Growth-Profitability Inter-relationship: A Case of Agro Based Firms in India

Kuldeep Kaur[1]

Monika[2]

Abstract

This study investigated the growth-profitability interrelationship for Indian Agro Based Firms. Using panel data for a period of twenty two years (1995-2016) and Arellano and Bond (1991) two step GMM estimation procedure, it was found that profits were important source of growth of firms. Further, direct relationship from growth to profitability and from age to profitability and growth signified that firms benefited from scale economies overtime. However, indirect relationship between size and growth of the firm implied that as firms grow in size they tend to sacrifice growth.

The findings also has important policy implication that corporate profits, particularly of agro based firms, should be taxed very cautiously as profits were pre-condition for growth. Further, direct relationship between age and profitability for small firms seemed to suggest that efforts should be made to setup more small scale agro firms as they can profitably exploits the market conditions.

[1] Professor & Head, Punjab School of Economics, Guru Nanak Dev University, Amritsar.

[2] **Corresponding Author:** Assistant Professor, S.D. College, Hoshiarpur and Research Scholar, Punjab School of Economics, Guru Nanak Dev University, Amritsar.

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Section I
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1. Introduction

The issues involved in growth-performance of Agro-based industry in India are vital especially on account of growing rural unemployment. **Gandhi et. al [1]**were of the view that agri-industrial sector in India heavily contribute to value addition and income generation. The relevance of this sector in future depends upon its potential to develop rural economy. Despite it, most of the existing empirical literature such as **[2], [3] and [4]** enquired into the growth performance of manufacturing sector only. Literature on issues of agro-based industry if available such as **[5], [6], [7], [8] and [9]** is either region specific or industry specific. Thus, a comprehensive analysis of agro-based industry is required to study its growth-performance process. The present study aimed at studying growth-profitability interrelationship and the impact of size and age on growth and profitability of firms. In this context, an attempt has been made to utilize more sophisticated Arellano and Bond (1991) two step GMM estimation procedure. In addition, analysis was also carried out at disaggregated level to analyse the robustness of the findings and impact of size on firms' growth-performance. Broadly, the study has been organized as follows: Section-I introduced the problem; section-II briefly discussed the issues involved in interrelationship between growth and profitability and impact of size and age thereon; Section III summarized database and methodology; Section IV presented the empirical resoults and finally, section V presented conclusion and policy implications.

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Section II
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2. Review of Literature

Relationship between growth and profitability of firm remained central to the issue of the performance of a firm. A voluminous literature such as **[10], [11], [12], [13]** is available where profit was considered to be the most important for the subsequent growth of a firm. The idea of 'growth of the fitter' advocated that fitter firms grow and survive in the market while the unfitted poor performing firms exit the market [**10**]. Further, **Carpenter and Petersen [11]** showed that retained earnings are an important source of internal financing of firms especially for those small firm which have no access to external finance. This implies that there was direct relationship between growth and retained earnings. **Fitzsimmons et al. [12]** investigated the longitudinal behavior of growth rates and profitability for a large sample of Australian firms and found that higher proportion of firms pursuing the profitability pathway were much more likely to achieve the growth targets than a much lower proportion of firms pursuing the growth pathways. **Coban [13]** for 137 Turkish listed manufacturing industries also confirmed direct relationship from growth to profitability and profitability to growth.

  Conflicting arguments, on the other hand, also appeared in literature where **[14] and [15]** highlighted that, on account of separation of ownership and control, firms creates a bias towards using the profits for the purpose of growth. Small businessmen view their companies as their priority work and find fulfillment of their entrepreneurial requirements through growth of their businesses **[14].** However, it cannot be assumed that all firms have the same propensity to grow. For example, GMs shareholders resisted investing in additional business opportunities and sought to restrict growth expenditure even when GM was a highly profitable company **[16] in [21]**. **Glancey [17**] opined that if growth is achieved through cutting margins in existing markets, rather than through diversification into new markets, the relationship between growth and profitability may also be negative. On the other hand, if small firm entrepreneurs basically rely on retained profits as their primary source of growth so as to avoid external lenders having a stake in the firm, then a positive relationship between profitability and growth can be expected. **Jang and Park [18]** utilized unit roots and VAR analysis to investigate the interrelationship between growth and profitability for 2927 US restaurant firms over the period of 1978-2007. They found that lagged and current growth adversely affected current profitability, which was consistent with classical Recardian view and managerial growth-maximization hypothesis. On the other hand, profitability had positive impact on current growth. **Nakano and kim [19],** for Japanese manufacturing firms, confirmed that there was trade-off between growth and profitability. They found that relationship between prior levels of growth to profitability was indirect. However, prior profits were the pre-requisites of current growth. In addition, in some case, it was also found that growth of firm can be achieved without sacrificing profitability. **Yoo and Kim [20],** for Korean construction companies, found that profit oriented strategy limited the growth of the firm. On the other hand, past levels of growth lead to higher level of profitability in the current period. They concluded that during long term stagnations small and medium firms which pursue short term profitability objective always choose to de-grow. However, **Coad [21],** using three digit panel data for 8405 French manufacturing firms, though showed some positive impact of profit on growth for second and third lag of profit, but on the whole, they concluded that growth was independent of profit. For the relationship from growth to profit, he found that past level of growth had positive and significant impact on subsequent profit, which was contrary to 'Penrose

