

# **The Impact of Acquisitions on Profitability: evidence from listed firms in South Africa**

Ralitza Dobreva  
University of Kwa-Zulu Natal

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## **Abstract**

There are various theoretical and strategic reasons used by firms to justify embarking on acquisitions. The theory is somewhat ambiguous about their impact on the acquirer's performance in terms of profitability, shareholder wealth, R&D, resource redeployment, management effectiveness and a variety of other indicators of value creation. The expansion of firms through acquisitions creates competition concerns in the cases where acquirers and targets are linked vertically or horizontally. However, the long-term effects of this method of expansion in the context of developing countries in general and of South Africa in particular require further investigation.

This paper adopts the approach taken by Dickerson, Gibson and Tsakalotos (1997) to analyse the long-term impact of acquisitions on the acquirers' profitability using a panel of companies listed in South Africa and observed over at least ten years. The aim is to compare the rate of return on company growth through acquisitions to the rate of return of growth through internal investment and to study whether embarking on acquisitions has positive or negative effects for generating value in the form of profits.

## 1. Introduction

Firms can grow in two ways – organic expansion and expansion through acquisitions. The motives for an acquisitions strategy include expansion of market share, diversification, hedging risk, acquiring new technologies and finding entry points into other territories and other sectors. This study aims to investigate whether emerging market firms can grow profitably through acquisitions in the medium to long run. The analysis is based on panel data from listed companies in South Africa.

Studies from mainly developed countries show that acquisitions are not always a good way of creating shareholder value for acquirers. The prevalent understanding is that the gains from acquisitions tend to accrue to the target's shareholders (e.g. Caves (1988), Loughran and Vijh, 1997, Ravenscraft and Scherer (1987)). Since 1990, developing country acquirers have become increasingly active in seeking to enhance their comparative advantage, often looking for opportunities outside their home country borders. In the period 1990 to 2007, South African firms have been the second most frequent acquirers, after Malaysia, in terms of the number of cross-border transactions and the third biggest in terms of deal value after Mexico and Brazil (Chernykh et al, 2011). However, little is known about the long-run effects of acquisitions on acquirer performance and even less regarding emerging market firms. This paper is an attempt to begin addressing this question.

## 2. A Brief Review of the Literature

The discussion about the effects of acquisitions on company performance involves many perspectives, spanning the fields of economics, finance, management and human resources. This study focuses on the long-run effects of acquisitions on the acquiring firms' profits, and adopts a perspective predominantly from the realm of economics.

In neoclassical theory, firm growth is integrally entwined with the profit maximisation objective – expansion is the means for the firm to achieve its optimal size. Later theories include managerial incentives (for example, empire building and prestige, Marris, 1964), which may be in conflict with profit maximisation. Also, there may be a managerial constraint to the pace of expansion in a given period, because existing management structures would be too stretched to cope effectively with larger operations (Penrose, 1959).

Firms' two options for expansion – internal (organic) and acquisitions growth – hold pros and cons. Dickerson et al (1997) outline three advantages and three disadvantages of acquisitions growth. The first advantage is the ability of the firm to realise returns soon after the investment is made, as the target firm is already in operation. Second, adding an already functioning business (that has a working staff complement) to the firm may relax the managerial constraint to growth. Third, acquisitions may offer the firm opportunities for internal expansion (Cable, 1977), which could enhance organic growth.

A major disadvantage of growth through acquisitions is that the firm forgoes the opportunity to tailor the investment to its exact needs and desires. Further, troubled firms are more likely to be acquisition targets and hence the acquirer's return may be smaller and be achieved slower. The challenges of integrating the internal structures and cultures of

different functioning firms amount to another disadvantage of acquisitions. Dickerson et al (1997) conclude that most firms are likely to employ both expansion strategies and use the (usual) equilibrium rule and predict that a firm will “acquire up to the point where discounted marginal returns from the acquisition are equal to the discounted marginal returns from investment internally” (p. 346).

