

The Analysis of Interaction between Growth and Profitability on the Basis of Growth Persistency: The Case of Turkey

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Abstract From the beginning of 2000, there have been a growing number of researches on the profitability and the growth of commercial banks, however, there is a paucity of studies done on Turkey. Generally, the studies indicate that the growth rate of companies for a period is independent from their size. However, it is accepted that the volatility in the growth rates can be correlated with their size. On the other hand, it is found that in different periods, companies' growth rates can be uncorrelated. In regard to these observations, the growth rates of the companies are accepted to show a random walk. It is also possible to apply this analysis to commercial banks. The basic aim of this research is to analyze the correlation of growth and profitability of commercial banks. In regard to this, persistency of growth and profitability of Turkish Banks, as well as, the growth in size and the profitability will be analyzed by using the Dynamic Panel Data model. While growth is not persistent, the profitability of banks is persistent. Finally, it is found out that the banking sector intensity has positive effect on the growth of banks as well as their profitability.

Keywords Gibrat's law, Banks growth, Bank profits, Persistence, Dynamic panel data

1. Introduction

The law of Gibrat which is also known as "Gibrat's Proportionate Growth Rule" contributed in an important way in the analysis of Dynamics of firm growth. In recent years, the law is also used in analysis of the correlation of growth and profitability of the banking sector. There are many studies that investigated the profitability of banking in different respects. Levonian [1, 2], Berger et al. [3], Goddard et al. [4, 5], Agostino et al. [6], Bektaş [7], Kaplan and Çelik [8], Shehzad et al. [9], Flamini et al. [10], Goddard et al. [11], Francis [12], Garza-Garcia [13], Aslan et al. [14] are the studies that investigated persistence of bank profitability and Dynamics of profitability. Moreover, the correlation between bank growth and bank profitability are taken into consideration the studies such as Goodard et al. [4, 5]. Although Shehzad et al. [9, 15] and Goodard et al. [4, 5] made progress in their researches; there is still a limited number of studies done on the area.

The basic questions that arise in this type of analysis are; if there is a correlation between growth and bank profitability and if the correlation between growth and profitability is

persistent or not. However, the results of the existing analysis are not robust and it is difficult to end up with assumptions. The ambiguous results can be due to the methods that are used and also on the differences on the structures of the data. It is inevitable to state the need for more empirical analysis to have answer for the stated questions. The aim of this study is to investigate the persistence of growth and profitability of commercial banks in Turkey. The analysis will be based on alternative dynamic panel data model which are used in previous studies. It is important to note that the results of the models were contradictory. Our analysis will also be based on such empirical studies. This will make it possible for us to make assumptions by using different econometric models. As an emerging country, Turkey has a fast developing economy. The Turkish commercial have recently been investigated in recent years. The factors that influence the profitability of banks are investigated by the studies such as Kaya [16], Tunay and Silpagar [17, 18], Doğru [19] and the persistence of bank profits by Bektaş [7], Kaplan and Çelik [8], Aslan et al. [14]. However, there is no any other study done on the bank growth on the basis of persistence of bank profits. In this study, the aim is to make theoretical evaluations on the persistence on banking growth and bank profits and results will be presented by applying econometrical analysis.

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2. Theoretical Background and Method of Analysis

In 1931, Robert Gibrat set a rule which is known as “Gibrat’s Law of Proportionate Effect”. It contributed a lot to the literature in the dynamics of firm growth, proposing three basic points. The first proposition is that for a specified period, the growth rate of a firm is independent from its size. The second, the variability of a firm’s growth rate is independent from its size. The third one is that for two consecutive periods the size of the firms is independent from each other. Regarding the law of Gibrat, the firms follow random walk process. The studies analysed if the Gibrat law is significant for banks or not, also analysed the correlation between growth and bank profitability. However, the results indicate significant variance according to the data set and the method of estimation.