effects'. **Lee [22]** investigated the relationship between growth and profitability for 606 Korean listed companies using both fixed effect and system GMM methods. The analysis confirmed that profitability was inversely associated with growth. Further, the inverse relationship was stronger in case of net sales.

As far the relationship between age, size and growth is concerned it was argued that firms with larger size can better exploit economies of scale and have better access to resources required for growth. Such firms perform better than smaller firms **[14] and [23]**. On the other hand, small firms suffer less from the agency problem and are characterized by more flexible non-hierarchical structures, which may be the appropriate organizational forms in changing business environments **[24].** However, Gibrat's Law states that firm growth is independent of age of the firm. **Evans [26]** on the other hand, confirmed that firm growth decreases with firm size and firm age. The negative relationship between growth and size holds for 89 percent of the industries and the negative relationship between growth and age holds for 76 percent of the industries. **Davidsson et al [27]** also found that age was inversely associated with growth and independence had positive and significant impact on business growth. Further, limited companies also had higher rate of growth. **Kouser et al [28]** also examined the inter relationship between firm size, growth and profitability for 70 Pakistani non-financial firm for the period of ten years from 2001-2010. The relationship between size and profitability was weak and there was inverse relationship between two. As far as the relationship between growth and size is concerned, firm size was inversely associated with growth and the coefficient was found to be insignificant. It was also concluded that small size firms grow faster. In case of India **Das [2],** using Evan's first and second order logarithmic equation for infant computer hardware industry, concluded that there was inverse relationship from lagged and current size to growth indicating that fixed factors (capital) were important deterrent to growth. However, age was positively associated with growth of the firms. It signifies that firms learn from their deficiencies and with the age returns for such firms increase. **Majumdar [29]** for 1020 Indian firms found that due to the presence of institutional framework older firms were more profitable and less productive whereas larger firms are more productive and less profitable. **Abor [30],** on the other hand, for 22 listed firms of Ghana found that increase in size of the firm led to increase in profitability. Similarly, older the firm higher was the profitability. **Kumar and Kaur [4]** for Indian automobile industry also found that there was direct relationship between size and profitability over a period of time. However, for cross sectional, they did not find any relationship two variables.

Taken together, all these studies provide inconsistent empirical results on the nature of relationships between growth and profitability. Moreover, all these studies are associated with overall industrial setup. The present study therefore focused on interrelationship between growth and profitability of agro based firms in India.

Section III

3.   Database and Methodology

The present study utilized prowess database for a sample 288 agro based firms. While choosing the sample it has been kept in the mind that adequate number of firms could qualify for the sample for maximum number of years. As a result the present study was carried out for a period of twenty two years spanning from 1995 to 2016. A total number five variables-two for growth and one for each size, profitability and age of the firm-were modeled to study the inter relationship. All the variables were deflated using GDP deflator for the base year 2011-12. As a proxy for growth of firms study utilized total assets and gross sales. In order to find out growth variables all the variables were converted into logs and then industry mean was subtracted from each year to normalize the variables **(see [22])** as follows:

$$nXt = \log X_{it} - (\log X_{it})/n \qquad\qquad 3.1$$
$$gX_t = ((nX_t - nX_{t-1})/nX_{t-1})*100 \qquad\qquad 3.2$$