Pre-acquisition, target firms tend to have low productivity and experience improvements afterwards. The productivity of the acquiring firms and the whether a main or peripheral division is buying or selling the plants were the main factors determining the extent of the improvements (Maksimovic and Phillips, 2001)

Schoar (2002) offers a more nuanced perspective by portraying diversifying acquisitions essentially as a mechanism of transferring efficiency from the more efficient industries of acquirers to the less efficient industries of their targets. Plants in diversified firms tend to be seven times more productive than those of firms operating on a single industry. However, when firms become more diversified, they experience a fall in average productivity, which Schoar attributes to a “new toy effect” – a shift in focus by management on the newly acquired businesses at the expense of existing plants. The evidence presented by Schoar (2002) confirms the view taken by Dickerson et al (1998) and paints a more detailed picture of the pre-acquisitions and post-acquisition behaviour of both acquirers and targets.

The payment method used in acquisitions is likely to matter in determining any abnormal returns. Loghran and Vijn (1997) find that acquirers that embark on stock (equity)-funded mergers experience negative returns, while those using the cash payment option benefit from positive returns. There are differences for target firms too, as holdings of acquirer stock do not result in positive excess returns for targets. Another factor in cross-border acquisitions is the acquirer and target’s home country – for example, emerging market acquirers tend to experience positive announcement returns if the target is in a firm in a developed country, but the benefits accrue only to the target firm if it is also in an emerging market (Chernykh et al (2011)).

Most evidence about acquisitions still stems from market valuations and event studies and takes a short-term view of gains, while Dickerson et al (1997) attempt to shift the focus to a longer-term perspective and take the economics approach. This paper is an attempt to bring the latter kind of enquiry into an emerging market context.

### **3. Data and Methodology**

The data used in the study was obtained from the Bloomberg databank and it includes 369 companies listed on the Main Board of the Johannesburg Stock Exchange, for which information was available. The data covers the period from 1988 to 2012 in the form of an unbalanced panel. The aim is to explore the long-run effect of acquisitions on profitability and attempt to compare it to the impact of internal (organic) growth.

Only 39% of companies, for which information was available, were non-acquirers (Table 1). Of the acquirers, most companies embarked on between two and five acquisitions, while a

minority (14 companies) showed greater appetite, making between 11 and 30 acquisitions in total.

**Table 1**  
**Acquisitions activity by JSE-listed companies**

<i>Total number of acquisitions</i>	<i>Number of companies</i>	<i>Per cent</i>
0	143	38.86
1	66	17.93
2 to 5	120	32.61
6 to 10	25	6.80
11 to 15	5	1.36
16 to 20	6	1.63
21 to 25	1	0.27
26 to 30	2	0.54
Total (n)	368	100.00

Source: Author's calculations using an unbalanced panel over the period 1988 to 2012. Data obtained from the Bloomberg databank.

The paper follows the methodology proposed by Dickerson et al (1997). The basic equation is given by

$$\pi_{it} = \beta\pi_{i,t-1} + \sum_{j=1}^5 \delta_j \text{SIZE}_{jit} + \eta \text{LEV}_{it} + \theta(L)G_{it} + \alpha_i + \gamma_t + \varepsilon_{it} \quad (1)$$

The dependant variable is the profitability of company  $i$  at time  $t$ , which is measured by the operating income (pre-tax profits) divided by the average of the opening and closing values of total assets for the period. This measure of profitability reflects the gross rate of return on assets.

The coefficient on lagged profits indicates the degree of persistence in profits. The relative firm size ( $\text{SIZE}_{it}$ ) is captured by dummy variables for the quintiles of total (net) assets. (These dummies reflect the size of the firm relative to the distribution of total assets among all firms in all periods and a firm's position may change in any period.) Leverage is measured by the sum of short-term and long-term borrowing as a ratio of total assets at the end of the period. The growth variable,  $G_{it}$ , is the growth of total (net) assets. Summary statistics for these variables are presented in Appendix A.

Company-fixed effects are captured by  $\alpha_i$ , which acknowledges the intrinsic differences between companies that result in unobserved heterogeneity. The time-fixed effects are captured by  $\gamma_t$  and include the effects of the business cycle and other time-specific events on the company performance.