If Gibrat law is valid for bank or not is studied by the works of Goddard *et al.* [4, 5], Benito [20] (2008), Shehzad *et al.* [9, 15]. Goddard *et al.* [4, 5] analyzed the validity of Gibrat’s law as well as the bank growth and profitability. They examined 600 commercial banks in five EU countries for the years between 1992-1998. The results present that the profitability of banks play an important role in the growth of banks in the future. It is also pointed out that the growth makes the banks to perform better. Likewise the growth of banks indicates persistence. The persistence of profit in commercial banks is found to be higher than savings banks, co-operative banks.

Benito [20], in his study, examined the commercial, saving banks and cooperatives in regard to the distribution volume of the population for the years between 1970-2006. The data is tested by the panel unit root test if they fit to the Gibrat law or not. According to the results, the size and the growth is not consistent (istikrarlı) in time. According to the banking activities, depending on the competitive environmental factors this plays a variance in the relation. As Spanish banking sector is highly regulated, it is observed that small sized banks are growing at a higher speed compared to the large –sized banks. This result supports the law of Proportionate Effect. Shehzad *et al.* [9, 15], investigate if there is persistence of growth and profitability in the commercial banks and also if the level of growth and profit and the volatility depends on the size of banks and consequently if there is an interaction between growth and profitability. Using dynamic panel GMM model 1500 commercial banks from 65 countries from the years of 1997 to 2000, are examined. Not only growth and profitability but also the level of the firms and the banking sector is investigated by macroeconomic variables. They found no evidence indicating the persistence of growth, however, results indicate persistence of bank profitability. Moreover, they pointed out that the growth in banking as well as the profitability dynamics are found to be different in OECD countries and non-OECD countries. The result of the studies done by Shehzad *et al.* [9, 15] indicate that there is persistence in bank profits but not on growth which deviate

from the findings of completely Goddard *et al.* [4, 5]. As the studies done by Shehzad *et al.* [9, 15] can be considered more extended and their data set is more recent with more robust results, their studies is considered superior.

Instead of using Arellano and Bond [21] dynamic panel data model they used system dynamic panel data model presented by Blundell and Bond [22]. The Arellano and Bond [21] dynamic model type can provide biased results regarding for a data set of short period of many banks. However, the results of the dynamic models of Blundell and Bond [22] provide more reliable results due to different structured data set.

This study will use Shehzad *et al.* [9, 15] model using control variables on the firm, the sector and macroeconomic level. Shehzad *et al.* [9, 15] primarily investigated if bank growth and its variance is independent from bank growth or not and then their persistence. In regard to this issue they developed the model given below:

$$S_{it} - S_{it-1} = \alpha_i + \delta_t + (\beta - 1)S_{it-1} + \gamma(S_{it-1} - S_{it-2}) + \varepsilon_{it} \quad (1)$$

in model (1) S_{it} indicates the log of the size of bank i in year t , α_i represents the constant of a bank, whereas δ_t the effect of time, β shows the linkages between logged bank size and yearly growth rate. γ reflects the effect of the previous year’s parameter. On the other hand ε_{it} is the white noise representing disturbances.

As it is proposed by Gibrat’s law that each firm’s growth rate is independent from its size, if $\beta > 1$ then bank is fast growing. The meaning of this is that the density will be high in the sector and the growth in banking distribution will be skewed. The second proposal by Gibrat’s law which the residuals are investigated is the firm’s size is independent from its growth. When the scatter plot of bank size and model residuals are analysed, the systemic variations existence through different bank sizes indicates the Gibrat’s proposal’s validity.

