

IMPACT OF FINANCIAL AND ECONOMIC VARIABLES ON A FIRM'S GROWTH

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ABSTRACT

This study examined the relationship between a firm's revenue as a measure of growth and the firm's financial ratios and macroeconomic variables. Fifty firms from the New York Stock Exchange were chosen at random for the period from 2009 to 2022. The variables included in the study were: Earnings per share (EPS), free cash flow (FCF), debt-to-equity ratio (DER), return on assets (ROA), current ratio (CR), inflation (CPI), GDP, federal fund rate (FFR), and unemployment rate (Unempl).

The results showed that each variable was significantly related to revenue for some firms. Across firms, the percentage of relationships for each variable was low (56% or less). In particular, the percentages over firms were as follows: EPS (56%), FCF (40%), CPI (30%), GDP (30%), DER (24%), FFR (24%), Unempl (20%), ROA (20%), and CR (22%). Financial ratios showed positive effects, as well as negative relationships with growth. These findings indicated that financial ratios are not good growth indicators.

INTRODUCTION

Growth is crucial to the long-term survival of a business. It helps to acquire assets, attract new talent, and fund investments. It also drives business performance and profit. Studies in the literature have examined factors related to firm growth, measured by growth in employment, earnings growth, or sales growth. In terms of firm characteristics, the factors analyzed were firm size, innovation, dividend payout, age, liquidity ratio, bank financing, current ratio, debt ratio, and return on assets. However, most studies were in emerging markets, and none considered the effect of financial ratios and macroeconomic variables on firm growth.

Studies in the literature have predominantly used regression analysis on time series data pooled over firms and time without considering serial correlations and non-stationarity, which could affect the accuracy of the results (Granger & Newbold, 1974; Nason, 2006; Wei, 2006). Besides, the effect of an independent variable in regression, as measured by its regression coefficient, is over all the firms and time and does not give information on an individual firm's dynamic behavior.

One must conduct a time series analysis on individual firms to gain information on the dynamics of individual firms. Results on individual firms are helpful for the investor. They will ascertain the importance of a given variable to a given firm and across firms in the sample.

This study uses a time series analysis of individual firms in a random sample of fifty New York Stock Exchange firms. We examine the impact of financial ratios and macroeconomic variables on a firm's growth as measured by the firm's revenue. This study is a significant addition to the literature, which lacks studies regarding the impact of financial ratios and macroeconomic variables on the growth of individual firms in a highly developed economy. Also, the study uses the proper time series analysis, which corrects for serial correlation and non-stationarity in the time series data.

REVIEW OF LITERATURE

Avdullahi & Ademi (2020) showed that firm size (measured as the number of employees) was positively related to growth in terms of sales for small and medium enterprises. The study used regression analysis and a sample size of 600 SMEs in Kosovo.

Dalgıç & Fazlıoğlu (2021) showed that innovation of Turkish SMEs had a positive impact on firm growth in terms of sales and number of employees. Product/service innovation had the most significant effect on growth, followed by process innovation and R&D efforts. Firms at the higher end of the growth distribution benefited more from innovation than firms at the lower end.

Kildaire et al. (2022) investigated the effects of real GDP and dividend payout ratio as independent variables on the earnings growth of firms listed on the Johannesburg Stock Exchange (JSE). Contrary to previous studies, results showed no relationship between the independent variables and earnings growth.

Megaravalli and Sampagnarob (2018) studied the impact of firm age and liquidity ratio on firm growth for manufacturing firms in India. Results indicated that the liquidity ratio had a positive effect on growth. Firm age, however, had a negative impact on firm growth. Younger firms grow faster than older or established firms.

Nuševa et al. (2021) reported on the effects of export, size, capital turnover, revenue cycle, current ratio (liquidity ratio), debt ratio, and return on assets on growth (changes in sales) of coffee processing companies in Serbia. Results of panel data analysis for 2015 – 2018 showed that size, revenue cycle, and current ratio were negatively related to growth. On the other hand, return on assets was positively related to growth.

