SUSTAINABLE GROWTH OF NON-FINANCIAL FIRMS: AN EMPIRICAL EXAMINATION OF EMERGING ECONOMIES

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ABSTRACT

The classic model of sustainable growth presented by Higgins is extensively used in accounting and finance research. This research empirically examines this model which was suggested to be underestimated in the existing literature. The investigation was performed using data from 2000 to 2015 from seven emerging countries. To find out the mean difference in growth between secondary equity issuing firms and non-issuing firms, we used an independent sample t-test. To identify the factors affecting differences in sustainable growth and realized growth, regression analysis was performed and a panel of seven countries for sixteen years data was used to estimate the panel regression. The study found the Higgins' model to be underestimated. One of the main factors of underestimation of the model was found to be the secondary equity issue. This factor was observed to be significant in the case of five countries i.e. Pakistan, India, Korea, Indonesia and Brazil while the same was found insignificant in Turkey and China. Also during the examination, firm-specific factors that are important for the underestimation of the SGR (Sustainable Growth Rate) model were detected which include leverage and size, whereas dividend policy and profitability gave mixed results. Our study suggests that firms with secondary equity issues are more likely to have sustainable growth than firms not having secondary equity issues.

Keywords: *Sustainable Growth; Higgins' Model; Emerging Economies; Random Effect Model.*

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INTRODUCTION

Future goals' setting regarding the financial process and activity is done by using the concept of financial planning. Firms can use long term financial planning, and based on the sustainability of the firm, results of such planning are expected in the future. Literature that focuses on the financial aspects has developed a relationship between the growth of an organization and financial planning (Faboozi, 2003). To achieve financial goals, policies must be established and the finance manager may face critical situations while making policies for the future. It is a common practice for a finance manager to set a higher goal for the growth rate of a firm but unfortunately, excessive growth rate creates financial misery for businesses. If a firm fails to manage its growth rate it leads them to become a burden, facing high costs with financial losses which ultimately reduces the share price because of its negative image in the market (Fonseka et al., 2012). It can be stated that at a certain level growth rate helps a firm and beyond that, it starts showing a negative impact on the firm (Higgins, 1977).

To find the value of a firm or investment from a financial perspective, the growth rate is the most important factor and it can be obtained by dividing earning and per-share price. To compute this estimation in the perspective of corporate finance the model of Higgin (1977;1981) has been used more frequently. This model contrasts with the financial performance which is consequential of decision making at an internal level like the rate of retention and return on equity whereas the model of Gordon (1962) has been used in the perspective of assets price (price is established by participants of the market) (González et al., 2012; Firer, 1995; Feng et al., 2020).

The model of growth rate at the sustainable level has been proposed by Higgin (1977; 1981), where he assumed that an organization or firm can create their new funds by only using external financing i.e., issuing debt or by using internal financing i.e. firm's retained earnings but it cannot be generated by new equity issuance. Conversely, he also undertook the ratio of constant leverage in his theory but the notion has been criticized by several researchers like Ashta (2008); Ulrich and Arlow (1980); Bivona (2000). On the other hand, Platt et al. (1995) show support to the concept of Higgins for using constant leverage and added that if the firm is facing financial distress and cannot use external financing due to the existing burden of debt they can use the assumption of constant leverage. Additionally, Higgins' (2008) has introduced an open debate based on the theoretical assumption of financial growth to use external financing (debt) and debated that when an organization does not raise funds by new issuance of equity then the

financial growth can be ascertained by using either new borrowing or through retained earnings, while both come under the umbrella of internal financing.

The ratio of constant leverage should be maintained by the firm, an increase in owner equity by one dollar increases debts by leverage ratio. Thus, Higgins (2008; 1977) proves that the growth of sales is equal to the estimated rate of growth with the assumption that of the constant leverage ratio and that the firm has no new equity finance.

$$g = \frac{\Delta S}{S} = \frac{b \times RoE}{1 - b \times RoE} = P \times T \times L \times (1 - D)$$

where g = sustainable growth rate, b = fraction of retained earnings not distributed as a dividend, S = Sales, P is profit margin, L is Asset/Equity, T is Asset turnover, and D is the Dividend Payout.

From the above discussion, it can be concluded that Higgins' rate of sustainable growth only deals with external debt and internal financing. Frameworks of Li and Wang (2018); Higgins (1977) and Chen et al. (2013) validate a firm's use of equity or external debt and mark the derivation of the rate of sustainable growth

$$g(t) = \frac{b \times RoE}{1 - b \times RoE} + \frac{\gamma \times \Delta n \times \frac{P}{E}}{1 - b \times RoE}$$

Where γ is the degree of market imperfection, Δn is the number of shares of new equity issued, P is the price per share of new equity issued and E represents the total equity.

Thus, a reviewed model to measure the rate of sustainable growth has one more unique term that contributes to the model positively i.e., issuance of new equity established by Chen et al. (2013). Consequently, Chen et al (2013) prove that the model of Higgins (1977; 2008) was not complete as it does not contain the factor of new equity to measure the growth rate. But Chen et al (2013) have not conducted an empirical study to test the Higgin model to prove if it is either underestimated or not. The focus of Chen et al (2013) study was to recognize the most optimized rate of growth in the existence of dividend payout procedure, to achieve their goal they studied optimal growth rate by joint optimization and ratio of optimal payout. Additionally, Chen et al (2013) also provide evidence of having divided per share specification error when using a stochastic rate of growth. Thus, to fill the research gap, the current study focuses on the investigation of the understated model of Higgins for emerging economies (Escalante et al., 2009; Barrett, 2012; Arora et al., 2018).