Further, in order to estimate profitability profit to income ratio was computed. Size of the firm was estimated using equation 3.1 in terms of total assets and growth variable was estimated using equation 3.2. In addition to these variables, age and year dummies were also used as control variables. In order to study the relationship between growth and profitability the following dynamic regression models were estimated using Arellano and Bond (1991) two step GMM estimation procedure [**31**], which give consistent estimates of coefficients in the presence of endogenous explanatory variables **[21].**

$$\Delta G_{it} = \alpha_0 + \sum \alpha \Delta_i G_{it-i} + \sum \beta_i \Delta \prod_{it-i} + \beta_3 SIZE_{t-1} + \beta_4 AGE_{t-1} + d_{yr} + U_t \qquad\qquad 3.3$$
$$\Delta \prod_{it} = \alpha_0 + \sum \alpha_i \Delta \prod_{it-i} + \sum \beta i \Delta Git_{-i} + \beta_3 SIZE_{t-1} + \beta_4 AGE_{t-1} + d_{yr} + U_t \qquad\qquad 3.4$$

In first dynamic equation, an attempt has been made to study the relation from profitability to growth. Here G_{it} refers to as growth of the firm in terms of assets (i.e. GRA) and sales (i.e. GRS) . Similarly, $\prod_{it}$ refers to as measure of profitability (i.e. ROI). On the other hand, for relationship from growth to profitability, the same set of variables was utilized.

Section IV

4. Empirical Estimation
4.1 Growth and Profitability: All Firms
4.1.1 Analysis of Growth

Table No. 4.1 Panel A presented the empirical findings for the relationship from profitability to growth, persistence of growth, and effect of profitability, size and age on growth of firms. First of all, growth equation was estimated using growth of assets (i.e. GRA) as dependent variable and ratio of profit to income (ROI) along with first lag of size i.e. SA and of age of the firms as explanatory variables. Clearly the analysis did not show any evidence of persistence of growth for both GRA and GRS as dependent variable as all their lagged values were found with significant negative sign [see model 1, 2, 3, 4, 5 and 6]

As far as relationship from profitability to growth was concerned, when GRA was treated as dependent variable, current as well as lagged values of ROI were found significant and had positive sign [see model 1, 2 and 3]. Similarly, for the relationship from ROI to GRS, all the coefficients were found significant with positive sign except for the first lag of ROI [see model 4, 5 and 6]. Therefore, broadly the analysis confirmed direct relationship from profitability to growth. However, size and growth of the firms was inversely associated as all the values of SA were found with negative significant sign. On the other, for the relationship from age to growth, all the lagged values of age, for GRA as dependent variable, were found significant and had positive sign. But, for GRS as dependent variable all the coefficients of SA were found with negative significant sign. The analysis also reported the Sargan-J statistics, which tests the null hypothesis of appropriate instruments restrictions against the alternative hypothesis of over specification of the GMM instruments. The first three values, which were meant for GRA as variable of growth, were found to be insignificant, which implied that the model specifications are satisfactory.

4.1.2 Analysis of Profitability

Panel B of Table 4.1 reported the results of relationship from growth to profitability. In order to analyse the persistence of profit its current value was regressed on its first, two and three lags in three alternative models. For relationship from growth to profitability, current and three lags of GRA/GRS were included in the regression. Further, one year lag of SA and Age variables were also included to analyse the relationship between size and profitability, and between age and profitability. It was found that lagged values of ROI were directly associated with ROI except for the second lag of ROI. Moreover, all the lagged values were also found significant. As far as the relationship from growth to profitability was concerned, the results seemed to vary with definition of growth variable. For GRA the relationship was inverse and for GRS it was direct. Further, there was direct relationship between size and profitability and between age and profitability as all the values were found significant and with positive sign. The only exception is model 8 where coefficient for age was found with significant and negative sign. As far as the values of Sargan statistic statistic were concerned, all values were found significant. This implies that, used instruments in this model were not sufficient and estimates of this model are not robust.

Broadly speaking, there was direct relationship from profitability to growth and from growth to profitability with some exceptions. Inverse relationship between size and growth was consistent with the traditional theory where economies of scale limit the growth of the firms. The relationship from age to growth was inconsistent. On one hand, lagged value of age was directly associated with GRA and on the other hand it was indirectly associated with GRS. The direct relationship between age and growth of firm may be due to the reason that as the firm matures it grows in terms of assets. However, with maturity, the firms do not concentrating upon the growth in terms of sale. Further, relationship between size and profitability and age and profitability was found direct.

4.2.1 Extended Analysis for size disaggregation

As it has been argued in section 2 that size of the firm can affect the dynamics of growth and profitability, the entire process of growth-profitability relationship was repeated by dividing total firms into three groups. Size of the firm was proxied by total assets of the firms. All the firms bellow thirty fourth percentile of total assets were treated as small firms and the firms between thirty fourth percentile and seventy sixty seven percentile were treated as medium sized firm. The above sixty seven percentile were treated as large firms.