In a recent study in Croatia, Srhoj (2022) reported on predicting high growth firms (HGF) (measured as employment or sales) from the firm's financial ratios. It was found that the firm's effectiveness in using assets to generate profits, EBITDA margin, debt ratio, equity-to-debt ratio, and return on assets was associated with a high-growth firm status. However, the prediction was modest, and the conclusion was that financial ratios did not provide a good prediction of HGF

status. It was suggested that better predictions could be obtained by incorporating nonfinancial variables.

Braunerhjelm and Thulin (2023) examined the relationship between explorative or exploitative innovation and firm employment growth. Explorative innovation was a dummy variable: “equal one if a firm applies for a patent in year t within a patent class where it has not applied for a patent for the last five years, zero otherwise.” Exploitative innovation was a dummy variable: “equal one if a firm applies for a patent in year t in a patent class where it has already applied for a patent for the last five years, zero otherwise.” Patent data were obtained from the Swedish register from 1997 to 2012. Regression analysis showed that both innovations had a positive relationship with employment growth. However, explorative innovation had a more pronounced effect on employment growth.

Khan et al. (2021) investigated the impact of the stock market and bank development on the growth of firms listed on the Pakistan Stock Exchange for the 2014-2019 period. Firm growth was measured by the natural log of total assets. Stock market development was measured by capitalization to GDP ratio and banks’ development by credit to the private sector to GDP. Multiple linear regression was used for the analysis, with the firm’s profitability, interest, and inflation as control variables. The analysis showed a positive relationship between stock market development and firm growth. However, a negative relationship existed between bank development and firm growth. The control variables were negatively associated with firm growth.

Ullah and Wei (2017) examined the relation between firm growth (sales growth and employment growth) and bank financing in the transition economies of thirty East European and Central Asian countries. The study period was from 2002 to 2014. Results of regression analysis showed that firms using formal bank finance grew faster than firms financed by informal sources. These results held when controlling for GDP, inflation, and firm characteristics such as age, size, and industry type (manufacturing, service).

In a similar study (in the period 2009-2011) of firms in Eastern European and Central Asian countries with transition economies, Brzozowski (2019) reported that bank credit or loan from a financial institution had a positive effect on the firm’s sales growth and a negative impact on its employment growth.

In a study on factors affecting firm sales growth, Hermelo and Vassolo (2007) showed, using regression analysis, that investing in new technology, diversifying from local towards national and international markets, and sales return had a positive impact on the growth of small and medium-sized firms in Tucumán, Argentina.

Peljko et al. (2017) examined how constructs representing an entrepreneur’s creative abilities impact firm growth in sales and number of employees. A structural model was used for the analysis. Data were from Serbia, the USA, and Slovenia combined. Results of the analysis showed that the entrepreneur’s creative abilities, in the case of the USA and Slovenia, were positively related to firm growth. There was no relationship between an entrepreneur’s creative skills and firm growth in the case of Serbia.

Zhu et al. (2021) studied the impact of R&D on firm sales growth in China's manufacturing industry from 2012-2017. Results of panel quantile regression showed that R&D positively affected firm growth. The impact was greater for private firms than for state-owned firms across all quantiles. In addition, the R&D impact was greater for non-SME firms than for SMEs. Also, R&D had a more significant effect on High-tech firms.

Using cross-sectional data, Kiani et al. (2012) examined the effect of financial factors on firm sales growth in Taiwan for the years 1997 and 2003. Principle component analysis was used on 18 financial variables, grouped into five extracted principal components or factors: short-term liquidity, return on investment, long-term liquidity, firm size, and capital turnover. Sales growth (dependent variable) was regressed on the five factors. Results of the regression analysis for the year 1997 showed that return on investment was positively related to firm growth, while long-term solvency was negatively associated with firm growth. Also, smaller firms tended to grow faster than larger firms. However, results for the year 2003 showed that larger firms grew faster than smaller firms, and sales growth was positively related to short-term liquidity. It was suggested by the authors that “firms that finance internally or do not rely too heavily on indebtedness may end up growing slower during boom periods, but they are the ones that survive and outperform after the bust.”