LITERATURE REVIEW

Higgins (1977) used the environment of a discrete-time period to argue “how much growth a firm can afford?” In this context, the growth model is described below by using mathematical tools:

$$g(t) = \frac{b \times RoE}{1 - b \times RoE}$$

This can be reduced to $g(t) = P \times T \times L \times (1 - D)$. To execute this model, Higgins used data of US firms from the year 1974 and established that the rate of growth required i) value of asset turnover and value of profit, ii) appropriate long-run target of leverage policies, and dividend. The above discussion can be concluded that he proposed that the growth of the firm can only be achieved by internal financing i.e., constant dividend policy, constant leverage, a constant margin of profit and no financing from outside.

The research of Higgin’s (1977) has further been extended by Johnson (1981) by showing the difference between long term liabilities and current liabilities in a state of inflation. Johnson studied a case study where the nominal sales varied the level of current liabilities and long term liabilities remain the part of the equity book value. The above-discussed model of Johnson (1981) extended the model of Higgin’s (1977) sustainable growth rate. She further added that the actual rate of sustainable growth can react inversely with the inflation rate as it is independent.

The argument of Johnson (1981) has been undertaken by Higgins (1981) to clear the difference between the two views. The main objective of this reply was to explain the impact of inflation when measuring leverage on the rate of sustainable growth in an economic situation. Higgins paid attention to use historical cost to equity when there was a presence of inflation in order to measure the leverage. He further added that the rate of sustainable growth does not affect uniform inflation.

Another issue raised by Arlow and Ulrich (1980) in their analysis highlighted the problem of beginning and ending equity and assets. They stated that the turnover of assets has an indirect relationship with the debt to equity ratio and a direct relationship with sales. On the contrary, Platt et al. (1995) only consider the balance sheet to conduct their analysis. Similarly, Platt et al. (1995) agreed to the assumption of Higgins’ constant leverage and stated that when an organization is financially unstable and have a constraint of using new debt because of the prevailing burden of debt, in such situation model of Higgin can be practical. Their study also

indicated two versions of the model of sustainable growth in the situation of firm financial instability. The model of SGR derived by them shows how to grow by not reducing the firm's financial resources when the firm's situation is unstable due to shut out of debt and equity markets. They sustained the model of SCR by Higgins' (1977, 1981). This is in the case of normal firms where $g = SGR = P \times T \times L \times (1 - D)$ while the first SGR model version for financial instability was $g = SGR = P \times T \times (1 - D)$.

Thus, it can be summarized that a firm with financial distress has a high level of debt so to manage the firm growth, leverage (L) cannot be used. Their second SGR version discussed the financial distress at a severe level i.e. $g = SGR = P \times T$. They clear the situation by using the data from the year 1995 of the USA's three key industries. Their study indicated that when a firm is going through severe distress, payment of the dividend is restricted by the creditors, thus it becomes useless to utilize the policy of dividend to increase firm growth (Anderson et al., 2017; al Ahbabi & Nobanee, 2019).

A debate has been opened by Higgins in his book (2008) of how the growth of a firm can be improved by using external financing namely debt, he underlines his statement if a firm has no source to raise their fund by issuing new equity, then cash for the growth of firm must be derived from internal sources such as borrowing or retained earnings. Most firms desire to have a balanced ratio of constant leverage while when the debt is increased by each added dollar into a ratio of leverage, it remains auxiliary into the owner's equity. In short, Higgins (1977; 1981; 2008) has validated that the rate of growth can be estimated as a rate of sales growth, assuming no-issuance of equity i.e. external financing and ratio of constant leverage.

$$g = \frac{\Delta S}{S} = \frac{b \times RoE}{1 - b \times RoE} = P \times T \times L \times (1 - D)$$

The rate of growth for the separate framework can involve four ratios: turnover of an asset, profit margin, retention ratio, and the ratio of financial leverage. The suggested ratio of financial leverage by Higgins can be measured by dividing total assets (closing) with equity (opening).

The model of SGR of Higgins has been supported by Ashta (2008) with a little modification. The researcher proposed that the same date of leverage ratio must be used to assess SGR. The measurement of SGR must be done by dividing total assets (opening) by equity (opening). Conversely, focusing on the mathematical aspect of the model, an adjustment must be made in

the above alteration specifically by adjusting the ratio of total asset turnover as sales divided by total asset opening, not by total assets ending that was projected by Higgins. It was further identified that sale becomes more natural as it devoured by present asset opening and a new inducement of an asset gives profit in the future gains. With the usage of sales, the growth rate will become steady even if the ratio of financial leverage and asset opening in turnover of assets are used (Ponce et al., 2021; Rosenberg, 2004; Ryabova & Samodelkina, 2018; Steblyanskaya et al., 2019).

Thus, the model of sustainable growth of Higgin has two sources of financing that is external financing via debt and internal financing. Framework by Higgins (1977) and Chen et al. (2013) permit firm to use equity and external debt to measure the rate of sustainable growth as:

$$g(t) = \frac{b \times RoE}{1 - b \times RoE} + \frac{\gamma \times \Delta n \times \frac{P}{E}}{1 - b \times RoE}$$

Hence, Chen et al. (2013) has proposed a new and revised model for the rate of sustainable growth which incorporated an additional term to the model that helps to utilize the impact of new equity issues. Thus Chen et al. (2013) provided evidence that the rate of sustainable growth measure by Higgins (1977; 1981; 2008) is underestimated as he does not focus on the issuance of new equity as a basis of growth. Yet, this claim by Chen et al. (2013) on Higgin's model to be underestimated was not empirically tested. The focus of Chen et al. (2013) study was to recognize the most optimized rate of growth in the existence of dividend payout procedure, to achieve their goal they studied optimal growth rate by joint optimization and ratio of optimal payout. Their result concluded the reverting process in the rate of growth and asserted that there is a covariance between the rate of growth and profitability to analyze policies of dividend payout (Kircher & Rösch, 2021; Li & Wang, 2018; Mukherjee, 2018).

