

The Impact of GDP Growth and Inflation on Corporate Revenue Growth: evidence from listed companies in China

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Abstract. This study examines the impact of GDP growth rate and inflation rate on the revenue growth of nine major listed companies (e.g., Alibaba, Pinduoduo, etc.) in China from 2015 to 2023 through multiple regression analysis. It is found that GDP growth rate is significantly and positively related to firms' revenue growth, while the effect of inflation rate is not statistically significant. GDP growth rate reflects the overall performance of economic activities and is an important predictor of firms' revenue growth, whereas China's inflation rate has been relatively stable during the study period, and therefore has a weak predictive effect on revenue growth. The theoretical contribution of this study is to reveal the impact of macroeconomic factors on firms' financial performance, especially in the context of stable inflation rates. The practical implication is to help Chinese firms and investors understand the impact of macroeconomic indicators on firm performance, so that they can formulate more effective business and investment strategies to cope with market changes and minimize risks during periods of economic volatility.

1 Introduction

Today, many Chinese enterprises are no longer thriving as they enter a mild economic downturn. Economic growth in China is taking a slower path because the capital that supported the economic boom has run dry, with energy costs for manufacturing going up and its real estate market suffering, making it harder for businesses to survive as they used to [1, 2]. After a high growth rate of 7-8% during the 2010s, GDP growth fell to about 3% in 2022 and 5.2% in 2023. This slowdown has had long-term impacts on the Chinese economy in terms of diminishing domestic demand, more challenging regulatory situations, and increasing fears over global trade/Western technology exchanges. Therefore, Companies are struggling to re-create the success they have already achieved, facing challenges in maintaining profitability, expanding market share, and sustaining growth. Naturally, this has made understanding of macroeconomic indicators more critical than ever for Chinese companies and investors worldwide. These indicators offer helpful information about the health of an economy in general and how it affects various industries as far as companies and investors are concerned. For the companies, it could mean better assessing their status quo

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and development tactics, which would help them maintain their competitive edge while emerging through another economic crisis. Likewise, it can help investors develop investment strategies that align with the economic circumstances, which minimizes unnecessary risks [3].

Existing research has not yet discussed the relationship between macroeconomic indices and company performance under the Chinese background, nor has there been research that uses corporate revenue growth rate as a measure of performance level. This study uses multiple regression analysis to investigate the relationship between Revenue growth rate, GDP growth rate, and inflation rate. The primary objective of this study is to identify which of these two macroeconomic factors best forecasts a company's revenue growth and offer lessons that companies and investors could utilize in operating through economic changes.

2 Method

The research will highlight the effect of GDP growth rate and inflation rate on revenue performance indicated in 9 Chinese listed companies (Alibaba, PDD, Xiaomi, Li, Meidi, Anta, Haier, Lining, Yili) from 2015 to 2023. The year-over-year growth rate of each company is calculated using their annual revenue reports. Data on the GDP growth rate is collected from the World Bank Group, and inflation rates are gathered from Zhongjing Data [3].

This study uses a multiple regression model to examine the relationship between the revenue growth rate and the two macroeconomic indices. The revenue growth rate is the dependent variable, and the GDP growth rate and inflation rates are the independent variables. The mathematical model is developed as follows:

$$\text{Revenue_Growth_Rate} = \alpha + \beta_1 \times \text{GDPGR} + \beta_2 \times \text{INF} + \varepsilon \quad (1)$$

The revenue growth rate as a proxy for firm performance is regressed on the GDP growth rate (GDPGR) and Inflation rates (INF) (Equation 1). This equation denotes the intercept term by α , coefficients for GDP growth, and inflation rates on revenue growth by β_1 and β_2 , respectively, with an error term represented as ε . This model allows the examination of the degree to which these macroeconomic factors shed light on changes in revenue growth across firms. Through this model, this research attempts to gain insights into how exogenous economic circumstances impact the financial performance of large firms in China.

One key advantage of using multiple regression over other methods is its ability to account for the simultaneous effects of various independent variables on one dependent variable. This provides a more accurate understanding of the relationship between the variables and helps control for potential confounding factors. Multiple regression is perfect for assessing the relationship between macroeconomic factors and company performance due to how the factors could interact with each other.

$$H_0: \beta_1 \text{GDP_Growth_Rate} = 0, \beta_2 \text{Inflation_Rate} = 0 \quad (2)$$

$$H_1: \beta_1 \text{GDP_Growth_Rate} \neq 0, \beta_2 \text{Inflation_Rate} \neq 0 \quad (3)$$

The purpose of this hypothesis test is to establish if the dependent and independent variables are related. The null hypothesis H_0 States that the beta coefficient is zero, implying that the GDP growth rate and inflation rates do not contribute to predicting the revenue growth rate. The alternative hypothesis H_1 states that the beta coefficient is not equivalent to zero, meaning if there is enough evidence to show that the GDP growth rate and inflation

rates do contribute to corporate revenue growth, it is sufficient to reject the null hypothesis [4].

To test the statistical significance of the result, the p-value generated from the regression was compared to the significance level that this study set as $\alpha = 0.05$ for this study. The result is statistically significant if the α is greater than the p-value generated from the result. For data explanation, R-squared and adjusted R-squared values are used to interpret whether the independent variables are sufficient to explain the variability in the dependent variable.

