slope between sections is accepted. So, it should be determined of data are panel or pull in to do this F Limer test is used.

Table 1: To fit the modle with latitude from origin

Variables	Coefficient	SE	t-statistics	Significant level
Fixed amount	-1/540354	0/1540121	-0/350852	0/7267
Number of bank branches	05/22866	73/11800	1/937681	0/0563
Number of deposits	4/581493	0/753703	6//078646	0/0000

Table 2: To fit the model without latitude from origin

Variables	Coefficient	SE	t-statistics	Significant level
No. of bank branches	07/19619	629/7280	2/694695	0/0086
No. of deposits	4/597278	0/748118	6/145125	0/0000

Table 3: Latitude from origin in different years

Years	Effects
2002	-0/5329958
2003	-0/3873075
2004	-0/3313279
2005	-0/2670312
2006	-0/1939830
2007	-10/27868
2008	0/1681495
2009	0/2681486
2010	0/4855336
2011	0/7936005

Table 4: Latitude from origin of banks

Banks	Effects
Tejarat	847/5416
Refah	-0/1108524
Sepah	-0/357424
Saderat	-0/1993027
Keshavarzi	-0/4511630
Maskan	0/1117255
Mellat	0/5610743
Melli	0/1241759

In this study to determine panel data models, we used aggregation estimation which estimate coefficients for all banks and years equally (Table 1).

As you can see, the hypothesis beingzero of fixed coefficient is accepted. So, we consider models without latitude from origin. It seems number of banks should be entered to the model. Before any decision about existence or non existence of number of banks variable we should fit the model without latitude from origin (Table 2).

In Table 2, regarding the significant level existence of number of banks variable and number of deposits variable are necessary and with regard to determined coefficient, the effect of these two variables is positive.

Now we can calculate estimation of latitude from origins for all banks in different years, results are as follows (Table 3 and 4).

In these two conditions, latitude from origin can't be fixed. On the other word, we face transiting regressions. So, the module model is not discussed but the panel model is appropriate here.

Table 5: To fit random and fixed model

Statistics	Model 1	Model 2	Model 3	Model 4
F-statistics	20/12314	46/06935	46/06935	47/96279
F-significant level	0/0000	0/0000	0/0000	0/0000
Revised F-statistics	0/685395	0/532928	0/825490	0/543156
Akaike criterion	33/45941	33/83505	32/95745	33/44809

Table 6: Hausman test

Effect	χ^2-statistics	df	Significant level
Sectional random effects	3/271900	2	0/008729

Now we have fixed effects test. In this test, H_0 means non-existence of fixed effects which shows a constraint regression.

In Table 5, the model 1 is sectional fixed effects model, the model 2 is sectional random effects model, the model 3 is sectional and temporal model and the model 4 is sectional and temporal random effects. The results of these models are abridged in Table 5.

As you can see all 4 models are appropriate but the model 3 has the highest revised R^2 and it has the least Akaike information criterion. So, this model is most appropriate. There are two important hypothesizes about sectional effects in panel data:

- In the random model, sectional effects are not correlated with descriptive variables
- In the fixed effect model, sectional effects and banks are correlated with descriptive variables

In Hausman test null hypothesis means there is no relation between disruption part of latitude from origin and descriptive variables and they are independent from each other. If we reject the null hypothesis then we have to use fixed effects method because fixed effects method is compatible while random effects method is not compatible. Hausman statistics test includes Chi-square distribution and if the significant level is smaller than 0/05 then the fixed effect model is 95% accepted.

The results of the test have 3 parts: the first result is the main result of the Hausman test as follows (Table 6). With regard to that Chi-square statistic is large and it is in critical condition (the significant level is <0/05), the hypothesis is rejected as random effects model is not appropriate and fixed effects model is preferred.

The second part of the test shows the details where estimation coefficients compare fixed and random effects with each other and also it shows the difference betweenthe coefficients ofvariance and as the significant level range for every coefficient is <0/05, so, the coefficient variance is meaningful. So, Anisotropy of variance is accepted and the GLS Model should be considered (Table 7).

Table 7: Details of Hausman test

Variables	Fixed effect	Random effect	Variance difference	Significant level
No. of bank units	50823/845718	47001/066718	135877185/499037	0/7430
No. of deposits	1/956434	1/839877	0/049966	0/6021

Table 8: Estimation of fixed sectional effects model in GLS Model

Variables	Coefficients	SE	t-statistics	Significant level
Fixed amount	-145846	2808290	-0/519336	0/6054
No. of bank units	50823/85	18192/49	2/793672	0/0070
No. of deposits	1/956434	0/728498	2/685572	0/0093

The third part of the test includes estimation of fixed sectional effects model in GLS Model as follows (Table 8). As you can see the fixed amount hypothesis is rejected again and the model is as follows:

$$MSB = 50823/85TSB+1/956434TVB$$

So, for the deposits of each state bank mentioned above we can use this model for the number of bank units and number of deposits.

DATA AND DESCRIPTIVE RESULTS

Our statistical society is estate bank of Isfahan and the sampling process started in 2002 and it finished in 2011 and gathered data were analyzed by appropriate statistical software.

Results show that average of unit banks of Saderat bank is the highest and Maskan bank has the least average of unit banks. The highest standard deviation is for Maskan bank and it shows fluctuations of bank units is high in Maskan bank. And changes domain is the highest in this bank which is the reason of so, many changes of bank units in different years. Saderat bank has the highest rate of deposits and Refah bank has the lowest deposit rate. The lowest standard deviation assigns to Refah bank and it shows although this bank has the lowest deposit rate but it has less fluctuation too and its deposit rates have not changed from 2002-2011. The highest deposit rate assigns to Melli bank with the average of 2435092. Melli bank has the highest value of deposits from 2002-2011 and the lowest value of deposits assigns to Refah ban which already had lower average and standard deviation. To compare banks in number and value of deposits we used one-way variance analyze which equally of banks in number of deposits was rejected. But we wanted to know in which banks the number of deposits is different so we used conformance test duncan for Refah, Tejarat, Sepah, Maskan and Mellatin one group and Saderat, Keshavarzi and Melli in another group. Equality in every group is accepted.

Table 9: Levin-Lin-Chu Unit Root test

Variables	Statistical value	Significant level
Unrevised t	-6/0757	0/0000
Revised t	-4/1277	0/0000

TO CHECK THE ACCURACY OF THE MODEL

In this part unit root and correlation tests were used to check the accuracy of the model. Using unit root test in panel data has more power than using Unit Root test for every section independently. Maddala and Wu (1999) showed that in panel data using Unit Root tests such as Dickey and Fuller (1979) and Phillips and Perron (1988) tests have lower power than Unit Root tests of panel data. Levin *et al*. (2002) showed unit root test for these data as follow (Table 9).

In this test, H_0 shows existence of unit roots and H_1 shows stationary. As you can see assumption of same unit root is rejected. Other unit root tests of panel data such as revised hadri test and Dickey fuller test approved this.

CONCLUSION

Results show with regard to accepted model in above there is meaningful and positive relation between number of bank units and number of deposits. It means when number of branches is increased, number of deposits and values will be increased.

So, if estate banks consider facilities to absorb deposits, number and then value of deposits will be increased.

Experts offered seven solutions to improve deposits conditions in banks according to the information from central bank about bank interest intervals with existed inflation in 10 years solutions financial policies quality and moving to use indirect tools to absorb cash and to free interest rate of bank deposits.

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