Thus, the current study focuses on empirically testing Higgins' model in the case of emerging economies. With the help of sustainable growth, a firm can determine the long-run growth rate. Emerging economies can be described as economies that grow at a greater and higher pace as compared to other economies (Vasiliou & Karkazis, 2002; J. Xu & Wang, 2018; Xu et al., 2020). The process of testing at the micro-level becomes supportive for finance professionals as they can modify their policies and decisions according to their surroundings and can achieve their sustainable growth goal. The primary objective of the current research is firstly to empirically test the sustainable growth model by Higgins, to understand whether it is underestimated or not when there is new issuance of shares equity. Moreover, this study intends

to explore the internal factor that affects a firm's sustainable growth. The current study compares the firms which have the issuance of new share equity with the firms that do not issue new share equity, further, it also compares financial firms with nonfinancial firms.

CONCEPTUAL FRAMEWORK

The conceptual framework of the current study is illustrated in figure 1. The framework demonstrates the relationship of secondary issues that are generated by firm controlling such as its leverage, size, dividend policies, and profitability with sustainable growth. Nonetheless, some factors are other than firm-specific factors such as market or country-specific factors that have an impact on the factor specified by the firm growth. Moreover, the extension of this framework i.e. profit margin, internal growth, and return on assets are considered as sub-parts of sustainable growth which assists the research to identify the factors of secondary equity that affects the rate of sustainable growth for future research. However, the major concern of this study is to explore the relationship between sustainable growth rate and secondary shares issue offerings.

Figure 1. Conceptual Framework

Source: Self-Created

DATA AND METHODOLOGY

This part of the research explains the sampling of data and study variables with the help of econometric models and hypotheses of the research.

Data

The current research has obtained data from DataStream on yearly basis. The data is related to sales, price, total assets, total income, total liabilities, total debt, cash dividend paid, equity of common shareholder, and outstanding share of the listed firm from emerging economies. Classification for the emerging economies is followed by using Morgan Stanley Capital International. Shortlisted firms are used to analyze the data by using their financial strength such as asset turnover, net profit margin ratio, equity multiplier, a ratio of dividend payout, return on equity, internal growth and size, return on assets, leverage, along with sustainable growth rate. Furthermore, actual growth in EPS, sales actual growth, and a categorical variable for the organizations which have secondary share equity issuance have been created. We measure the difference of actual and sustainable growth to explore the impact of secondary equity issues on growth as discussed by Higgins, it is treated as a dependent and categorical variable to analyze the secondary equity issue treated as an independent variable. Whereas, leverage, size, dividend policy, and profit margin have been treated as controlled factors.

Population and Sampling Framework

The current study has concentrated on the population of listed firms from emerging economies. As discussed earlier, it is the situation of economies in which the economies grow at a higher speed as compared to other economies. This study will help the finance professionals and policymakers as they can modify policies and decisions according to their surroundings and can achieve the goal of sustainable growth in the long run.

Classification for the emerging economies is followed by using Morgan Stanley Capital International. Current research uses data from DataStream Thomson Reuter annual database. The countries that were selected for the sample economies are Indonesia, China, Mexico, India, Saudi Arabia, Brazil, Pakistan, Turkey, Russia, Nigeria, and Korea. Table 1 shows the analysis of emerging countries. Panel A of the table demonstrates the collection of data from the database of DataStream. In order to conclude the sample of selected firms, a filtering technique has been applied. Firstly, the period from the year 1990 to 2015 was selected for the sample, based on the data availability regarding individual stocks. Secondly, the firms that did not have data of 2015 were excluded from the sample size. Lastly, the firms which had no data regarding

common equity, sales, common shares outstanding, net income, cash dividend, debt, and asset were also omitted.

Subsequently, with the help of above mentioned filters, we obtained an unbalance data panel i.e., several firms available to the nominated emerging countries. Table 1 (Panel B) demonstrates the unbalanced data of selected emerging economies' firms. Growth is a long-run process, panel B also shows some firms with the availability of 3 to 4 years data, either they were newly established or they did not have historic data. In Nigeria, no data was available before 2003. In the case of Saudi Arabia, no data was obtainable before 2002. In the context of China, there was no availability of data before 2012 for 561 firms but if the time frame was selected from 2012-2015 then more than 2,470 companies' data was available. In the context of India, there was no availability of data before 2000 for 1,100 firms but if the year 2000 was taken into account then data from 1,700 firms could be collected. However, we have faced a critical issue like the absence of data at the severer level as discussed in the case of India and China. On the other hand, if the current study incorporated newborn firms then we would not have been able to show a true image of sustainable growth. In the tradeoff between sustainability and survival bias, we selected the 16 years' timeframe for the current study. This means the time frame selected for the data is from 2000 to 2015. Finally, panel C shows the firms that have been used for the selected timeframe i.e. 2000-2015. After applying all the filters to the data, Saudi Arabia and Nigeria have no availability of data whereas 36 firms from Mexico and 11 firms from Russia were reduced which resulted in having less than 40 firms for both of these countries thus these countries were excluded from the sample of the current study.