Wang et al. (2022) examined the effect of financial constraints on firm growth. Growth was measured by the average sales growth rate over the past three years. Financial constraint was a dummy variable that equaled one if the firm was a rejected borrower or discouraged borrower and zero otherwise. The data came from the World Bank World Business Environment Survey (WEBS) dataset. Multiple linear regression analysis was used to control for firm size, age, past sales, exporter, foreign and government ownership, and manufacturing and region dummies. Results showed that financial constraints had a negative impact on firm growth. The impact was more substantial in the case of small firms. In addition, there was no difference in the impact of financial constraints between state-owned and non-state-owned firms.

Lee (2023) examined the effects of firm characteristics on firm sales growth in the Czech Republic, Hungary, and Poland. Data were obtained from the World Bank's Enterprise Surveys. Regression analysis was performed where the dependent variable was growth, and the independent variables were firm age, size, foreign-owned and government-owned firms, and the firm's financial condition, measured by the number of loans it has obtained from financial institutions and the share of external funds. Results differed over the three countries. Firm age and size, in the case of Poland, had significant negative relationships with growth. However, there was no significant relationship in the case of the Czech Republic and Hungary. In addition, a firm's excess to external financing had a negative impact on growth.

Elston and Weidinger (2023) examined the relationship between firm size and firm growth in the Middle East and North African (MENA) region. Regression results showed that, in agreement with previous studies on firms in the West, smaller firms grew faster than larger firms. However, this was not the case for firms in the energy, telecommunication, and manufacturing sectors, where firm size and growth were unrelated.

Rabinovich (2023) examined the effects of advertising, R&D, and capital expenditure on sales growth of US nonfinancial firms for the period 1979-2018. Using quantile regression and controlling for the age and size of the firm, it was found that R&D had a positive effect on growth in sales in the case of high-growth firms and a negative impact on the rest of the firms. Advertising had a positive effect on growth in sales for all firms except the top decile. Capital expenditure had a positive impact on the growth of sales in all firms.

Joensuu-Salo and Matalamäki (2023) investigated the effect of the digital capability of a firm and firm size on firm growth and performance in Finnish SMEs. Using structural equation modeling, results showed that digital capability had a positive relationship with firm growth and firm performance. Also, firm size had a positive relationship with firm performance but did not affect firm growth.

METHOD

Data

Quarterly data (using Macrotrends) of free cash flow (FCF), debt-to-equity ratio (DER), current ratio (CR), earnings per share (EPS), return on assets (ROA), and total revenue (REV) (defined as the amount of money, in millions of US dollars, a company receives from its customers in exchange for the sales of goods or services) were obtained for each of fifty firms chosen at random from all firms listed on the New York Stock Exchange for the period 2009 to 2022. In addition, quarterly data on inflation (CPI), unemployment rate (Unempl), GDP in Millions, and federal fund rate (FFR) were obtained using the Saint Louis Federal Reserve economic database.

Time series analysis

In this study, we use the transfer function approach in time series to relate a stationary input time series to a stationary output time series. In general, the model relating a stationary output series y_t to a stationary input series x_t is expressed as

$$y_t = v(B) x_t + a(t), \tag{1}$$

where $a(t)$, is the residual and

$$v(B) = w(B)B^c/d(B).$$

Here, $w(B) = w_0 - w_1B - \dots - w_sB^s$

$$d(B) = 1 - d_1B - \dots - d_rB^r.$$

B is the backshift operator,

and c represents the time delay (or lag) until the input variable x_t produces an effect on the output variable y_t .

We assume the input series follows an ARMA process, $\frac{\varphi(B)}{\theta(B)} x_t$. The function $v(B)$ with its lags is determined from the cross-correlations between the white noise input series $\frac{\varphi(B)}{\theta(B)} x_t$ and the filtered output series $\frac{\varphi(B)}{\theta(B)} y_t$ (Wei, 2006).