4.2.1.1 Growth and Profitability: Small firms
4.2.1.1.1 Growth Analysis

Panel A of Table No. 4.2 showed the empirical results associated with persistence of growth, and effect of profitability, size and age of the small firms on growth. For GRS as a dependent variable, the analysis confirmed the earlier findings.

Table 4.1 Growth-Profitability Relationship for All Firms

Explanatory variables	Panel A:Growth Regression: Dependent variables					
	GRA			GRS		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
GRA/GRS(-1)	**-0.16**	**-0.21**	**-0.25**	**-0.10**	**-0.12**	**-0.14**
p-values	0.00	0.00	0.00	0.00	0.00	0.00
GRA/GRS(-2)		**-0.15**	**-0.20**		**-0.16**	**-0.17**
p-values		0.00	0.00		0.00	0.00
GRA/GRS(-3)			**-0.12**			**-0.04**
p-Values			0.00			0.00
ROI	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
p-values	0.00	0.00	0.00	0.00	0.00	0.00
ROI(-1)	**0.00**	**0.00**	**0.00**	-0.00	-0.00	-0.00
p-values	0.00	0.00	0.00	0.00	0.00	0.00
ROI(-2)		**0.00**	**0.00**		**0.00**	**0.00**
p-values		0.00	0.00		0.00	0.00
ROI(-3)			**0.00**			**0.00**
p-values			0.00			0.29
SA(-1)	**-0.84**	**-0.82**	**-0.81**	**-0.25**	**-0.26**	**-0.28**
p-values	0.00	0.00	0.00	0.00	0.00	0.00
AGE(-1)	**0.11**	**0.11**	**0.13**	**-0.21**	**-0.40**	**-0.22**
p-values	0.00	0.00	0.01	0.00	0.00	0.00
J-statistic	218.65	216.32	210.76	230.81	232.15	233.53
Instrument	213.00	213.00	212.00	213.00	213.00	212.00
Explanatory variables	Panel B: Profitability Regression: Dependent variables					
	ROI			ROI		
	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
ROI(-1)	**0.48**	**0.57**	**0.64**	**0.49**	**0.57**	**0.63**
p-values	0.00	0.00	0.00	0.00	0.00	0.00
ROI(-2)		**-0.32**	**-0.37**		**-0.31**	**-0.37**
p-values		0.00	0.00		0.00	0.00
ROI(-3)			**0.14**			**0.13**
p-values			0.00			0.00
GRA/GRS	**-81.69**	**171.76**	**145.41**	**890.50**	**595.08**	**590.94**
p-values	0.00	0.00	0.00	0.00	0.00	0.00
GRA/GRS(-1)	**-100.21**	**-42.33**	**-15.06**	**337.69**	**105.82**	**153.25**
p-values	0.00	0.00	0.00	0.00	0.00	0.00
GRA/GRS(-2)		**-110.22**	**-75.01**		**114.06**	**261.47**
p-values		0.00	0.00		0.00	0.00
GRA/GRS(-3)			**-5.53**			234.99
p-values			0.00			0.00
SA(-1)	-0.07	**189.57**	**96.62**	**149.91**	**168.92**	**147.09**
p-values	0.61	0.00	0.00	0.00	0.00	0.00
AGE(-1)	**300.11**	**-160.85**	**81.35**	**925.86**	**170.71**	**558.68**
p-values	0.00	0.00	0.00	0.00	0.00	0.00
J-statistic	287.96	287.91	287.93	282.75	285.31	284.80
Instrument	227.00	225.00	223.00	229.00	227.00	223.00

Note: 1.All the bold values signify the significance of coefficient at 5 percent level of significance. Sargan Statistic (J statistics) at 106, 105 and 104 degrees of freedom are 220, 219.9 and 217.73 respectively.
2.Source: Authors calculations

But, for GRA as dependent variable, only current values of ROI were found positive and significant. All the past values of ROI were found insignificant. Further, size coefficients had negative and significant sign, which implies that there was indirect relationship from size to growth of the firm. However, the coefficients for age variable were found significant and with positive signs when GRA was treated as dependent variable and were found negative and significant when GRS was treated as dependent variable. Further, the values for Sargan-J values were insignificant signifying the appropriateness of all the instruments used in the model.