Table 1. Sampling Framework and Data

Economies Type	Panel A		Panel B		Panel C	
	1990 – 2015		1990 – 2015		2000 – 2015	
	All	Financial	All	Financial	All	Financial
Turkey	375	94	347	88	54	14
Pakistan	321	45	315	43	73	13
China	2851	180	2786	176	58	7
India	2676	353	2586	275	180	14
South Korea	1870	160	1851	152	356	24
Indonesia	505	136	501	133	216	55
Brazil	345	74	334	72	109	24
Russia	484	43	457	18	11	1
Mexico	154	42	135	37	36	5
Saudi Arabia	174	63	171	61	-	-
Nigeria	125	32	122	31	-	-

This table shows the availability of firm data of sample economies. Panel A represents available firms' data collected. Panel B represents available data after considering filtered criteria of missing figures. Panel C represents the final sample for analysis after the tradeoff between Sustainability and survival bias.

Variables

The financial data such as net income, total debt, prices, liabilities, sales, shareholder's equity, total assets, outstanding shares, cash dividend paid⁶ and capitalization of emerging economies of the listed firm are used to measure the ratio of asset turnover, net profit margin ratio, and equity multiplier, the ratio of dividend payout, return on equity, internal growth and returns on assets, leverage, size, and sustainable growth rate. Table 2 explains the variables utilized in research analysis.

Table 2. Variables and Formulae

Variable	Descriptions	Computational Descriptions
Dependent [⋆]		
SGR	Sustainable Growth	Return on equity * Retention Rate
AGR	Actual Sales Growth [⋆]	$(\text{Sale}_t - \text{Sale}_{t-1}) / \text{Sale}_{t-1}$
Diff in Growth	The difference in Growth Rate	$\text{AGR}_t - \text{SGR}_{t-1}$
Independent Variables		
Dum (Equity Issue)	Dummy Variable: Whether they have issued Secondary Equity or not	0 if Common Shares Outstanding (2000) = Common Shares Outstanding(2015) 1 if Shares Outstanding (2000) < Shares Outstanding(2015)
Control		
LEV	Leverage	Total Debt ÷ Total Assets
SZ	Size	Log (T. Assets)
PM	Profit Margin %	Net Profit ÷ Sales
DPO	Dividend Payout	Cash Dividend ÷ Net Income

[⋆] In analysis, hyper-growth (i.e., three digits growth) of any year was treated as an outlier hence discarded.

[⋆] For Robustness Prices, Dividend and Assets were also used.

Research Design

To test the Higgins Model that if it is underestimated or not, regression on panel data and t-test were applied. Moreover, we have explored the internal factors of the organization to assess the rate of sustainable growth through the multiple panel regression technique.

Is Higgins' Model underestimated?

Initially, we applied an independent t-test on the difference of sustainable growth and actual growth rate as well as on the rate of sustainable growth of the Higgins Model. The unequal

⁶ Shares Outstanding has been taken from world scope and adjusted for stock dividend and stock splits.

variance was allowed in an independent t-test. There are two groups of firms, one group has issued secondary equity and the second does not issue secondary equity in a given sample time.

H1a: *Sustainable growth of firms with no secondary equity shares issued is always less than sustainable growth of firms with secondary equity shares issued.*

$$SG \text{ (No Secondary Equity Issued)} < SG \text{ (Secondary Equity Issued)}$$

H1b: *The difference between actual growth and sustainable growth with no secondary equity share issue is less than the difference between actual growth and sustainable growth with the secondary equity share issue.*

$$Diff (AG - SG) \text{ (No Secondary Equity Issue)} < Diff (AG - SG) \text{ (Secondary Equity Issue)}$$

Both hypotheses mentioned above have been tested by an independent t-test for the financial and non-financial firms that allow having unequal variance. Next, we have analyzed equations 1 and 2 by using panel regression for sustainable growth and the rate of actual growth. In Equations 1 and 2, firm-specific factors were treated as controlled variables and secondary issues were indulged as dummy variables. To control the factor of firm-specific factors it is more effective to use the method of panel regression. To discuss which option must be taken from Pooled Regression, Random Effect Model, or Fixed Effect Model, it is important to analyze the nature of the study and check the characteristic of the data if it is aligned with model assumptions or not. Current research focuses to discover the effect of dummy variables i.e. time-invariant of a firm that issues secondary equity. The core of the research is to study the dummy variable and the Fixed Effect Model is not suitable for the current analysis of time-invariant which issues secondary equity. Present data is consisting of the short panel as Cameron and Trivedi (2008) claim that short panel cannot be used in the Fixed Effect Model because of incidental parameters issues (Barrett, 2012). Thus, we are left with two options either choose Pooled OLS or Random Effect model. As the data have heterogeneity we have to select Random Effect Model for the final investigation. Random effects of the Lag range multiplier test by Breusch and Pagan (1980) were used to identify the panel data heterogeneity. The conclusion of these tests selected the Random Effect model, which uses GLS estimations. Thus, we have used Random effect models that permit GLS estimation as well as Pooled OLS to check firm-specific heterogeneity by cluster robust standard errors.

Below are the Panel Regression equations:

$$SGR_{it} = \alpha_0 + \beta_1 Dum_i + \varepsilon_{it} \quad (\text{Eq. 1})$$

$$Diff(AGR - SGR)_{it} = \alpha_0 + \beta_1 Dum_i + \varepsilon_{it} \quad (\text{Eq. 2})$$

where SGR = Sustainable growth (Higgins), Dum = Categorical variable for issuing Secondary shares equity, and AGR = Actual growth in Sales.

In Equation 1, if β_1 is less than zero, then it represents less firm growth in the case of secondary shares equity issue as compared to the firm that does not issue secondary equity and in case of Positive β_1 . the situation is contrariwise. In Equation 2, β_1 shows the underestimation of Higgins' model i.e. rate of actual growth of the firm is higher than the rate of Higgins growth for issuing Secondary equity.

