

From Accounting to Economics: The Role of Earning Reporting Features in The Relationship between Aggregated Earnings and GDP

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Abstract

This research investigates the effect of earning risk and earning smoothing on the GDP of companies listed on the Tehran Stock Exchange. The current research method is applied research in the descriptive-correlation research group. The information required for this research was collected from the financial statements of 110 companies in 2011-2022 from Rahavard Novin software and the websites of CBI and CODAL. Multivariate regression with panel data was used to test the hypotheses. The final data analysis was also done with the help of Eviews version 12. In line with the research topic, three criteria of risk of total earning, risk of cash items of earning and risk of accrual items of earning were used. The findings of the research hypotheses test show that the measure of earning risk cash items significantly affects the GDP rate, and smoothing does not statistically moderate the above influence.

Keywords: Earning risk, GDP, earning smoothing.

Introduction

GDP is one of the most effective output indicators and a complete picture. Policymakers and economists use GDP to evaluate economic development or recession and changes in monetary and financial policies. Therefore, quality forecasting of GDP is critical (Hangs, M. 2019) Forecasting GDP growth is one of the most important tasks of economists. Forecasting GDP growth greatly influences the decisions of a large group of society, from managers who use these forecasts to predict demand and plan production levels accordingly governments who set their annual budgets and other users such as investors rely on these forecasts for investment purposes. Most importantly, the central bank considers production growth expectations a main indicator before implementing monetary policies ultimately affect everyone's lives through the application of interest rates. Therefore, accurate and reliable forecasts of GDP growth are necessary. (Henderson et al., 2012) Also, that the economic crisis is clearly visible in Iran in recent years due to the imposition of international sanctions. The issue of more accurate is more necessary and important. However, preliminary announcements of GDP are based on incomplete and imprecise information and are usually updated in several subsequent periods

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(Nallareddy & Ogneva, 2016). Quarterly GDP statistics in the economic indicators of the Central Bank of the Islamic Republic of Iran are generally adjusted and updated until the last quarter of the same year. Considering that one of the characteristics of accounting information is the prediction of future economic events, the predictive value has been proposed as one of the criteria of relevance of information in the theoretical framework of financial reporting. The predictive value of information means its use in the forecasting process. Much of the researches to predict other variables in the accounting and financial fields (such as earning per share, debt ratio and dividends). The results of these researches have confirmed the ability and information content of accounting variables in predicting microeconomic variables (Kothari, 2001, Shivakumar & Urcan, 2017) although many results and evidences have been obtained from these studies since the studies of macroeconomic indicators such as inflation, budgeting, currency market, employment and unemployment, GDP and economic risks have been done independently of accounting variables (Salehi et al., 2021; Ramey, 2016; Bohi, 2017; Mankiw & Reis, 2018). Therefore, there is a lack of research on the information content of accounting data to describe GDP, and the relationship between accounting and macroeconomics has not been fully considered. In other words, focusing on information content and explanatory power of information extracted from financial statements has been neglected in forecasting macroeconomic variables (Badu & Appiah, 2018; Barth et al., 2022; El-Diftar & Elkalla, 2019). Evidence from recent research shows that aggregate earnings contain useful information about the possibility of predicting some macroeconomic indicators such as GDP growth. (Konchitchki & Patatoukas, 2014), inflation (Shivakumar & Urcan, 2017) these studies ignore the firm-level earnings attributes, although evidence suggests that such characteristics affect the information content of aggregate earnings (Kothari, 2001; Dechow et al., 2010). In this research, we seek to find the answer to whether paying attention to firm-level earnings attributes improves the information content of aggregate earnings for forecasting GDP. It is unclear whether the use of level reporting attributes enhances aggregate earnings' information content?, the innovation and contribution of the current research is that for the first time, the attributes of accounting earning are based on relevant theoretical foundations for the investigation and feasibility of forecasting GDP used.

Literatures Review

The basis of accrual accounting in recognizing transactions is historical cost. On this basis, the income of an economic event is recognized when its process is completed with a high degree of certainty. Therefore, the earnings reported in the income statement reflect past economic events, and the earnings are a historical component. The increasing macroeconomic research indicates that aggregate earnings provide information about future activities in macroeconomics. One reason is that earnings reflect the return on investment which tends to be stable. Therefore, according to the degree of stability, the current earnings can provide information about the NIPA (national income and product account earnings), considering that the NIPA is a part of the GDP. Therefore, accounting earning can be a good substitute for the NIPA (Abdalla & Carabias, 2021).