The third proposal that reflects the persistence of growth which indicates that current growth rate is independent from its past growth and can be evaluated by γ parameter. Goddard *et al.* [5] investigated the retarded profit given in the equation (1) as an explanatory variable as (π_{it-1}) with the bank growth linkages. Therefore, they tried to examine the linkages between bank profitability and bank growth:

$$S_{it} - S_{it-1} = \alpha_i + \delta_t + (\beta - 1)S_{it-1} + \gamma(S_{it-1} - S_{it-2}) + \varphi\pi_{it-1} + \varepsilon_{it} \quad (2)$$

Shehzad *et al.* [9, 15] developed the model by adding a control variable matrix (X_{it}) as given in the equation (3):

$$S_{it} - S_{it-1} = \alpha_i + \delta_t + (\beta - 1)S_{it-1} + \gamma(S_{it-1} - S_{it-2}) + \varphi\pi_{it-1} + \zeta X_{it} + \varepsilon_{it} \quad (3)$$

When the banks get more homogenous that is $\alpha_i = \alpha$; the estimations of the model numbered (3) will become unbiased. Yet, if the banks are heterogeneously structured then the

estimations will be unbiased. If the banks are heterogeneously structured then $(\beta-1)$ will become biased and insignificant estimator. For this reason Shehzad et al. [9] developed the model (5) as given below:

$$S_{it} - S_{it-1} = (\beta - 1)(S_{it-1} - S_{i0}) + \gamma(S_{it-1} - S_{it-2}) + \varphi\pi_{it-1} + \zeta X_{it} + \xi_{lit} \quad (4)$$

in equation (4); $\xi_{lit} = \alpha_i + \varepsilon_{it} + \beta S_{i0}$ is defined. By such derivation, the model become biased and significant. In the restructuring, take the lagged variables are used by taking their differences.

Shehzad et al. [9, 15] applied bank growth model to profitability as equation (4):

$$\pi_{it} - \pi_{it} = (\beta_{\pi} - 1)(\pi_{it-1} - \pi_{i0}) + \gamma(S_{it-1} - S_{it-2}) + \zeta_{\pi} X_{it} + \xi_{2\pi it} \quad (5)$$

the equation (5) is defined as $\xi_{2\pi it} = \alpha_{\pi i} + \varepsilon_{\pi it} + \beta_{\pi} \pi_{i0}$. This model is developed in order to test the propositions of Gibrat in regard to profitability.

In the study, the balance sheet of the commercial banks in Turkey and the macroeconomic variables are used for the years 2002-2012. The web sites of Turkish Banking Association and the Turkish Republic of Central Bank are used to compile the data set. For that specific period, 30 commercial bank's data set is used making it possible to have 300 observations.

Bank assets for the bank volume and return on average equity (ROE) and return on average total assets (ROA) are used as bank measures. Equity to total assets ratio is used for the equity structure of the banks. To have a high ratio means that capital adequacy of a bank is high. The overhead costs to net income is the control variable of profitability. When the ratio gets higher the profitability will go down. Recurring earning power ratio is calculated by subtracting unstable earning from net income and tax and then divided by the total assets. As unstable extraordinary income is taken into consideration.

In addition, as the reflection of macroeconomic changes, growth rate to real GDP, inflation rate in terms of price index and the concentration in the banking system are used. The concentration ratio is calculated by dividing total assets of five banks into total assets.

3. Data Set

Table 1. Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max
Asset Growth	0.1896	0.3042	-0.8300	1.7720
Return On Equity	2.4278	19.3537	-186.3920	51.4550
Total Assets	14.9251	2.2138	10.1130	18.9010
Overhead Costs / Income	58.7284	54.1413	-638.0260	341.2500
Recurring Earning Power	4.4344	4.4874	-23.1900	22.9710
Equity / Assets	18.4680	16.2876	3.2650	85.7500
Real GDP Growth	0.0732	0.0408	0.0017	0.1640
Inflation	11.2220	7.3572	2.6600	30.8000
Concentration	0.4099	0.0188	0.3866	0.4406