The estimation of the model in equation (1) and its modifications presents a number of problems. First, using a fixed-effects model allows for time-invariant characteristics intrinsic to each company to be incorporated. Second, however, the fixed effects estimators in a dynamic panel model are likely to be biased, especially for short runs of data. Fortunately the bias falls for longer runs, i.e. when  $T$  rises and is proportional to  $1/T$  (Nickell, 1981). Hence only companies with at least 10 years of data are used in the estimation. The average  $T$  for this subsample of 240 companies is 16.58 years.

Third, the current growth and leverage variables are likely to be endogenous. Clearly, firms expand their operations in order to enhance profitability and profits can be used to grow the firm's asset base. Similarly, leverage facilitates improved profitability and profits make borrowing easier. Hence, the lagged values of growth and leverage and the second lag of profits are used as instruments for current growth and current leverage.

Arellano and Bond (1991) propose an estimator, which uses differencing to eliminate the fixed effects bias and which exploits further moment conditions in order to instrument for the lagged dependent variable, also allowing for instrumentation of other endogenous variables. One drawback of the Arellano-Bond estimator is that the use of dummy variables becomes somewhat problematic.

Both the fixed effects and Arellano-Bond estimates are presented in Section 4. In the case of the South African data, the estimates differ, unlike Dickerson et al's claim about the results obtained using their UK sample of firms (footnote 21 on p.352).

The basic model in equation (1) is modified in three ways, once again following the approach taken by Dickerson et al. First, Model 2 adds a shift dummy variable. The dummy variable changes from zero to one when a firm completes its first acquisition and remains at one in all subsequent periods. The coefficient on this shift dummy is intended to measure a potential persistent change in profits when a firm becomes an acquirer. Dickerson et al refer to this as "any permanent effect resulting from acquisition" (p.352) and note that this rough definition of acquirer does not distinguish between firms that use this expansion method with varying frequency. Hence the results are likely to be biased towards a smaller "permanent effect".

The second modification of the basic model (Model 3) is the inclusion of an impulse dummy variable, which takes on the value of one in any period when at least one acquisition is made and zero otherwise. The impulse dummy is an attempt measure the transient effects of acquisitions. It has its own limitations because firms that are multiple acquirers are not distinguished from firms that embark on a single transaction. The data shows that South African firms recorded up to eight acquisitions in a given year, but most frequently the number of acquisitions was between one and three per year (Table 2).

**Table 2**  
**Acquisitions per year of JSE-listed firms**

<i>Number of acquisitions per firm per year</i>	<i>Frequency</i>	<i>Per cent</i>
0	3280	86.32
1	374	9.84
2 to 3	120	3.16
4 to 5	23	0.59
6 to 7	1	0.03
8	2	0.06
Total (N)	3800	100.00

Source: Author's calculations using an unbalanced panel over the period 1988 to 2012. Data obtained from the Bloomberg databank.

The impulse dummy can also be used to gauge the probability of making acquisitions in the subsequent year, given whether the firm undertook at least one acquisition in the current year. The transition probabilities are shown in Table 3.

**Table 3**  
**Transition probabilities of making at least one acquisition in the next year**

	<i>No acquisitions made in the next year (<math>A1_{t+1} = 0</math>)</i>	<i>At least one acquisitions made in the current year (<math>A1_{t+1} = 1</math>)</i>	<i>Total</i>
<i>No acquisitions made in the current year (<math>A1_t = 0</math>)</i>			
<i>Number</i>	2,743	321	3,064
<i>Percentage</i>	89.52	10.48	100
<i>At least one acquisition made in the current year (<math>A1_t = 1</math>)</i>			
<i>Number</i>	314	182	496
<i>Percentage</i>	63.31	36.69	100
<i>Total</i>			
<i>Number</i>	3,057	503	3560
<i>Percentage</i>	85.87	14.13	100

Source: Author's calculations using an unbalanced panel over the period 1988 to 2012. Data obtained from the Bloomberg databank.