4.2.1.1.2 Analysis of Profitability

Panel B Clearly showed that all the values for the first lag had a positive sign and were significant. However, the values for second lag in model 8 and 9 were recorded as -0.05 and -0.05, which were negative and significant. Broadly, results seemed to suggest direct relationship between current value of ROI and one year lagged values of ROI. Further, the analysis was also carried out to study the relationship from growth to profitability (i.e. GRA and GRS). For all the models, it was found current and past values of GRA and GRS were having positive sign and were also found significant. This implies that profitability was the precondition of growth as far as the small firms were concerned. In the context of relationship from SA to profitability, all the values were found negative and significant. It was contrary to the earlier findings where the relationship was direct. This implies that as firms grow in size they tend compromise their profitability. Furthermore, all significant values of the coefficient of age were found to be positive except for the model 9. This seemed to suggest that as firms matures they tend increase their profitability.

Overall speaking, the analysis confirmed the persistence of profit hypothesis. Further, current and past values of profitability seemed to suggest a direct relationship from profitability to growth with a few exceptions. Furthermore, growth was also seemed to be positively associated with profitability.

4.2.1.2 Growth and Profitability: Medium Size firms

4.2.1.2.1 Analysis of Growth

The same exercise was carried out for medium sized firms also. In the context of relationship from profitability (i.e. ROI) to growth was absent as all the p values for current as well as past values of ROI were insignificant. As far as the coefficients of SA (i.e. size) variable were concerned all the values were having negative sign and were also significant. This implies that size of the firm was inversely related to growth of the firms in case of medium sized firms also. All the coefficients of lagged Age were insignificant particularly when GRA was treated as dependent variable [see model 1, 2 and 3]. However, for GRS as dependent variable, all the values were recorded with significant negative sign. This implies that as medium size firms grow in age, they trend to lose rate of growth. Further, Sargan statistic values in case of all the models were insignificant, which implies that all the instrument restrictions are valid.

4.2.1.2.2 Analysis of Profitability

Panel B reported the results for analysis of profitability. For relationship from growth to profit, current values of GRA for model 7 and 8 were found positive and significant. Further, for   the first, second and third lag, these values were found negative and significant. On the other hand, when GRS was considered as explanatory variable all the values for current, first, second and third lag were found positive and significant [see model 10, 11 and 12]. In case of relationship from size to profitability, all the significant values of lagged SA had negative sign except for the model 8. Broadly, there was indirect relationship from size to profitability. In the context of age of the firm, all the values were found significant with negative sign. Thus, here age was also inversely associated with profitability.

Thus, results seemed to confirm the presence of persistence of profit hypothesis as majority of coefficients ROI and ROA were found directly associated with their current values. Further, in the context of relationship from profitability to growth, the relationship varies with the definition of growth. For GRA as explanatory variable, the analysis suggested that relationship was negative. On the other hand, when GRS was used as a measure of growth, relationship seemed to be direct.

4.2.1.3 Growth and Profitability: Large Firms

4.2.1.3.1 Analysis of Growth

In the context of growth- profitability relationship for large firms the results were reported in Table 4.4. In this case also empirical results confirmed the earlier evidence of non-persistence of growth. Further, as far as the relationship from profitability to growth was concerned, when GRA was considered as dependent variable, all the current and lagged values of ROI were found with positive significant sign [see model 1, 2, 3]. On the other hand when GRS was considered as dependent variables, only current values of ROI were found positive and significant. The values of first and second lag of ROI were found negative and significant and of third lag the value was again turned out to be positive and significant [see models 4,5 and 6].