Table 2. Correlation Matrix

	Asset Growth	ROE	Total Assets	Overhead Costs / Income	Recurring Earning Power	Equity / Assets	Real GDP Growth	Inflation	Concentration
Asset Growth	1								
ROE	0.1028	1							
Total Assets	0.1232	0.0278	1						
Overhead Costs / Income	-0.0262	-0.1546	-0.1521	1					
Recurring Earning Power	-0.1145	-0.0685	-0.0273	-0.0161	1				
Equity / Assets	-0.1694	-0.0291	-0.0406	0.0845	0.0303	1			
Real GDP Growth	-0.0740	0.0706	-0.1942	0.0429	0.0787	-0.0353	1		
Inflation	-0.1356	0.0634	-0.1319	0.0058	0.1336	-0.0254	0.0847	1	
Concentration	-0.0615	0.0940	-0.2494	0.0154	0.0255	-0.0119	0.0754	0.051	1

4. Empirical Results

The summary of descriptive statistics is given in Table 1. In Table 2, the correlations are presented that are used in the model. When the correlations of explanatory variables are analyzed, it is observed there is a low multicollinearity problem.

The analyses that are used to take the basis of the models (4) and (5) which are developed by Shehzad *et al.* [9, 15]. In addition to Shehzad *et al.* [15], not only the system dynamic

panel data models which are developed by Arellano-Bover [23] and Blundell and Bond [22], system dynamic panel data which is also known as Arellano and Bond's [21] model are also estimated in this study. The aim is to compare the model with Goddard *et al.*'s [4, 5] method of analysis.

The results of the dynamic panel data are given in Table 3. When the results are analysed all the models are seen as significant at 1% level with Wald Chi-squared test. Hansen over-identifying restriction test results are insignificant. Therefore control data set is significant.

Table 3. Dynamic Panel Estimation Results

	Bank Growth		Bank Profitability	
	(1)	(2)	(3)	(4)
Estimator:	AB ¹	ABBB ²	AB	ABBB
Bank Growth (t-1)	-0.12292 (-7.820*)	-0.14408 (-19.644*)	3.066047 (4.977*)	-2.41029 (-1.839***)
Bank Size (t-1)	-0.47747 (-20.139*)	-0.09773 (-9.022*)	-7.01246 (-2.060**)	-0.84816 (-6.559*)
Return On Equity (t-1)	-0.00135 (-2.171**)	-0.00172 (-5.961*)	0.08929 (15.991*)	0.138303 (9.148*)
Equity / Assets	-0.00992 (-12.736*)	-0.00747 (-6.428*)	-0.25204 (-28.914*)	-0.59564 (-7.440*)
Overhead Costs / Income	-6.2E-05 (-0.710)	-1.5E-05 (-0.094)	-0.04643 (-0.709)	-0.01784 (-2.094**)
Recurring Earning Power	-0.00475 (-2.092**)	-0.00323 (-1.617***)	0.938427 (29.943*)	1.192018 (21.344*)
Real GDP Growth	1.029363 (4.547*)	1.483271 (5.382*)	-34.5333 (1.880**)	38.892 (-1.933***)
Inflation	0.016702 (7.980*)	0.005864 (4.189*)	0.472112 (1.549)	0.15366 (4.896*)
Concentration	-9.65219 (-9.351*)	4.341064 (9.871*)	6.03415 (2.649*)	5.27561 (1.430)
Number of Observation	240	270	240	270
Number of Banks	30	30	30	30
Number of Instruments	36	44	44	52
Arrelano-Bond Tests:				
AR(1)	-2.6036	-2.4171	-1.3275	-1.6874
Prob. for AR(1)	0.009	0.0156	0.1844	0.0981
AR(2)	-1.7186	-1.1344	1.2575	1.4623
Prob. for AR(2)	0.0857	0.2566	0.2086	0.1437
Hansen Test:				
Chi Square	23.1059	24.1776	23.125	25.948
Prob. for Chi Square	0.6793	0.9155	0.9382	0.9815
Wald Test:				
Chi Square	21910.79	1069.28	9318.86	23442.06
Prob. for Chi Square	0.0000	0.0000	0.0000	0.0000

* represents significance at 1%, while ** represents significance at 5% and *** represents significance at 10% z tests.

(1) Arellano-Bond (1991) Estimator. (2) Arellano-Bover (1995), Blundell-Bond (1998) Estimator.