Changes in the profitability of companies affect economic variables for three reasons. First, the sustainability of current earning indicates the profitability of future investments in property, equipment, research and development of human resources. Therefore, corporate profitability affects managers' investment decisions, higher earnings facilitate more investment because financing frictions such as the cost of capital or the cost of debt are reduced. The growth of companies' earnings in different ways can change managers' understanding of investment opportunities and investment strategies. Second, to the extent that earning can be converted into cash flow, more earning means more access to resources for investment. On the other hand, the

decrease in earnings aggravates financial constraints and makes less funds available for investment. Third, better profitability reduces credit risk and increases the willingness of banks and lenders to grant loans, and then the funds available for investment increase, and this affects the economic situation. (Shivakumar & Urcan, 2017). Given that the estimate of GDP relies on several sources of information, some of which are not available at the time of initial estimation. Unavailable components of GDP are estimated by trend using information from previous months, quarters or years, so the accuracy of initial can be improved using more accurate assumptions. It shows that the GDP growth pattern is correlated with is reflected in time lead and lag (Nallareddy & Ogneva, 2016). Aggregate earnings an indicator of the performance and capabilities identified in the past activities of companies in the national economy, so it can be an indicator of the ability to generate national earnings in the future and the future GDP. .In general, many economists agree on the point of view that the profitability of companies is effective in the short term on the GDP and inflation, but their differences of opinion are on the channels of influence of the profitability of companies and their importance each other. (Abdalla & Carabias, 2021) According to the discussed topics, the first hypothesis is stated as follows:

H1: earning risk measures have a significant effect on the GDP rate.

As Ball and Sadka (2015) state, the random errors at the firm level would be greatly reduced by diversification based on aggregate earnings. On the other hand, earnings properties that are correlated across firms (those inherent characteristics of the financial reporting system) will be reflected in the aggregate earnings. If there is sufficient variation across firms, perhaps this variation can be used to increase the useful aggregate information. Even if these features are preserved in the information content of the aggregate, it is not clear whether professional macroeconomists consider the contribution of firms to vary in the information content of the aggregate earnings. First, we consider the volatility of firm-level earnings and the volatility of cash flow at the firm level as a feature of financial reporting, so that lower earnings volatility indicates smoother earnings. The main reason for choosing earnings smoothness as the desired financial reporting feature is that earnings smooth transitory fluctuations in cash flows (Dechow et al., 2010). In the context of smoothing, it still does not say with certainty whether smoothing enhances or weakens the awareness of the information contained therein. To be more precise, in economic terms, one of the roles of items is to smooth the fluctuations of cash flow transitions. However, smooth earnings of companies can be obtained more smoothly by artificially manipulating data by company managers to smooth the effects of earnings ability. In addition, corporate managers can use this discretionary domain to manipulate the company's earning information to hide negative earning changes (at the same time beneficial for corporate decision-making) (e.g., DeFond & Park, 1997; Leuz et al., 2003). Or convey relevant private information about the company's performance to interested groups. A number of current researches in line with the confirmation of the hypothesis of the transfer of important private information by manipulating the data have shown that the smoothing of the firm's earnings improves the information content of the earning data and increases the persistence and predictability of the firm's earnings (e.g., Subramanyam, 1996; Tucker & Zarowin, 2006). However, whether the increase in the awareness of the company's earnings information comes from the range of authority and ability of company managers (such as Demerjian et al., 2017) or it indicates the fundamental process of earning, we would expect that the smoother earnings of companies will better reflect their basic economic aspects, the probability of having useful information about macroeconomic outcomes will be higher in this category of information. If the information from smoothing is purely idiosyncratic to the firm, then we would not expect this information to be preserved in the aggregation process. According to the discussed topics, the second hypothesis is stated as follows:

H2: smoothing has a moderating role the effect of earnings risk on the GDP rate

Research Background

Nallareddy & Ogneva (2016) state that by considering aggregated earnings, GDP growth and the unemployment rate can be predicted with a lower error percentage, considering that economic experts do not consider accounting information in their forecasts. The results of Haung (2015) shows that aggregated earnings that are exposed to earnings management predict GDP growth up to the next medium term. While separating earnings into accrual earnings and cash flows, operating cash flows are able to predict GDP up to the next three intermediate periods. Saini & Todd (2015) concluded in their research that corporate leverage and market volatility affect the relationship between aggregated earnings and GDP. The research results of Gaertner et al. (2017) indicate that aggregate earnings reacts faster to negative economic news, than to good economic news; negative changes in accounting earnings can predict economic growth for the next three periods. The results of Ball et al. (2019) showed that the smoothed aggregate earnings combination performs relatively better in predicting macroeconomic variables. In addition, the results indicate that analysts who use aggregate earnings in their forecasts ignore the effects of smoothing. In a research, Sumiyana (2020) investigated the relationship between aggregate earnings and GDP in developed and developing countries (1989-2015). The results indicate that the informational content of aggregate earnings can predict the growth of future GDP, but this result is relevant only in developed countries where aggregate earnings are positive. In other words, in developing Asian and African countries, the informational content of aggregate earnings it cannot be used to predict GDP growth. Using Australian data, Zhang & Fargher (2022) results show a significant relationship between earnings and GDP growth. The findings of Son & Jeong (2022) showed that aggregate earnings can predict GDP growth.

Material and Methods

The present research method is descriptive, correlational, and practical in terms of the purpose of collecting research data. The library method was used to formulate theoretical topics, and for data and financial information, the financial statements of sample companies and the Rahavard Novin software related to the Tehran Stock Exchange and the central bank of Iran websites were used.

In the present study, listed companies on the Tehran stock exchange during 2012-2021 were considered the statistical population. The companies were sampled through a screening method, considering the following conditions

1. The company was admitted to the stock exchange before 2012 and its name was not removed from the list of mentioned companies until the end of 2021.
2. The firm's final fiscal year should last until the year's final day.
3. The firms under investigation should not be a part of investing, holding, and financial intermediation companies.
4. Their information and data should be available.

Finally, data of 110 firms were analyzed after applying the above conditions.

Data and information related to research variables were collected from Tehran Exchange (www.tse.ir) and the Central of Iran (www.cbi.ir) websites.

The research hypotheses were tested using the panel data approach initiated by doing the unit root test. After the likelihood ratio test (LRT) was implemented to ensure the use of the panel method, the Hausmann test was implemented to select the random or fixed effects method. The random effects method did not allow the unobserved effect to be correlated with independent variables, but the fixed effects method allowed it to do so (Wooldridge, 2009). Likewise, Pearson's correlation test was carried out to ensure the absence of multi-collinearity.

Independent variables

In this research, earnings risk is an independent variable.

- A- According to Bryan and Mason (2020), the risk of total earnings is the standard deviation of the operating earnings ratio to the book value of total assets for 4 periods before the desired year. In other words, the ratio of operating earnings to book value of total assets is calculated for 5 periods (the current year and 4 previous years) and the standard deviation ratio is calculated from these 5 ratios.
- B- The risk of total cash flow from cash activities, which according to Nekrasov & Shroff (2009) is the standard deviation of the ratio of total cash flow to the book value of total assets 4 periods before the desired year. In other words, the ratio of total cash to the book value of total assets is calculated for 5 periods (the target year and 4 previous years) and the standard deviation ratio is calculated from these 5 ratios.
- C- According to Nekrasov & Shroff (2009), the risk of accruals is the standard deviation of accruals to the book value of total assets 4 periods before the desired year. In other words, the ratio of accrual items to the book value of total assets is calculated for 5 periods (the target year and 4 previous years) and the standard deviation is calculated from these 5 ratios. Total accruals are calculated from the following formula

$$TACC_{it} (\Delta CA_{it} - \Delta Cash_{it}) - (\Delta CL_{it} - \Delta STD_{it}) \quad (1)$$

Where: $TACC_{it}$: total accruals; ΔCA_{it} : changes in current assets; $\Delta Cash_{it}$: cash balance changes; ΔCL_{it} : changes in current liabilities; ΔSTD_{it} : changes in the current share of long-term liabilities.

In this research, the moderator variable is earning smoothing company is introduced as an earning smoother, if the coefficient of change of earning to the coefficient of change of its revenues is smaller than 1, in other words:

$$CY = \frac{CV \Delta I}{CV \Delta S} < 1 \quad (2)$$

$CV \Delta I$: dispersion coefficient of earning changes in company i in the research period; $CV \Delta S$: dispersion coefficient of sales changes in company i during the research period

If CY is greater than one, the company has not smoothed its earnings if CY is less than one, it has smoothed its earnings. It should be noted that the dispersion coefficient can be measured based on the ratio of the standard deviation of the company's net earnings or sales in the current period to the average net earnings or company sales in the period under review

Macro variables

The total monetary or market value of all the finished goods and services produced within a country's borders in a specific time period is called GDP. CBI releases real GDP growth estimates.