Internal Factors of Sustainable Growth

We have applied the technique of panel regression to recognize factors that internally affect the rate of sustainable growth. In Equation 3 below, the dependent variable is sustainable growth whereas, in Equation 4, the dependent variable is the difference in the rate of actual growth and rate of sustainable growth.

Equation 3.

$$SGR_{it} = \alpha_0 + \beta_1 Dum_i + \beta_2 Size_{it} + \beta_3 LEV_{it} + \beta_4 PM_{it} + \beta_5 DPO_{it} + \varepsilon_{it}$$

Equation 4.

$$Diff(AGR - SGR)_{it} = \alpha_0 + \beta_1 Dum_i + \beta_2 Size_{it} + \beta_3 LEV_{it} + \beta_4 PM_{it} + \beta_5 DPO_{it} + \varepsilon_{it} \quad (\text{Eq. 4})$$

In both equations, the categorical variable of the secondary equity share issue is used as an independent along with controlled factors of size, profitability, leverage, and dividend of the firm. The following hypotheses were also tested for the above equations.

H2a: Secondary Equity Shares Issue has a significant positive correlation with Sustainable Growth.

$$\beta_1 > 0$$

H2b-H2e: Profitability, Size, Leverage and Dividend policy have a significant correlation with Sustainable Growth.

$$\beta_2 \neq 0, \beta_3 \neq 0, \beta_4 \neq 0, \beta_5 \neq 0$$

Also, the controlled factors have been identified for all financial as well as non-financial firms.

RESULTS AND DISCUSSION

The objectives of the current study were first to empirically test whether the sustainable growth model by Higgins' is underestimated or not in case of new issuance of equity. Secondly, the study aimed to explore the internal factors that affect a firm's sustainable growth. Chen et al. (2013) ideally demonstrated that the Sustainable Growth Model of Higgins is underestimated as well as they also prove that the issue of secondary equity has a positive impact on a firm's growth which was not considered in Higgins Model. An independent t-test was applied to analyze the sustainable growth as per Higgins' model for two groups of firms. The first group issued secondary shares equity and the second did not issue secondary share equity. Lastly, the panel was used to identify the factors that were responsible for the difference between actual growth and sustainable growth. In addition to the secondary equity issues, other factors were tested such as dividend policy, profitability, leverage, and size.

Summary of Sustainable Growth and Actual Growth

Table 3 shows a clear image of decreasing means of all economies' SGR of the Higgins model as compared to the rate of actual growth. If the model presented by Higgins is good enough then no difference will be witnessed between actual growth and Higgins' sustainable growth at a significant level. But the delaying pattern allows us to investigate the reason and causes behind this trend. For instance, Turkey shows that the sustainable growth rate of 55 firms' is 3.43%, whereas the rate of actual growth means is 16.69%. Though the sustainable growth means of 41 nonfinancial firms is 1.79% and the actual growth mean is 16.79%. The sustainable growth mean of 41 financial firms in Turkey is 8.50% and the actual growth mean is 15.80%.

In the case of Pakistan, the data shows the mean sustainable growth rate of 73 firms' is 8.63%. Whereas the sustainable growth mean of 60 nonfinancial firms is 7.97%. The sustainable growth means of 13 financial firms in Pakistan is 11.58%, however, the actual growth rate mean is 15.35% of 73 firms, 13 financial firms obligate 16.61 % mean of AGR and 60 non-financial firms have a 15.07% mean of AGR.

In South Korea, the case table shows that the mean actual growth rate of 356 firms (333 non-financial and 23 financial) is 5% to 6% which is higher than the rate of sustainable growth. Similarly, Indonesia shows a Sustainable growth rate of 215 firms' of 6.22%, whereas the rate

of actual growth means is 14.43% Though mean of sustainable growth of 159 nonfinancial firms is 5.48% and the mean actual growth is 12.18%, that shows the difference of 7% between the mean values of both. The mean value of the sustainable growth rate of 56 financial firms is 8.33% and the mean value of the actual growth rate is 20.87% with the highest difference of 12.5%.

In the case of India, the results demonstrate that the sustainable growth rate of 180 firms is 10.70%, and the actual growth is 16.12%. Though the sustainable growth means of 166 nonfinancial firms is 10.66% and the actual growth mean is 16.01%. The mean of sustainable growth of 14 financial firms in India is 11.3% and the actual growth mean is 17.46%.

For China, SGR mean is 3.34, and AGR mean is 12.63 for 58 firms. However, the mean of sustainable growth of 51 nonfinancial firms is 2.8% and the actual growth mean is 11.67%. The sustainable growth mean of financial firms is 7.22% and the actual growth mean is 19.47%.

For Brazil, the table shows that 109 firms have SGR 4.78% and AGR 13.01, respectively. However sustainable growth means of nonfinancial firms is 4.61% and the actual growth mean is 12.80%. The sustainable growth mean of 85 financial firms is 5.40% and the actual growth mean is 13.79%

Table 3 shows the analysis of cross-country analysis. On average, Pakistan and India have the highest rate of growth for all cases of AGR and SGR. China and South Korea have the lowest rates of growth among the sample economies. The highest difference was to observe the variance between AGR and SCR.