The residuals are also tested if they are autoregressive or not by the Arellano-Bond test. In the models (2) and (4), the first difference autoregressive process is significant whereas the second difference is insignificant. In the model (1), residuals first and second differences are significant. The model (3) the first and second differences are insignificant. Consequently, only in the models (2) and (4) autoregression problem is observed on residuals. Then the models (2) and (4) will be used. If the diagnostic checking performance of the models are ignored between dependent and independent variables estimations significant coefficients can be observed. Even if the estimators have variability this indicates that there are minor observations can be produced among models. That is to say, the results do not present huge differences in Turkish Banking case. This is observed due to the differences on the application of the structure of models between Goddard et al. [4, 5] and Shehzad et al. [9, 15].

Within the significant models bank size and bank growth and bank profitability interaction investigated separately. In regard to this, as it can be seen in the model (2) the logarithmic banks size which is reflected by $(\beta-1)$ indicates a negative value showing that larger bank's growth is slower than small sized ones. Although this indication is significant with Shehzad et al. [9, 15] which contradicts with the results of Goddard et al. [5], the estimator (4) shows that bank size

influence profitability is negative.

The bank size and growth and also the variability in profitability is to be investigated by significant model's residuals and for the bank size scatter plots are drawn that can be seen in Figure 1. There is no observation for a systemic change for residuals. Therefore, it cannot be concluded that there is an effect of bank size on the variables of growth and profitability. The results are significant with the findings by Yurtoğlu [24] are Gschwandtner [25].

This study aims to evaluate if there is a linkage between bank growth and the persistence of profit by applying significant models separately. It is observed that bank growth indicates negative persistence whereas bank profit has positive persistence, as expected. However, the persistence level of both is very low. It is possible to conclude that the negative persistence of growth in banking is that banks ended their growth in recent period. Not in the banking sector but generally in the finance sector, there are many studies that support that the persistence of bank growth which is negative such as Carrizosa [26].

The low level of profit persistency is consistent with the findings of Goddard et al. [11]. In regard to this, it can be pointed out that the persistence of profitability is considerably lower in developing countries than developed ones.