Table 4.2 Growth-Profitability Relationship for Small Firms

Explanatory variables	Panel A:Growth Regression: Dependent variables					
	GRA			GRS		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
GRA/GRS(-1)	**-0.06**	**-0.06**	**-0.09**	**-0.18**	**-0.20**	**-0.23**
p-values	0.00	0.00	0.00	0.00	0.00	0.00
GRA/GRS(-2)		**-0.04**	**-0.05**		**-0.09**	**-0.13**
p-values		0.00	0.01		0.00	0.00
GRA/GRS(-3)			-0.02			**-0.02**
p-Values			0.17			0.00
ROI	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
p-values	0.00	0.00	0.04	0.00	0.00	0.00
ROI(-1)	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
p-values	0.73	0.80	0.44	0.00	0.00	0.00
ROI(-2)		0.00	0.00		**0.00**	0.00
p-values		0.19	0.44		0.03	0.87
ROI(-3)			0.00			**0.00**
p-values			0.71			0.00
SA(-1)	**-0.78**	**-0.75**	**-0.75**	**-0.40**	**-0.44**	**-0.45**
p-values	0.00	0.00	0.00	0.00	0.00	0.00
AGE(-1)	0.09	**0.19**	**0.27**	**-0.33**	**-0.45**	**-0.48**
p-values	0.20	0.04	0.01	0.00	0.00	0.00
J-statistic	70.52	69.49	69.97	85.17	84.85	83.58
Instrument	97.00	97.00	97.00	97.00	97.00	97.00
Explanatory variables	Panel B: Profitability Regression: Dependent variables					
	ROI			ROI		
	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
ROI(-1)	**0.03**	**0.02**	**0.01**	**0.09**	**0.05**	**0.04**
p-values	0.00	0.00	0.00	0.00	0.00	0.00
ROI(-2)		**-0.05**	**-0.05**		**0.06**	**0.01**
p-values		0.00	0.00		0.00	0.00
ROI(-3)			**0.04**			**0.09**
p-values			0.00			0.00
GRA/GRS	**89.52**	**90.39**	**89.63**	**156.53**	**140.02**	**143.60**
p-values	0.00	0.00	0.00	0.00	0.00	0.00
GRA/GRS(-1)	**98.99**	**131.25**	**158.42**	**146.39**	**156.40**	**179.83**
p-values	0.00	0.00	0.00	0.00	0.00	0.00
GRA/GRS(-2)		**95.55**	**122.28**		**20.35**	**58.38**
p-values		0.00	0.00		0.00	0.00
GRA/GRS(-3)			**90.66**			**72.50**
p-values			0.00			0.00
SA(-1)	**-6.63**	**-36.43**	**-54.13**	**-17.36**	**-17.54**	**-17.82**
p-values	0.00	0.00	0.00	0.00	0.00	0.00
AGE(-1)	**42.88**	**28.02**	**-25.70**	**149.16**	**272.04**	**200.45**
p-values	0.00	0.00	0.00	0.00	0.00	0.00
J-statistic	96.19	96.40	96.51	95.80	96.29	93.57
Instrument	97.00	97.00	97.00	97.00	97.00	97.00

Note: 1.All the bold values signify the significance of coefficient at 5 percent level of significance. Sargan Statistic (J statistics) at 72, 71 and 70 degrees of freedom are 92.8, 91.67 and 90.53 respectively.

2.Source: Authors calculations

Table 4.3 Growth-Profitability Relationship for Medium Firms

Explanatory variables	Panel A:Growth Regression: Dependent variables					
	GRA			GRS		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
GRA/GRS(-1)	**-0.13**	**-0.15**	**-0.17**	0.00	0.00	-0.01
p-values	0.00	0.00	0.00	0.63	0.89	0.27
GRA/GRS(-2)		**-0.05**	**-0.05**		**-0.18**	**-0.18**
p-values		0.00	0.01		**0.00**	**0.00**
GRA/GRS(-3)			0.01			**-0.02**
p-Values			0.57			**0.00**
ROI	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
p-values	0.70	0.45	0.68	0.04	0.03	0.04
ROI(-1)	0.00	0.00	0.00	0.00	0.00	0.00
p-values	0.94	0.80	0.42	0.33	0.33	0.31
ROI(-2)		0.00	0.00		0.00	0.00
p-values		0.59	0.84		0.60	0.77
ROI(-3)			0.00			0.00
p-values			0.77			0.54
SA(-1)	**-0.63**	**-0.58**	**-0.58**	**-0.11**	**-0.07**	**-0.07**
p-values	0.00	0.00	0.00	0.00	0.00	0.00
AGE(-1)	0.09	-0.03	0.19	**-0.25**	**-0.14**	**-0.16**
p-values	0.73	0.89	0.63	0.00	0.01	0.01
J-statistic	72.74	68.41	66.11	76.87	84.06	83.54
Instrument	95.00	95.00	95.00	95.00	95.00	95.00
Explanatory variables	**Panel B: Profitability Regression: Dependent variables**					
	ROI			ROI		
	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
ROI(-1)	**0.38**	**0.51**	**0.51**	**0.32**	**0.49**	**0.45**
p-values	0.00	0.00	0.00	0.00	0.00	0.00
ROI(-2)		**-0.37**	**-0.38**		**-0.31**	**-0.27**
p-values		0.00	0.00		0.00	0.00
ROI(-3)			**0.02**			**0.01**
p-values			0.00			0.00
GRA/GRS	-617.52	218.07	170.69	2592.30	2716.30	2493.80
p-values	0.00	0.00	0.00	0.00	0.00	0.00
GRA/GRS(-1)	-360.02	-77.86	-73.08	499.51	202.02	451.10
p-values	0.00	0.00	0.00	0.00	0.00	0.00
GRA/GRS(-2)		-416.44	-386.10		1033.50	1294.90
p-values		0.00	0.00		0.00	0.00
GRA/GRS(-3)			-40.39			763.59
p-values			0.00			0.00
SA(-1)	**-436.36**	**65.00**	**-34.02**	**-144.55**	14.06	20.11
p-values	0.00	0.00	0.00	0.00	0.33	0.38
AGE(-1)	**-860.41**	**-2675.1**	**-2425.3**	399.53	-1058.50	-369.12
p-values	0.00	0.00	0.00	0.00	0.00	0.00
J-statistic	74.99	70.26	72.73	62.85	71.94	61.28
Instrument	96.00	95.00	95.00	95.00	95.00	95.00