Table 3. Summary Statistics of SGR and AGR for Sample Economies by classification of Secondary Equity Issue

Country	Types of Firms	All Firms					Nonfinancial Firms					Financial Firms				
		firm	Higgins' SGR		AGR(Sales)		firm	Higgins' SGR		AGR(Sales)		firm	Higgins' SGR		AGR(Sales)	
			μ	σ	μ	σ		μ	σ	μ	σ		μ	σ	μ	σ
Turkey	All	55	3.4%	21.1%	16.7%	35.0%	41	1.8%	21.7%	16.8%	31.6%	14	8.5%	18.3%	15.8%	44.2%
	No SEI	16	5.5%	14.0%	18.4%	29.7%	14	4.9%	14.0%	18.7%	30.5%	2	9.9%	12.7%	16.2%	24.0%
	SEI	39	2.5%	23.6%	15.9%	37.2%	27	0.0%	24.9%	16.0%	32.2%	12	8.3%	19.1%	15.7%	45.2%
Pakistan	All	73	8.6%	17.2%	15.4%	28.4%	60	8.0%	17.8%	15.1%	28.8%	13	11.6%	13.9%	16.6%	27.6%
	No SEI	31	8.3%	18.8%	12.4%	28.1%	29	8.3%	18.8%	12.2%	28.0%	2	8.5%	19.6%	17.4%	29.2%
	SEI	42	8.9%	16.0%	17.5%	28.5%	31	7.7%	16.9%	17.7%	28.9%	11	12.2%	12.6%	17.0%	27.4%
South Korea	All	356	3.0%	15.8%	8.2%	25.6%	333	2.9%	15.7%	8.0%	24.0%	23	4.6%	16.8%	10.6%	42.9%
	No SEI	155	5.0%	9.7%	7.7%	22.6%	144	4.9%	9.4%	7.4%	20.3%	11	6.5%	12.8%	12.3%	42.8%
	SEI	201	1.5%	19.2%	8.6%	27.8%	189	1.4%	19.1%	8.5%	26.6%	12	2.8%	19.7%	9.0%	43.1%
Indonesia	All	215	6.2%	18.7%	14.4%	30.1%	159	5.5%	19.3%	12.2%	27.9%	56	8.3%	16.7%	20.9%	34.9%
	No SEI	59	7.1%	16.0%	12.6%	27.2%	54	6.9%	16.4%	11.6%	25.8%	5	9.8%	10.8%	23.3%	37.7%
	SEI	156	5.9%	19.7%	15.2%	31.2%	105	4.7%	20.7%	12.5%	29.0%	51	8.2%	17.2%	20.6%	34.7%
India	All	180	10.7%	14.8%	16.1%	24.2%	166	10.7%	15.2%	16.0%	24.6%	14	11.3%	8.9%	17.5%	17.9%
	No SEI	53	11.4%	12.7%	12.9%	22.4%	53	11.4%	12.7%	12.9%	22.4%	0	N/A	N/A	N/A	N/A
	SEI	127	10.4%	15.7%	17.5%	24.8%	113	10.3%	16.3%	17.5%	25.5%	14	11.3%	8.9%	17.5%	17.9%
China	All	58	3.3%	16.2%	12.6%	36.5%	51	2.8%	16.9%	11.7%	35.5%	7	7.2%	9.3%	19.5%	42.9%
	No SEI	16	0.9%	18.0%	8.5%	40.3%	14	0.6%	19.1%	6.8%	36.4%	2	2.9%	6.9%	19.6%	60.3%
	SEI	42	4.3%	15.4%	14.2%	35.0%	37	3.6%	15.9%	13.5%	35.0%	5	8.9%	9.6%	19.4%	34.4%
Brazil	All	109	4.8%	18.4%	13.0%	26.4%	85	4.6%	19.3%	12.8%	24.6%	24	5.4%	14.6%	13.8%	32.3%
	No SEI	47	6.1%	16.7%	11.7%	27.0%	35	5.0%	18.8%	11.5%	24.9%	12	9.1%	7.6%	12.4%	32.4%
	SEI	62	3.8%	19.5%	14.0%	25.9%	50	4.3%	19.7%	13.8%	24.3%	12	1.5%	18.6%	15.3%	32.2%

This table highlights the Mean Sustainable Growth rate and Mean Actual Growth Rate for not only all, nonfinancial and financial firms but also for all firms (All), secondary equity shares issuing firms (SEI) and no secondary equity shares issuing (SEI) firms

Univariate analysis via t-tests

Here, we analyze the hypotheses H1a and H1b with the help of Tables 4 and 5 individually. Table 4 displays the difference of mean by applying t-test for H1a, i.e. “Sustainable Growth with no secondary shares equity issued is less than sustainable growth with Secondary share equity issued”.

$$SGR (No Secondary Shares Issue) < SGR (Secondary Shares Issue)$$

Table 4. Summary of Univariate Analysis

<i>H1a: Sustainable Growth (No Secondary Issue) < Sustainable Growth (Secondary Issue)</i>					
	SGR(NSEI)	SGR(SEI)	Both	Difference	T-Statistics
	A	B	C	A – B	
Panel A: All Firms					
Turkey	5.52%	2.48%	3.43%	3.05%	2.2143**
Pakistan	8.33%	8.86%	8.64%	-0.53%	-0.4761
South Korea	4.98%	1.47%	3.04%	3.51%	8.5111***
Indonesia	7.13%	5.86%	6.22%	1.27%	1.8475*
India	11.39%	10.42%	10.71%	0.97%	1.6733*
China	0.91%	4.25%	3.34%	-3.34%	-2.453**
Brazil	6.05%	3.80%	4.78%	2.24%	2.4311**
Panel B: Nonfinancial Firms					
Turkey	4.91%	0.02%	1.79%	4.89%	3.0107***
Pakistan	8.32%	7.65%	7.97%	0.68%	0.5539
South Korea	4.86%	1.38%	2.93%	3.48%	8.2414***
Indonesia	6.88%	4.73%	5.48%	2.15%	2.7103***
India	11.39%	10.31%	10.66%	1.08%	1.7871*
China	0.62%	3.61%	2.80%	-2.98%	1.9437*
Brazil	4.98%	4.34%	4.61%	0.63%	0.5658
Panel C: Financial Firms					
Turkey	9.88%	8.25%	8.51%	1.64%	0.5811
Pakistan	8.45%	12.16%	11.58%	-3.71%	-1.0014
South Korea	6.54%	2.80%	4.63%	3.74%	2.02**
Indonesia	9.77%	8.18%	8.33%	1.60%	1.1358
India	No Financial firms in the sample were found in India which has issued secondary equity shares				
China	2.88%	8.91%	7.22%	-6.02%	3.5086***
Brazil	9.12%	1.49%	5.40%	7.63%	4.916**
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$					