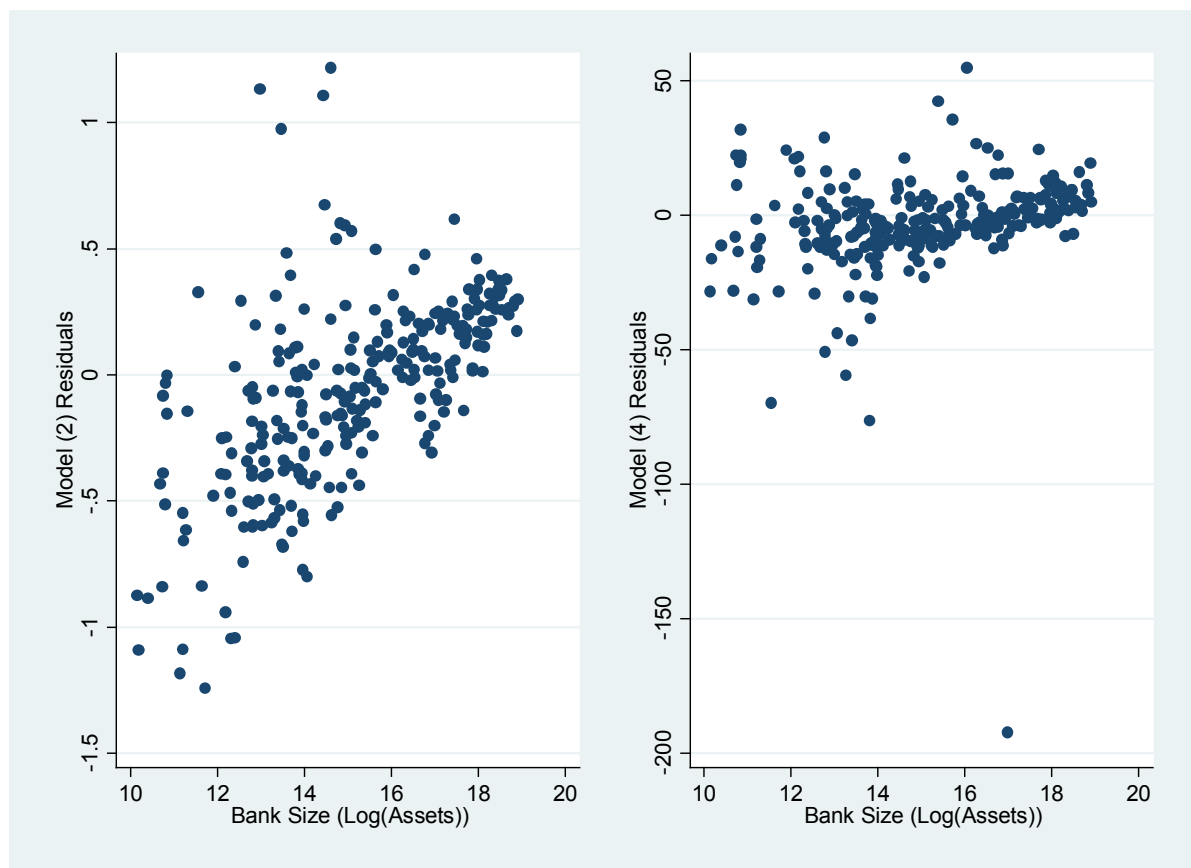


Figure 1. Residual Plots of Significant Models against Bank Size

The results are also evaluated with the effect of profitability on bank growth and bank profitability on bank growth. It can be observed that in significant models, the effect of profitability on bank growth is negative and likewise the effect of bank growth on bank profitability is also negative. It can be concluded that the banks with a decreasing trend of profitability tend to grow but the profitable banks do not have such tendency.

The effect of control variables that are added to the model is of high importance. Equity to assets ratio influence growth and profitability negatively. That is to say, if the capital adequacy of a bank is on increase than their profitability and growth go down. The overhead costs to income also indicate a negative relation both with profitability and growth. Recurring earning power and profitability models present different results. This ratio has a negative effect on growth but positive on profitability. The increase on real GDP, inflation and concentration interaction with growth and profitability is found to be positive. The positive interaction with concentration and growth and profitability is very important. The sector's concentration made the banks to grow and increase their profit margin.

5. Conclusions

In this study, as an emerging economy, the Turkish Bank's persistence of growth and profitability is analysed. The models that are developed by Goddard et al [4, 5] and Shehzad et al. [9, 15] are used and two different dynamic panel data models are estimated. Although alternative estimation methods that are used are significant, the model's significance is different from each other. The models that are developed by Arellano-Bover [23] and Blundell and Bond [22] indicate better results for the dynamic panel data models than Arellano and Bond [21]. The close parameter values are considered to be due to the added new variables to the analysis rather than the methodology used before. There is a need for further analysis for this issue to come up with a judgement.

Generally, the results in this study are close to the results of Shehzad et al. [9, 15]. The results of analysis indicate that in Turkey, there is persistence of bank profits thus at a low level. This result is consistent with the results of other empirical studies done on Turkey and on other developing countries. On the other hand, the persistence of growth is found as negative. The reason of this result is seen in the growth trend. That is to say, the banks that had a growing trend in the past may stop their growth in current period indicating that the profitable banks do not have a motive to grow. As there is no other investigation on the persistence of growth of banks and it is not possible to make a comparative analysis. However, the results indicate that large-sized banks compared to small-sized ones are growing at a lower speed supporting our finding that there is a negative persistence of growth.

In this study, bank size and growth and also growth and profitability interactions are analysed. It can be said that between bank size and such variables there is no significant correlation. Moreover, the effect of concentration in the banking sector on growth and profitability is analysed and it is found that concentration had a positive effect on both growth and profitability.

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