Note: 1.All the bold values signify the significance of coefficient at 5 percent level of significance. Sargan Statistic (J statistics) at 70, 69 and 68 degrees of freedom are 90.53, 89.39 and 88.25 respectively.
2.Source: Authors calculations

Table 4.4 Growth-Profitability Relationship for Large Firms

Explanatory variables	Panel A:Growth Regression: Dependent variables					
	GRA			GRS		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
GRA/GRS(-1)	**-0.08**	**-0.12**	**-0.12**	**-0.04**	**-0.11**	**-0.14**
p-values	0.00	0.00	0.00	0.00	0.00	0.00
GRA/GRS(-2)		**-0.09**	**-0.12**		**-0.15**	**-0.13**
p-values		0.00	0.00		0.00	0.00
GRA/GRS(-3)			**-0.08**			**-0.11**
p-Values			0.00			0.00
ROI	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
p-values	0.00	0.00	0.00	0.00	0.00	0.00
ROI(-1)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
p-values	0.00	0.00	0.00	0.00	0.00	0.00
ROI(-2)		**0.00**	**0.00**		**0.00**	**0.00**
p-values		0.00	0.00		0.00	0.00
ROI(-3)			**0.00**			**0.00**
p-values			0.00			0.00
SA(-1)	**-0.91**	**-0.89**	**-0.90**	**-0.18**	**-0.15**	**-0.18**
p-values	0.00	0.00	0.00	0.00	0.00	0.00
AGE(-1)	**1.21**	**1.51**	**1.39**	**0.32**	**-0.08**	**0.23**
p-values	0.00	0.00	0.00	0.00	0.01	0.00
J-statistic	79.01	73.14	73.05	82.33	80.53	76.93
Instrument	96.00	96.00	96.00	96.00	96.00	96.00
Explanatory variables	**Panel B: Profitability Regression: Dependent variables**					
	ROI			ROI		
	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
ROI(-1)	**0.00**	**-0.01**	**-0.01**	**-0.02**	**-0.03**	**-0.05**
p-values	0.00	0.00	0.00	0.00	0.00	0.00
ROI(-2)		**-0.02**	**-0.02**		**0.08**	**0.06**
p-values		0.00	0.00		0.00	0.00
ROI(-3)			**0.00**			**0.13**
p-values			0.00			0.00
GRA/GRS	**1.50**	**15.13**	**14.60**	**-8.53**	**0.88**	**4.58**
p-values	0.00	0.00	0.00	0.00	0.00	0.00
GRA/GRS(-1)	**6.39**	**27.38**	**28.08**	**130.24**	**156.43**	**191.12**
p-values	0.00	0.00	0.00	0.00	0.00	0.00
GRA/GRS(-2)		**29.21**	**31.61**		**18.54**	**34.18**
p-values		0.00	0.00		0.00	0.00
GRA/GRS(-3)			**6.95**			**36.44**
p-values			0.00			0.00
SA(-1)	**-14.10**	**-14.83**	**-15.71**	**-31.83**	**-32.18**	**-39.20**
p-values	0.00	0.00	0.00	0.00	0.00	0.00
AGE(-1)	**-36.71**	**-62.91**	**-72.73**	**0.07**	**41.04**	**90.81**
p-values	0.00	0.00	0.00	0.96	0.00	0.00
J-statistic	94.66	88.92	87.73	84.05	81.15	81.13
Instrument	98.00	96.00	97.00	98.00	97.00	96.00

Note: 1.All the bold values signify the significance of coefficient at 5 percent level of significance. Sargan Statistic (J statistics) at 72, 71 and 70 degrees of freedom are 92.8, 91.67 and 90.53 respectively.
 2.Source: Authors calculations

Thus, for 'large sized firms' also relationship from profitability to growth seems to be direct for all the current as well past values except some past values ROI when GRS was considered as dependent variable. In context of relationship from size to growth, it was inverse in this case also. For age, all the values of the coefficients of lagged age were having positive sign, except for model 8.