As shown in Table 4, if hypothesis H1a has a significant positive impact then it can be interpreted as Higgins Sustainable Growth Model that asserts that the firms that issue secondary shares equity are lesser than the firm that does not issue equity. It shows the underestimation

of Higgins's model to calculate the firm's sustainable growth which issues secondary shares equity. It also shows that except China all other countries at the emerging level have positive variances that underestimate the Higgins model of Sustainable Growth, the only exception case is Pakistan that shows the insignificant impact of the co-efficient. On the other side, on the financial and non-financial classification, we observe Brazil, South Korea, and China have significant results.

Table 5. Summary of Univariate Analysis

<i>H1b: Diff (Actual Growth – Sustainable Growth) (No Secondary Issue) < Diff(Actual Growth – Sustainable Growth) (Secondary Issue)</i>					
	(NSEI)	(SEI)	All	Differences	T-Statistics
	A	B	C	A – B	
Panel A: All Firms					
Turkey	12.90%	13.71%	13.46%	-0.81%	-0.2768
Pakistan	4.04%	8.69%	6.73%	-4.65%	-2.3383**
South Korea	2.74%	7.09%	5.15%	-4.35%	-5.4181***
Indonesia	5.48%	9.29%	8.21%	-3.81%	-2.9659***
India	1.50%	7.03%	5.39%	-5.54%	-5.0015***
China	7.47%	9.94%	9.27%	-2.47%	-0.7536
Brazil	5.65%	10.12%	8.17%	-4.47%	-2.7296***
Panel B: Nonfinancial					
Turkey	13.82%	15.99%	15.21%	-2.17%	-0.6838
Pakistan	3.91%	10.10%	7.11%	-6.20%	-2.7818***
South Korea	2.52%	7.15%	5.09%	-4.63%	-5.9513***
Indonesia	4.73%	7.75%	6.69%	-3.02%	-2.1991**
India	1.50%	7.14%	53.22%	-5.64%	-4.937***
China	6.13%	9.86%	8.85%	-3.74%	-1.1271
Brazil	6.48%	9.40%	8.19%	-2.92%	-1.6125
Panel C: Financial Firms					
Turkey	6.34%	8.23%	7.93%	-1.88%	-0.2842
Pakistan	5.90%	4.87%	5.03%	1.03%	0.1645
South Korea	5.74%	6.23%	5.99%	-0.50%	-0.0929
Indonesia	13.48%	12.45%	12.54%	1.03%	0.2148
India	No Financial firms in the sample were found in India which has issued secondary equity shares				
China	16.72%	10.51%	12.25%	6.22%	0.5101
Brazil	3.26%	13.24%	8.07%	-9.99%	-2.5826***

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

T-test results are shown in the above table 5, it has the mean difference of AGR and SGR for the firms without the issuance of secondary equity, and with the issuance of secondary equity. For this purpose, we have to build a hypothesis that shows the difference of AGR-SGR for the

firms that issue secondary shares equity is greater than the difference of Actual Growth – Sustainable Growth for the firm that does not offer the secondary issue of equity. Alternatively, the second H1b, which is “Difference between Actual growth and Sustainable growth with no Secondary equity shares issued is less than the difference between Actual growth and Sustainable growth with Secondary equity shares issued”

$$\text{Diff}(AG - SG) (\text{No Secondary Shares Issue}) < \text{Diff}(AG - SG) (\text{Secondary Shares Issue})$$

As mentioned above in Table 3 the figures of AGR are greater than SGR. Here our concern is to investigate the framework of issuance of secondary equity in both cases either the firm issuing secondary equity or not. The difference of AGR-SCR must be a positive figure as stated in Colum A, B, and C. as we are supposed to answer the question that if Higgins Sustainable Growth rate model is underestimated or not, we are required to test the range of differences in the second issue. So we assume that the difference in Colum A-B should be negative. We can observe panel A for all the firms and panel B for non-financial firms, the highlighted column is negative, which shows significance for a sample of emerging economies from five out of seven economies taken as study sample i.e. Brazil, Pakistan, Indonesia, South Korea, India. The same conclusion is for non-financial firms. In financial firms’, the results remain the same as it shows significance except for Brazil because growth is not influencing the secondary equity as demonstrated for other economies, the difference is about 1%, and it is also insignificant.

Panel Regression / Multifactor Analysis

To obtain the result of equation 4 we have applied the Random Effect Model with panel-based regressions in table 6. The result of the regression has been presented in detail in a separate column. All firms’ data as in panel A, panel B has non-financial firms’ data whereas panel C shows the financial firms’ data.