Control variables

In order to improve the internal validity of a research by limiting the influence of confounding and other extraneous variables, control variables are used in this research. The control variables of the research are (Table 1):

Firm size: It is calculated through the natural logarithm of the total book value of the firm's assets at the end of the period.

Leverage: obtained through the ratio of the total book value of liabilities at the end of the period to the book value of all assets.

Growth opportunity: calculated through the ratio of market value to book value of equity.

Sales growth: This is obtained from the ratio of the difference between the current year's and the previous year's sales amount over the previous year's sales amount.

Asset return: obtained through the ratio of net earnings to the book value of total assets at the end of the period.

Table 1. Descriptive statistics of the research

Variables	Mean	Median	Max	Min	Sd.	Cd
GDP growth	0.1974	0.1945	0.3512	-0.0116	0.0972	-0.5109
Earning risk	0.0672	0.0566	0.2781	0.0073	0.0427	1.449
Cash flow risk	0.0321	0.0219	0.2168	0.0017	0.0316	2.7187
Accrual risk	0.1124	0.1015	0.4604	0.0227	0.0593	1.2334
Firm size	14.28	14.10	20.14	10.50	1.507	0.7689
Leverage	0.5915	0.5969	1.565	0.0369	0.1937	0.1778
Growth opportunity	0.4858	0.4195	2.566	-1.817	0.3918	1.091
Asset return	0.1194	0.1032	0.6267	-0.4044	0.1381	0.5203
Sales growth	0.2434	0.1845	6.555	-0.7152	0.4321	4.331
Smoothness observation	257					

As mentioned earlier, to test the hypotheses of the present study, the data of 110 reporting firms active in the stock exchange over ten years was used the average leverage is around 60% and shows the studied firms' high level of obligations. The calculated average earning risk criteria are low and show that the risks related to the firm's earnings are low. The standard deviation calculated in most variables shows the appropriate and logical distribution of the data. Examining the skewers of each variable and comparing it with normal distribution shows that all research variables are normally distributed

Testing the first hypothesis

The significance level for each variable and the whole model has been calculated at 95%. According to the coefficient of determination of the fitted model, it can be claimed that the independent and control variables explain 11.37% of the changes in the dependent variable of the research hypothesis. Autocorrelation violates one of the standard assumptions of the regression model, and the Durbin-Watson statistic can be used to determine the absence of autocorrelation in the regression model. The calculated Durbin-Watson statistics between (1.5-2.5), indicates the absence of autocorrelation and shows the independence of the remaining error components. As shown in Table 2, the significance level of the t-statistic for the cash flow risk variable of earning is lower than the acceptable error level of 5; therefore, the existence of a significant influence between the above variable on the GDP is confirmed.

Testing the second hypothesis

The significance level for each variable and the whole model has been calculated a95%. According to the model's coefficient of determination, it can be claimed that 11.52% of the changes in the dependent variable of the research hypothesis are explained by the independent and control variables. Autocorrelation is a violation of one of the standard assumptions of the regression model, and the Durbin-Watson statistic can be used to determine the absence of autocorrelation in the regression model. The calculated Durbin-Watson statistic (2.022), Which is between 1.5 and 2.5, indicates the absence of autocorrelation and shows the independence of the remaining error components. As can be seen in Table 3, the significance level of the t-

statistic for variable measures of earning risk \times earning smoothing is higher than the acceptable error level of 5%. Therefore, the moderating role of earning smoothing on the impact of earning risk on GDP is not confirmed.

Table 2. Results of testing the first hypothesis based on panel data and fixed effects

Variable	Coefficient	T value	Sig	St. Error	VIF
Earning risk	-0.1	-1.53	0.13	0.07	1.18
Cash flow	-0.2	-2.16	0.03	0.09	1.08
Accrual risk	-0.008	-0.16	0.87	0.05	1.14
Firm size	-0.002	-0.98	0.32	0.001	1.06
Leverage	0.03	1.64	0.1	0.02	2
Growth opportunity	-0.01	-1.36	0.17	0.007	1.2
Asset return	0.13	4.65	0	0.029	2.03
Sales growth	0.06	8.61	0	0.006	1.08
C	0.19	6.56	0	0.03	-
R-Squared	0.113704				
Adjusted R-Squared	0.107205				
F-statistic	17.49572				
Probe (F-statistic)	0.0				
Durbin-Watson statistic	2.016				