4.2.1.3.2 Analysis of Profitability

Table 4.4 presented the results for relation for persistence of profit and from growth to profitability. The values of coefficients for all the lags of ROI were found negative and significant [see model 7, 8 and 9]. This implies that persistence of hypothesis do not hold for large firms. In the context of relationship from growth to profitability, it may be noted that all the current as well as past values of GRA and GRS were found with positive sign and were also significant except current value of GRS in model 10. Thus, results seemed to convey direct relationship from growth to profitability for large firms also. As far as the size and age of the firm was concerned, it may be noted that all the significant coefficients for lagged SA were found with negative sign. Further, the coefficients of lagged coefficients of age were found with negative sign when GRA was treated as dependent variable [see model 7, 8, and 9]. On the other hand, when GRS was treated as dependent variables, the significant values were identified with positive signs [see model 10, 11, and 12]. The Sargan statistic values in this case also were found insignificant, which implies that all the instrument restrictions were sufficient.

On the whole, it can be concluded the relationship from profitability to growth depends upon the definition of the variable. The relationship was found to be direct when GRA was considered as dependent variable. Further, growth of the firm was found directly associated with profitability. In the context of size of the firm, it was found that size was indirectly related to both growth and profitability. As far as the relation with age was concerned, growth was found to be directly associated with age and relationship between profitability and age varies with definition of growth variable.

Section V

4.3 Conclusions and Policy Implications

In this study attempt has been made to analyse the growth profitability dynamics for Indian agro based industry. A total of 288 firms were selected for the analysis. The analysis was carried out for all firms and disaggregated level. Broadly, the following conclusion can be drawn from above deliberations:

- For all groups of firms the relationship from current level of profitability to growth was seemed to be direct. However, the relationship seemed inconsistent in the context of definition of growth variable and lagged values. Specifically, for GRA as growth variable, the past values of ROI were directly associated with growth. This is particularly true for "all firms" and "large firms". For small and medium firm the past values of ROI were not associated with growth. However, when GRS was treated as growth variable, some lagged values of ROI were found with negative sign. On the whole results seemed to suggest that there was direct relationship from current and prior profitability to growth. However, when GRS was treated as growth variable the prior profitability was adversely affected the growth of sales of large firms in particular. An important policy implication of this result is that only fitter firms grow in case of Indian agro based industry. Direct relationship from profitability to growth particularly for small scale agro firms implies that the easy corporate tax policy expected to play important role for the growth of agro based industry in India.

- In the context of relationship between size and growth, lagged values of size variable were inversely related to growth of the firm, which implies that as firms grow in size, it sacrifices its growth objective. This was in consistent with the traditional theory where economies of scale limit the growth of the firms. This conclusion was common for all groups of firms.

- As far as the relationship between age and growth was concerned, it was direct for large firms. This implies that as firms mature, they tend to learn overtime, diversify and produce more efficiently. This was particularly true when GRA was treated as growth variable. However, for GRS as growth variable, the relationship was found inverse for "all the firms", "small firms" and "medium firms". This seemed to suggest that as firms mature they do not concentrate on growth in terms of sales rather they try to restrict their operations to core competence areas.

- Further, the hypothesis of persistence of profit seems to be true for all the group of firms except for 'large firms'. This implies that, probably due to barriers to entry, lack of competition in agro based industry tended to accumulate abnormal profits.

- Direct relationship from instantaneous growth to instantaneous profitability was confirmed for all the groups of firms. Further, lagged growth was also found directly associated with profitability with few exceptions. However, for small and large firms, all the current as well as past values of growth were

found to be directly associated with profitability. The direct relationship was also confirmed in case of 'medium sized' firms particularly when GRS and ROI were modeled together. It also confirmed the finding of [26], who for French manufacturing firms concluded that past level of growth had positive and significant impact on subsequent profit, which was contrary to 'Penrose effects'. This implies that profitability of agro based industry in India improved due to scale economies and also they learn overtime. However, when growth was estimated in terms of assets, the relationship from growth to profitability was found inverse.

- As far the relationship from size of the firm to profitability was concerned, for small, medium and large group of firms, it was found negative and significant. Since, size of the firm was estimated in terms of assets, the accumulation of assets might lead to lower profitability. This implies that as firms grow in size (in terms of assets) they tend to sacrifice their rate of profit.

- For relationship from age and profitability, it was direct for "All firms" and "small Firms" group and inverse for "medium firms" and "large firms" group particularly when profitability was modeled with GRA. The direct relationship between age and profitability particularly in case of small firms seemed to suggest that efforts should be made to setup more small scale agro firms as they can profitably exploits the market conditions.

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