Moreover, table 6 also shows dummy variables in panel A for the issue of secondary shares equity which is significant for Indonesia, Pakistan, Brazil, India, and South Korea but not in the case of China and Turkey for all the firms with size and leverage (taken as the control variables). Whereas, the ratio of dividend payout and profitability have mixed results. Further, it shows the secondary equity issue with the leverage and size of the firms. Panel B has the same results whereas, panel C shows an insignificant result of the secondary issue of equity, which means that financial firms cannot be influenced by secondary equity issues.

Table 6. Multi Factor Regression Analysis – Country-wise

Sample Economies	Turkey	Pakistan	South Korea	Indonesia	India	China	Brazil
Panel A: All							
Number of Cross	55	73	356	215	180	58	109
Dum	-0.00955	0.0444**	0.0317***	0.0442***	0.0377***	-0.0105	0.0388**
Leverage	0.244***	0.0752*	0.116***	-0.0769***	0.170***	0.000786	0.0614
Size	-0.023***	-0.00040	-0.00586**	-0.00573	0.00137	0.0174***	0.00729
Profitability	-0.0192	0.0407*	-0.00442	-0.0042***	-0.000815	-0.000361	0.00192**
Dividend Payment	-0.000183	0.00106	0.000178	-0.00895*	0.00377	-9.32E-05	-0.00318*
Constant	0.380***	0.0253	0.122**	0.196***	-0.0389	-0.174*	-0.0608
Observations	754	1048	5131	3041	2640	813	1545
Panel B: Nonfinancial only							
Number of Cross	41	60	333	159	166	51	85
Dum	-0.00109	0.0565**	0.0347***	0.0352**	0.0366***	0.00701	0.0224
Leverage	0.395***	0.0756	0.104***	-0.0635***	0.186***	0.00124	-0.0257
Size	-0.03***	0.00134	-0.00745**	-0.00176	0.000765	0.0173**	0.00983*
Profitability	0.0161	0.0468*	0.000347	-0.00390**	-0.00082	-0.000362	0.0659*
Dividend Payout	2.27E-05	0.00177	0.0004	-0.0112**	0.00407	-0.000159	-0.0065**
Constant	0.433***	-0.00338	0.152***	0.105	-0.032	-0.186	-0.062
Observations	573	855	4810	2252	2435	713	1208
Panel C: Financial only							
Number of Cross	14	13	23	56	14	7	24
Dummy	0.0116	-0.0261	-0.0159	0.035	0	-0.203	0.0329
Leverage	0.101	0.0317	0.278**	-0.131**	-0.0746	-0.387	0.450***
Size	-0.00283	0.00171	-0.00713	-0.0193***	-0.00922	0.0289	-0.00169
Profitability	-0.0611	-0.0318	-0.0773	-0.00508**	-0.0833	-0.0186	0.00235**
Dividend Payout Ratio	-0.0278	-0.0774	2.41E-05	-0.00586	-0.113	0.0547	-0.00189
Constant	0.089	0.0652	0.165	0.539***	-0.19	-0.16	-0.0312
Observations	181	193	321	789	205	100	337

This shows multi-factor panel regression for the difference of Actual Growth – Sustainable Growth (Equation 4) with a random effect model for all the sample economies. Panel A refers to All, Panel B refers to nonfinancial only and Panel C for financial.

CONCLUSION AND FURTHER RESEARCH

In financial economics, stock pricing is performed by using the growth model by Gordon and in corporate finance, the sustainable growth of firms is computed by the Higgins model. Both of these models have been modified and revised over time. Framework by Higgins (1977), and Chen et al. (2013) permit firms to use equity and external debt to measure the rate of sustainable growth. This model has a new positive term that takes into account the new equity issue.

Finally, Higgins (1980; 2008) sustainable growth model has been proved underestimated by Chen et al (2013) as it does not incorporate the impact of new equity issues to measure growth. Yet, this claim by Chen et al (2013) on the Higgins model was not empirically tested. The focus of Chen (2013) study was to recognize the most optimized rate of growth in the existence of dividend payout procedure and to achieve their goal they studied optimal growth rate by joint optimization and ratio of optimal payout.

The objectives of the current study were to empirically test if the sustainable growth model by Higgins is underestimated or not in the case of issuance of shares equity. The findings of the study will help the firms to have a sustainable growth rate in the long run. As emerging economies grow at a greater pace relative to other economies, the process of testing firm-level data at the micro-level becomes sympathetic for finance professionals as they can change and modify their policies and devise decisions according to their surroundings to achieve sustainable growth.

RESEARCH AND PRACTICAL IMPLICATIONS

The result of the current study shows that Higgins Sustainable growth rate model is underestimated and a modified version of Chen (2013) should be used if firms include the issue of secondary equity. Chen et al (2013) include market imperfection with the issue of secondary equity so the finance manager must take into account the prevailing market conditions before issuing secondary equity. Further, the results show that size and leverage have an important role to achieve sustainable growth for firms, particularly for non-financial firms, as a case finding in our study.

FUTURE RESEARCH RECOMMENDATIONS

While analyzing the cross-country data, mixed results show that in addition to firms' policies of dividend, leverage, profitability, and size there are other factors such as country-specific factors or market-specific factors that can influence firm-specific growth. Thus it allows future researchers to explore country-specific factors like monetary policy, inflation, FDI, GDP, import exports that determine the growth of the firm.

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Author(s) Contribution:

This research is extracted from previous research conducted as part of the Master's thesis of the corresponding author and was conducted from 2014 to 2017 (Mubeen, 2017). However, after completion of the thesis, the unexplored possibilities of the research were identified and further research was conducted by the authors of this paper. Hence, for this particular research, all the authors have contributed equally.

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