3 Result

As shown in Table 1, the P-value indicates the significance of the result in the hypothesis testing. It measures the probability of the data occurrence by random chance. If the p-value exceeds the set threshold of 5% based on the level of confidence of 95%, do not reject the null hypothesis. The p-value of the GDP growth rate generated from the regression is 0.0088. This implies there is only a 0.88% chance that the scenario hypothesized in the null is true. Therefore, based on the significance level of 5%, it is sufficient to say reject the null, which is that the GDP growth rate does not contribute to predicting the revenue growth rate. The p-value of the inflation rate is 0.8699, which is significantly greater than the significance level of 5%. This indicates an 87% chance that the observed result could happen by random variation. This provides insufficient proof to reject the null hypothesis that the inflation rate correlates with company revenue growth.

Table 1. Regression analysis results.

SUMMARY OUTPUT						
Regression Statistics						
Multiple R	0.3076182					
R Square	0.09462895					
Adjusted R Square	0.07048573					
Standard Error	0.40319552					
Observations	78					
ANOVA						
	df	SS	MS	F	Significance F	
Regression	2	1.27435407	0.63717704	3.91948232	0.02404349	
Residual	75	12.1924973	0.16256663			
Total	77	13.4668514				
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	-0.2936891	0.21348316	-1.3757014	0.17300876	-0.7189694	0.13159118
GDP Growth Rate	0.06778712	0.02520238	2.68971138	0.00880964	0.01758141	0.11799282
Inflation Rate	0.01030979	0.06275317	0.16429115	0.86994391	-0.1147009	0.13532051

The F-statistic indicates the overall significance of the model, and the Significance F is the p-value associated with the F-statistic. An F-statistic value of 3.92 and a Significance F value of 0.024 signifies that at least one variable in the model helps predict the outcome. The GDP growth rate is the meaningful predictor in this case.

The R-squared value determines the proportion of variance in the dependent variable explained by the independent variable. It demonstrates the degree to which the independent

variable influences the dependent variable. The R-squared value generated from the regression says that only 9.46% of the variation in revenue growth is explained by the GDP growth rate and the inflation rate. The R-squared value adjusted for the number of predictors in the regression is even lower, standing at 7.05%. This implies the model poorly fits the data, and the variation in the GDP growth and inflation rates do not account for a large portion of the revenue growth of Chinese corporations.

The low R-squared value and low p-value displayed in the relationship between GDP growth rate and revenue growth rate illustrate a statistically significant but not strong relationship. This confirms the correlation between GDP growth rate and revenue growth rate. Still, it also implies that the variability in the revenue growth of Chinese corporations might be explained by other variables that were left out of the regression model. On the other hand, the relationship between the inflation rate and revenue growth rate reveals a low R-squared value and a high p-value. It can be concluded that the inflation rate does not participate in predicting nor explaining the trend of revenue growth rate.

4 Discussion

There are a couple of reasons why the revenue growth rate strongly correlates to the GDP growth rate and not inflation. GDP growth represents the performance of the entire economy. An increase in GDP growth often signifies increased consumption, investment, and government spending [5, 6]. A company's sales revenue is highly related to these economic activities. When consumption increases, consumers consume more products from the business [7]. When investment increases, it could substantially increase the quality of the goods and services they produce, attracting more consumption [8]. When government spending increases, it might create a better environment for the companies to generate revenue [9]. For example, delivery efficiency could primarily increase when the government invests in a new highway system, leading to cheaper and faster production. An increase in GDP is also related to increased employment levels and consumer confidence, which can lead to a rise in consumer demand that helps firms generate revenue.

Inflation does not contribute to revenue growth prediction because the inflation level in China has been relatively stable throughout the years. Inflation could only affect company performance when the inflation rate changes so drastically that it affects the consumers' purchasing power and the companies' operating costs [10, 11]. During the chosen period, 2015-2023, the inflation rate has never exceeded 2.5%, meaning the price level remained relatively stable. The inflation rate is a factor that illustrates the changes in the price level; it does not accurately reflect the growth of the economy.

5 Conclusion

This study theoretically demonstrates the impact of the two macroeconomic indices on corporate revenue growth. It confirms that the GDP growth rate, as a measure of economic activity, is a solid predictor of corporate revenue growth. However, the finding that there is no statistically significant relationship between inflation and corporate revenue growth during periods of stable inflation challenges the assumption that inflation uniformly influences corporate revenues. This study could inspire further studies on what other macroeconomic factors play a vital part in the Chinese economy and what macroeconomic factors could better explain the variability exhibited in the revenue growth of Chinese corporations.

This study's practical significance lies in its ability to provide insights for business owners in China and investors who are interested in investing in Chinese companies. By

demonstrating that the GDP growth rate significantly impacts the revenue growth rate of major Chinese companies, this study emphasizes the significance of aligning business and investment strategies with economic trends. When investing or expanding, understanding the relationship between GDP growth and companies' revenue growth rate could help investors and business owners forecast company performance, allowing them to better adapt to drastic economic changes. Investors and businesses can also adjust their strategy during anticipated periods of economic slowdown to mitigate risk. This study also highlights the minor significance inflation has on the performance of companies during periods with stable price levels. This suggests that investors and businesses do not need to prioritize the inflation rate when planning revenue goals.

While this study's research method provides valuable insights, it has certain limitations that must be acknowledged. One key limitation is that not enough variables are accounted for in the regression model, which would restrict other macroeconomic variables that could affect the revenue growth rate from exhibiting their results in the model. Additionally, company performance is also highly related to its strategy and management; neglecting these variables could lead to low R-squared values. To improve the robustness of this study, further studies could incorporate more variables that affect the revenue growth rate to capture their effect.

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