Once $v(B)$ is identified, one can express a_t in Eq. (1) as

$$a(t) = y_t - v(B) x_t \quad (2)$$

and identify the appropriate time series model for Eq. (2). With a_t known, one can determine the final model in Eq. (1).

For this analysis, the independent variables (FCF, DER, CR, EPS, ROA, Unempl, GDP, CPI, and FFR) and the dependent variable (revenue) were tested for stationarity using the Phillips-Perron test and the augmented Dickey-Fuller test. Where a variable was not stationary, we used its first difference, which was stationary. Thus, all variables that entered the model were stationary. The backward elimination variable selection technique (Montgomery et al., 2001) was used so that the final model included only the independent variables significantly related to the dependent variable.

RESULTS AND DISCUSSION

Table 1 presents the time series models for each of the 50 firms. Each model is from equation (1) of the time series analysis. Table 2 summarizes the results of the analysis presented in Table 1. The results in Table 2 show that EPS was related to revenue in 28 firms or 56%. The relationship was positive in 23 firms (46%). The next variable to show a relationship with revenue was the GDP. Fifteen firms, or 30%, showed a positive relationship with the firm's revenue, as expected. FCF had a significant relationship with revenue in 20 (40%) firms. Eighteen percent of the firms had a positive relationship, and 22% had a negative relationship. Fifteen firms (30%) showed a significant relationship between CPI and revenue. The relationship was positive in 9 (18%) firms and negative in 6 (12%) firms. DER was significantly related to revenue in 12 (24%) firms. Six firms had a positive relationship, and six firms had a negative relationship. Twenty-two percent of the firms showed a significant relationship between CR and revenue. The relationship was positive in 8% of the firms and negative in 14%. There was a significant relationship between FFR and revenue in twenty-four percent of the firms. This relationship was positive in 10% of the firms and negative in 14%. Twenty percent of the firms showed a significant relationship between unemployment and revenue. The relationship was negative in 16% of the firms and positive in only 4%. Return on assets was significantly related to revenue in 20% of the firms. The relationship was positive in 8 (16%) of the firms and negative in 2 (4%).

The above results indicate that all the financial ratios and the macroeconomic variables had a significant relationship with revenue for some of the firms. No variable had a predominant relationship with revenue over the firms. Earnings per share were the most dominant among the variables and had a relationship in only 56% of the firms. The relationship was mostly positive. The relationship between a variable and revenue across the firms was as follows: EPS (56%), FCF (40%), CPI (30%), GDP (30%), DER (24%), FFR (24%), Unemployment (20%), ROA (20%), and CR (22%). Relationships were positive for GDP, primarily positive for EPS, and mostly negative for unemployment. For all other variables, the impact on growth was positive or negative.

From the investor's perspective, these results are not encouraging because no financial variable was a strong indicator of the firm's revenue or growth across the firms. This is in agreement with the study by Srhoj (2022) in a developing economy in which the conclusion was that financial ratios did not provide a good prediction of growth.

Earnings per share was positive in 44% of the firms. This is expected because EPS indicates how much money a company makes, and a higher EPS can suggest growth.

In 30% of the firms, GDP was positively related to growth. This implies that economic growth, as measured by the GDP, enhances growth in some firms, but the majority are not affected.

The effect of inflation on growth can be positive or negative. This can be explained by the realization that, at times, consumer spending remains on the increase in the face of inflation, which can lead to a positive relationship between growth and inflation. On the other hand, if consumer spending declines with inflation, this could lead to a negative relationship between inflation and growth. The current ratio ($CR = \text{current assets}/\text{current liabilities}$) can impact growth positively or negatively. Liabilities can help finance the company, which can help the company grow. This can lead to a negative relationship between growth and CR since an increase in liability would decrease CR while increasing growth. Also, increased assets would increase CR and revenue, leading to a positive relationship between CR and Growth. The debt-to-equity ratio can be positively or negatively related to growth. Too high a debt can be a signal of poor business prospects and growth. However, debt can enable the firm to grow by securing finance such as loans for investment. Lowering FFR rates makes borrowing money cheaper. This encourages consumer and business spending and investment and can lead to growth, translating into a negative relationship between FFR and growth. Increasing rates can, on the other hand, benefit bond buyers, lenders, and savers. This can contribute to growth for some firms. Hence, FFR and growth can also have a positive relationship. Unemployment is, as expected, negatively related to growth. When businesses are down, firms lay off workers, and unemployment increases. Return on asset is expected to have a positive relationship with growth, but the relationship can be negative depending on the change in net income relative to assets. Free cash flow can be positively related to growth. However, a company can have earned revenue and low to negative cash flow since an increase in revenue does not mean that the company has received cash immediately.