Table 3 shows that given no acquisition are made in a given year, the probability of at least one acquisition in the following year is about 10%. The probability of acquisitions activity

continuing in the following year, given the company was active in the current year is 37%. Hence, there could be some persistence effects regarding acquisitions, perhaps supporting the waves of activity observed in developed countries, but these effects are not particularly strong for South Africa.

Model 4 retains the shift dummy and aims to distinguish between the impacts of internal and acquisitions growth by decomposing the growth variable. Acquisition growth is the total value of acquisitions in a given year as a proportion of average assets for the period. Internal growth is the change in total assets less the value of acquisitions as a proportion on average assets.

#### **4. Results**

The results from the fixed effects instrumental-variables regressions for all four models are presented in Table 4 below. The instruments used for the endogenous leverage and growth variables are the first lag of leverage, the second lag of growth (decomposed into acquisitions and internal growth in Model 4) together with the second lag of the dependent variable, profit.

**Table 4**  
**Company profitability and acquisitions**  
**(Instrumental variables fixed effects regression results)**

	<b>Dependent variable: profit (<math>\pi_{it}</math>)</b>			
	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>
<b>Lagged profit</b> ( $\pi_{it-1}$ )	0.2257*** (0.0499)	0.2209*** (0.0506)	0.2298*** (0.0493)	-0.4420 (0.5075)
<b>SIZE2<sub>it</sub></b>	1.2322*** (0.4478)	1.3864*** (0.4683)	1.3403*** (0.4634)	9.7467 (10.7741)
<b>SIZE3<sub>it</sub></b>	1.5348*** (0.5342)	1.7976*** (0.5730)	1.7580*** (0.5722)	13.5702 (15.2435)
<b>SIZE4<sub>it</sub></b>	1.5353** (0.6233)	1.9111*** (0.6822)	1.8629*** (0.6815)	16.4045 (17.9558)
<b>SIZE5<sub>it</sub></b>	0.9610 (0.6627)	0.4998** (0.7531)	1.4672* (0.7560)	17.3171 (20.0488)
<b>LEV<sub>it</sub><sup>+</sup></b>	6.3034*** (1.1693)	6.2770*** (1.1821)	6.4942*** (1.1574)	-2.3843 (26.8092)
<b>Growth (<math>G_{it}^+</math>)</b>	-4.9364*** (1.4497)	-5.2170*** (1.4906)	-4.9467*** (1.4469)	-
<b>Lagged growth</b> ( $G_{it-1}$ )	1.0566*** (0.1892)	1.0507*** (0.1913)	1.0242*** (0.1897)	-
<b>Acquisitions</b> <b>growth (<math>AG_{it}^+</math>)</b>	-	-	-	-34.2465* (16.8647)
<b>Lagged</b> <b>acquisitions</b> <b>growth (<math>AG_{t-1}</math>)</b>	-	-	-	2.5620 (2.6807)
<b>Internal</b> <b>growth</b> ( $IG_{it}^+$ )	-	-	-	-39.7988 (32.8500)
<b>Lagged</b> <b>internal</b> <b>growth (<math>IG_{t-1}</math>)</b>	-	-	-	1.3414 (1.5076)
<b>Acquisitions</b> <b>dummy (<math>A_{it}</math>)</b>	-	-0.4376* (0.2294)	-0.6994** (0.2763)	-4.5933 (10.9000)
<b>Impulse</b> <b>dummy</b> ( $A1_{it}$ )	-	-	0.7523** (0.3318)	-
<b>Constant</b>	-1.7434*** (0.3477)	-1.7824*** (0.3537)	-1.8017*** (0.3550)	-5.0280 (10.1684)
<b>Observations</b>	3082	3082	3082	2843

*Source:* Author's calculations using an unbalanced panel over the period 1988 to 2012. Data obtained from the Bloomberg databank.

*Notes:*

- \*\*\* significant at the 1% level
- \*\* significant at the 5% level
- \* significant at the 10% level



The results from the first three models highlight several features. The coefficient on lagged profit shows that there is a degree of persistence in profits, which is consistent with theoretical expectations and other empirical studies (e.g. Geroski and Jacquemin (1988), Dickerson et al (1997)). Size appears to have a positive impact on profitability, but is likely to follow an inverted-U relationship in a similar to the results found by Dickerson et al (1997) for the UK. However, leverage has a large positive effect, which is contrary to the evidence for the UK. Current and lagged growth has opposite impacts on profits, which may imply that expansion does not pay off immediately.