Table 3. Results of testing the second hypothesis based on panel data and fixed effects

Variable	Coefficient	T value	Sig	St. Error	VIF
Earning risk	-0.1059	0.0784	-1.349	0.1774	1.4648
Cash flow	-0.2265	0.1048	-2.1618	0.0308	1.4301
Accrual risk	0.0161	0.0541	0.2988	0.7651	1.338
Smoothing	0.0158	0.017	0.9295	0.3528	6.7349
earning risk \times smoothing	0.0184	0.176	0.1046	0.9167	4.0579
Cash flow risk \times smoothing	0.1606	0.2144	.7490	.4540	2.6041
accrual risk \times smoothing	-0.1741	0.1413	-1.2322	0.2181	7.2289
Firm size	-0.0018	0.0019	-0.9934	0.3207	1.0678
Leverage	0.0328	0.0203	1.6133	0.1070	2.0246
book value to market value	-0.0106	0.0078	-1.3623	0.1734	1.2186
Asset return	0.1338	0.0292	4.5702	0.0000	2.1261
Sales growth	0.0568	0.0067	8.4526	0.0000	1.0976
C	0.1922	0.0297	6.4551	0.0000	-
R-Squared	0.1152				
Adjusted R-Squared	0.1054				
F-statistic	11.800				
Probe (F-statistic)	0.0000				
Durbin-Watson statistic	2.022				

Conclusion and Recommendations

An efficient stock market, by facilitating the process of capital accumulation and the supply of new technologies, will improve employment and overall increase economic growth and the welfare of society. Economic growth also affects the increase in GDP and employment by increasing production and investment capacity. It is in such a situation that it can be said that the stock price index can show the direction of the economy. It is very important to note that the total stock price index alone does not necessarily indicate the efficiency of the stock market and is not considered a mirror of the country's macroeconomic performance. This index alone cannot show the prosperity or stagnation of the country's economy or industry. In other words, a correct analysis of the economic situation in the country cannot be achieved only by studying

the change in the total stock price index. Many factors, such as the state of the industry, volume of liquidity, monetary and financial variables, markets that can play the role of alternative goods for investment, etc., They can influence the stock market and raise the stock price index without increasing economic growth or GDP. The connection and impact of the risks related to earnings and capital have made the economic role of the stock markets very important against macroeconomic parameters. No doubt, removing the obstacles ahead in achieving a dynamic economy caused by the growth and development of GDP will lead to the prosperity of the capital market, the correct direction of its developments, and the compensation of the supply and demand of funds in the market. While macroeconomic variables such as GDP are not only affected by the economic and political conditions of society, the financial and capital markets also affect them. According to the capital asset valuation model, the rate of return of an asset is linearly related to the systematic risk of the market, not to the specific diversification risk of the company in the same market. Therefore, earning and capital risk factors are expected to affect any country's economy. In other words, understanding the role of earning and capital risk factors on GDP growth is particularly important.

This research aims to examine the effect of earning risk on GDP, emphasizing the feature of earnings smoothing in companies listed on the Tehran Stock Exchange. The findings of the research hypotheses test show that the earning risk cash flow measure significantly affects the GDP rate. In other words, it can be stated that the cash component of earning risk, caused by the cash accounting basis, has priority over the accrual criterion, and the GDP rate influences the cash component. The result of this research is consistent with the results Haung (2015) show that aggregated earnings that are exposed to earnings management predict GDP growth up to the next medium term. While separating earnings into accrual earnings and cash flows, operating cash flows are able to predict GDP up to the next three intermediate periods. Another result of the research hypotheses test show that the moderating role of earning smoothing on the impact of earning risk on GDP is not confirmed. In an experimental study, Hann et al. (2017) concluded that earning news conveys information about the future labor market and this information content has an impact on macroeconomic criteria in some ways. The above is even. The criterion of total earnings and the criterion of earning accruals do not have a significant effect. In their study, Nallareddy & Ognova (2016) found that the information related to accounting earnings can be used in the estimation of macroeconomic criteria, and the results of total earning and accrual items are contrary to the findings of the research of Nallareddy & Ognova (2016) In line with future research, it is suggested to examine earning risks separately in a systematic and unsystematic way. It is also suggested that the above research be studied and examined separately in different life and economic cycles.

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