From the above discussion, financial ratios can have a positive or negative effect on growth, which agrees with the results. Also, in most firms, financial ratios did not affect growth. As such, they are not good indicators of growth.

CONCLUSION

In this study, we used time series analysis to investigate the impact of financial ratios and macroeconomic variables on the growth of business firms, as measured by their revenue. The independent variables considered in the study included Earnings per share (EPS), free cash flow (FCF), debt-to-equity ratio (DER), return on assets (ROA), current ratio (CR), inflation (CPI), GDP, federal fund rate (FFR), and unemployment rate (Unempl). The findings of the investigation

revealed that the relationship between any given variable and growth was 56% or less across firms. The percentages across firms were EPS (56%), FCF (40%), CPI (30%), GDP (30%), DER (24%), FFR (24%), Unempl (20%), ROA (20%), and CR (22%). The sign of the relationship between a variable and growth was predominantly positive for EPS, positive for GDP, and mostly negative for unemployment. The impact of other variables turned out to be inconclusive. These results indicate that, in general, financial ratios are not good indicators of firm growth.

TABLE 1. EQUATIONS RELATING THE DEPENDENT VARIABLE (REVENUE) TO THE INDEPENDENT VARIABLE(S) FOR DIFFERENT COMPANIES

Company Code	Dependent Variable	Independent Variable(s)	$a_t = f(e_t)$
AEO	Revenue(1) _t	Mean EPS _t FCF _t CR _t DER _t CPI _t 17.62 144.38 -0.209 -105.24 -116.74 -33.13	$a_t = e_t / (1 - \phi_4 B^4)$ $\phi_4 = 0.974$
AES	Revenue(1) _t	Mean FCF _t CPI(1) _t -109.72 0.191 130.66	$a_t = e_t / (1 - \phi_1 B^1 - \phi_2 B^2 - \phi_3 B^3)$ $\phi_1 = -0.849$ $\phi_2 = -0.746$ $\phi_3 = -0.717$
AIV	Revenue _t 167.32	Mean EPS _t DER(1) _t ROA _t 98.17 72.04 -8.07	$a_t = e_t / (1 - \phi_1 B^1 - \phi_4 B^4)$ $\phi_1 = 0.433$ $\phi_4 = 0.508$
AT&T	Revenue(1) _t	Mean CPI(1) _t GDP(1) _t CR _t EPS _t -8819.0 -3617.0 0.013 6104.5 -2236.1 FCF ROA 0.461 456.54	$a_t = e_t / (1 - \phi_1 B^1)$ $\phi_1 = -0.0086$
AVD	Revenue(1) _t	Mean FFR _t DER(1) _t EPS _t -0.188 -3.462 38.98 30.76	$a_t = e_t / (1 - \phi_4 B^4)$ $\phi_4 = 0.758$
ALV	Revenue _t	Mean FCF _t EPS _t 1610.3 5.01 280.84	$a_t = e_t / (1 - \phi_1 B^1)$ $\phi_1 = 0.02879$
BLX	Revenue _t	Mean EPS _t EPS _{t-1} 34.51 13.23 30.18	$a_t = e_t / (1 - \phi_1 B^1)$ $\phi_1 = 0.635$
BNS	Revenue(1) _t	Mean FFR _t CR _t EPS _t EPS _{t-1} 2154.2 236.39 -2934.2 1443.3 -777.84	$a_t = e_t / (1 - \phi_1 B^1)$ $\phi_1 = -0.222$
BXP	Revenue(1) _t	Mean Unempl(1) _t Unempl(1) _{t-1} CR(1) _t CR(1) _{t-1} 5.69 -8.41 8.61 -5.66 -4.47	$a_t = e_t / (1 - \phi_1 B^1)$ $\phi_1 = -0.469$
KO	Revenue(1) _t	Mean CPI(1) _{t-1} CPI(1) _{t-2} GDP(1) _{t-1} DER(1) _{t-1} 105.23 334.55 -340.87 0.00208 -823.57 ROA(1) _t 107.73	$a_t = e_t / (1 - \phi_4 B^4)$ $\phi_4 = 0.862$

CACI	Revenue(1) _t	Mean	CPI(1) _t	Unempl(1) _t	DER _t	DER _{t-2}	$a_t = e_t / (1 - \varnothing_1 B^1)$ $\varnothing_1 = 0.693$	
		67.61	15.63	6.29	56.84	-108.85		
CDE	Revenue _t	Mean	Unempl(1) _{t-1}	EPS _{t-4}			$a_t = e_t / (1 - \varnothing_1 B^1)$ $\varnothing_1 = 0.585$	
		180.93	-5.23405	8.09				
DEI	Revenue(1) _t	Mean	Unemp(1) _{t-1}	FFR(1) _t	FFR(1) _{t-1}	FCF _t	$a_t = e_t / (1 - \varnothing_2 B^2)$ $\varnothing_2 = -0.196$	
		1.56	-2.402	-6.76	13.92	-0.0062		
DXC	Revenue(1) _t	Mean	DER(1) _t				$a_t = e_t / (1 - \varnothing_1 B^1)$ $\varnothing_1 = 0.063$	
		3.77	-563.30					
EOG	Revenue(1) _t	Mean	Unempl(1) _{t-1}	EPS _t	FCF(1) _t		$a_t = e_t / (1 - \varnothing_2 B^2)$ $\varnothing_2 = -0.338$	
		-32.87	-377.19	133.42	0.271			
ENR	Revenue(1) _t	Mean	EPS _{t-1}	FCF _{t-3}	FCF _{t-4}		$a_t = e_t / (1 - \varnothing_1 B^1 - \varnothing_2 B^2)$ $\varnothing_1 = -0.263$ $\varnothing_2 = -0.602$	
		32.78	-48.14	0.437	-0.467			
EQC	Revenue(1) _t	Mean	DER(1) _{t-2}	FCF _t			$a_t = e_t / (1 - \varnothing_1 B^1 - \varnothing_2 B^2 - \varnothing_3 B^3)$ $\varnothing_1 = -0.949$ $\varnothing_2 = -0.776$ $\varnothing_3 = -0.616$	
		2.49	113.64	-0.0086				
FOR	Revenue(1) _t	Mean	GDP(1) _{t-1}	Unempl(1) _t	FCF _t		$a_t = e_t / (1 - \varnothing_4 B^4)$ $\varnothing_4 = 0.514$	
		-4.027	0.000091	-9.12	-0.082			
FTK	Revenue _t	Mean	EPS _t				$a_t = e_t / (1 - \varnothing_1 B^1 - \varnothing_4 B^4)$ $\varnothing_1 = 0.243$ $\varnothing_4 = 0.616$	
		43.56	12.34					
GS	Revenue _t	Mean	FFR(1) _t	FFR(1) _{t-1}	EPS _t	FCF _{t-4}	ROA _t	$a_t = e_t / (1 - \varnothing_1 B^1 - \varnothing_2 B^2)$ $\varnothing_1 = 0.510$ $\varnothing_2 = -0.446$
		6184.9	2714.2	-2777.0	226.48	-0.043	2306.1	
GSL	Revenue(1) _t	Mean	CPI(1) _{t-2}	FFR(1) _{t-5}	FFR(1) _{t-6}	CR(1) _t		$a_t = e_t / (1 - \varnothing_1 B^1)$ $\varnothing_1 = 0.352$
		0.157	4.17	4.91	23.02	8.30		
		ROA(1) _t						
		0.679						
HOV	Revenue(1) _t	Mean	EPS _{t-2}	FCF _{t-1}	ROA _t			$a_t = e_t / (1 - \varnothing_4 B^4)$ $\varnothing_4 = 0.941$
		11.89	0.804	-0.130	-1.863			

IPI	Revenue(1) _t	Mean	GDP(1) _{t-2}	EPS _t		$a_t = e_t / (1 - \theta_1 B^1 - \theta_2 B^2)$ $\theta_1 = -0.330$ $\theta_2 = -0.413$		
KMB	Revenue _t	Mean	EPS _t			$a_t = e_t / (1 - \theta_4 B^4)$ $\theta_4 = 0.560$		
MRO	Revenue _t	Mean	FCF _{t-2}			$a_t = e_t / (1 - \theta_1 B^1)$ $\theta_1 = 0.932$		
MTW	Revenue(1) _t	Mean	CPI(1) _t	FCF _{t-4}		$a_t = e_t / (1 - \theta_1 B^1)$ $\theta_1 = -0.455$		
NOG	Revenue _t	Mean	CPI(1) _t	GDP(t) _{t-3}	FFR(1) _{t-1}	ROA(1) _t	$a_t = e_t / (1 - \theta_1 B^1 - \theta_3 B^3)$ $\theta_1 = 0.452$ $\theta_3 = 0.547$	
NRG	Revenue(1) _t	Mean	GDP(1) _t	EPS _t			$a_t = e_t / (1 - \theta_1 B^1)$ $\theta_1 = -0.587$	
NSC	Revenue(1) _t	Mean	CPI(1) _{t-1}	GDP(1) _{t-1}	FFR(1) _{t-2}	DER(1) _{t-2}	$a_t = e_t / (1 - \theta_4 B^4)$ $\theta_4 = 0.527$	
ONTO	Revenue(1) _t	Mean	GDP(1) _{t-3}	FFR(1) _{t-3}	CR _t	CR _{t-1}	$a_t = e_t / (1 - \theta_1 B^1)$ $\theta_1 = 0.100$	
PBI	Revenue(1) _t	Mean	CPI(1) _t	GDP(1) _t	EPS _{t-3}		$a_t = e_t / (1 - \theta_1 B^1 - \theta_2 B^2)$ $\theta_1 = -0.532$ $\theta_2 = -0.363$	
PRO	Revenue(1) _t	Mean	GDP(1) _{t-1}	CR _{t-1}	EPS(1) _{t-1}	FCF _t	$a_t = e_t / (1 - \theta_1 B^1)$ $\theta_1 = -0.132$	
PYX	Revenue _t	Mean	CPI(1) _t	Unempl(1) _{t-2}	CR _{t-4}	EPS _t	ROA(1) _{t-3}	$a_t = e_t / (1 - \theta_4 B^4)$ $\theta_4 = 0.795$
TEL	Revenue _t	Mean	CPI(1) _{t-1}	FFR(1) _{t-1}	CR _t			$a_t = e_t / (1 - \theta_1 B^1)$ $\theta_1 = 0.463$

ABM	Revenue(1) _t	Mean	CPI(1) _t	Unempl(1) _{t-2}	FCF _{t-1}	ROA(1) _t	$a_t = e_t / (1 - \theta_1 B^1 - \theta_2 B^2 - \theta_3 B^3)$ $\theta_1 = -0.682$ $\theta_2 = -0.640$ $\theta_3 = -0.720$
		10.68	48.50	-20.91	-0.340	14.72	
AMG	Revenue(1) _t	Mean	GDP(1) _{t-1}	EPS _t	EPS _{t-1}		$a_t = e_t / (1 - \theta_2 B^2)$ $\theta_2 = 0.388$
		5.19	0.000051	7.02	-7.81		
TK	Revenue _t	Mean	DER _t	EPS _{t-2}	FCF _t		$a_t = e_t / (1 - \theta_2 B^2)$ $\theta_2 = -0.397$
		0.165	-0.076	0.087	0.999		
TRV	Revenue(1) _t	Mean	CPI(1) _{t-1}	GDP(1) _{t-1}	FCF(1) _t		$a_t = e_t / (1 - \theta_1 B^1)$ $\theta_1 = -0.660$
		-1.32	34.91	0.00071	0.0338		
UTL	Revenue _t	Mean	EPS _t				$a_t = e_t / (1 - \theta_4 B^4)$ $\theta_4 = 0.611$
		83.40	45.33				
TPR	Revenue _t	Mean	GDP(1) _{t-1}				$a_t = e_t / (1 - \theta_1 B^1 - \theta_4 B^4)$ $\theta_1 = 0.708$ $\theta_4 = 0.992$
		1154.8	0.00042				
BANC	Revenue(1) _t	Mean	DER(1) _t				$a_t = e_t / (1 - \theta_1 B^1)$ $\theta_1 = -0.324$
		1.69	-6.549				
BK	Revenue _t	Mean	CPI(1) _t	EPS _t			$a_t = e_t / (1 - \theta_1 B^1)$ $\theta_1 = 0.948$
		3899.7	-222.52	749.82			
BLK	Revenue(1) _t	Mean	CPI(1) _{t-1}	CPI(1) _{t-2}	GDP(1) _{t-1}	FFR(1) _t	$a_t = e_t / (1 - \theta_1 B^1)$ $\theta_1 = -0.370$
		-27.07	143.81	-209.93	0.00045	-161.80	
			DER(1) _{t-1}	FCF _t			
		149.20	0.078				
BRFS	Revenue(1) _t	Mean	EPS _t	FCF _{t-1}			$a_t = e_t / (1 - \theta_1 B^1)$ $\theta_1 = -0.493$
		71.12	1013.1	-0.530			
BLDR	Revenue(1) _t	Mean	Unempl(1) _{t-3}	EPS(1) _t	FCF(1) _t		$a_t = e_t / (1 - \theta_1 B^1)$ $\theta_1 = 0.313$
		79.45	-93.53	441.40	-0.379		
BMY	Revenue(1) _t	Mean	Unempl(1) _t	Unempl(1) _{t-8}	DER _t		$a_t = e_t / (1 - \theta_1 B^1)$ $\theta_1 = -0.662$
		-1081.8	346.64	-1008.3	808.19		

BX	Revenue _t	Mean	FFR _t	EPS _t	ROA _t	$a_t = e_t / (1 - \phi_1 B^1)$ $\phi_1 = 0.781$
		1409.5	-1508.5	912.18	75.32	
CLW	Revenue(1) _t	Mean	GDP(1) _{t-4}	CR(1) _{t-1}		$a_t = e_t / (1 - \phi_1 B^1)$ $\phi_1 = 0.002$
		-0.066	0.0000495	-33.57		
CNX	Revenue _t	Mean	CR _t	EPS _t		$a_t = e_t / (1 - \phi_2 B^2 - \phi_4 B^4)$ $\phi_2 = 0.260$ $\phi_4 = 0.599$
		509.51	244.09	159.07		
CBU	Revenue(1) _t	Mean	FFR(1) _{t-1}			$a_t = e_t / (1 - \phi_1 B^1)$ $\phi_1 = 0.043$
		1.63	5.63			

The symbol (1) refers to the first difference.

TABLE 2. VARIABLES THAT WERE SIGNIFICANTLY RELATED TO GROWTH, AS A PERCENT ACROSS FIRMS

Variable	Positive relationship	Negative relationship
EPS 28 (56%)	23 (46%)	5(10%)
GDP 15 (30%)	15 (30%)	0
CPI 15 (30%)	9(18%)	6(12%)
CR 11 (22%)	4(8%)	7(14%)
DER 12 (24%)	6 (12%)	6(12%)
FFR 12 (24%)	5 (10%)	7(14%)
Unempl 10 (20%)	2 (4%)	8(16%)
FCF 20 (40%)	9(18%)	11(22%)
ROA 10 (20%)	8(16%)	2 (4%)

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