Model 2 highlights that becoming an acquirer causes a downward shift in profits (shown by the shift dummy A), while Model 3 adds the contrast of enhanced returns to firms in periods when they embarked on acquisitions (as reflected by the impulse dummy A1).

Model 4 probably suffers from the noisiness of the internal growth and acquisitions growth variables. Nevertheless, it is consistent in showing that acquirer profits are reduced by acquisitions.

The Arellano-Bond results that are presented below show rather different, but largely insignificant findings. The methodology used by the model, and specifically the differencing, is likely to turn any impacts measured by dummy variables insignificant. In addition, the large number of instruments reduces the power of the model substantially, given that there are only 240 companies with 10 or more years of data available in the panel (and 129 companies with less than 10 years of data were not used in the estimation).

**Table 5**  
**Company profitability and acquisitions**  
**(Arellano-Bond regression results)**

	<b>Dependent variable: profit (<math>\pi_{it}</math>)</b>			
	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>
<b>Lagged profit</b> ( $\pi_{it-1}$ )	-0.2064*** (0.0120)	-0.2056*** (0.0127)	-0.2054*** (0.0125)	-0.2180*** (0.0145)
<b>SIZE2<sub>it</sub></b>	-0.2567 (0.7265)	-0.2451 (0.7127)	-0.2481 (0.7276)	0.1765 (0.3502)
<b>SIZE3<sub>it</sub></b>	-0.5590 (1.0750)	-0.5542 (1.0372)	-0.5699 (1.0720)	0.1179 (0.5241)
<b>SIZE4<sub>it</sub></b>	-0.7734 (1.4418)	0.7852 (1.3811)	-0.8051 (1.4310)	0.0307 (0.5638)
<b>SIZE5<sub>it</sub></b>	-0.8326 (1.3643)	0.8358 (1.3166)	-0.8615 (1.3689)	0.1572 (0.6487)
<b>LEV<sub>it</sub><sup>+</sup></b>	-11.9192*** (0.9828)	-11.8820*** (1.0125)	-11.8756*** (1.0159)	-11.8563*** (1.0815)
<b>Growth (G<sub>it</sub><sup>+</sup>)</b>	0.6798 (0.7774)	0.6883 (0.7754)	0.6941 (0.8008)	-
<b>Lagged growth</b> (G <sub>it-1</sub> )	0.2974 (0.2702)	0.3006 (0.2705)	0.3011 (0.2742)	-
<b>Acquisitions growth</b> (AG <sub>it</sub> <sup>+</sup> )	-	-	-	0.2165 (0.4526)
<b>Lagged acquisitions growth</b> (AG <sub>t-1</sub> )	-	-	-	0.3939 (0.2451)
<b>Internal growth</b> (IG <sub>it</sub> <sup>+</sup> )	-	-	-	-0.0461 (0.3197)
<b>Lagged internal growth</b> (IG <sub>t-1</sub> )	-	-	-	0.0043* (0.0023)
<b>Acquisitions dummy</b> (A <sub>it</sub> )	-	0.1790 (0.3031)	0.2287 (0.2882)	-0.0216 (0.2930)
<b>Impulse dummy</b> (A1 <sub>it</sub> )	-	-	-0.0407 (0.1265)	-
<b>Constant</b>	2.6047** (1.0701)	2.5232 (1.0751)	2.5139 (1.0852)	1.9361 (0.4825)
<b>Observations</b>	3082	3082	3082	2843

Source: Author's calculations using an unbalanced panel over the period 1988 to 2012. Data obtained from the Bloomberg databank.

Notes:

- \*\*\* significant at the 1% level
- \*\* significant at the 5% level
- \* significant at the 10% level

The limitations of the data and the models are discussed further in Section 5 below, together with some robustness checks. The directions for further research are also explored.

## **5. Robustness checks and limitations**

The use of accounting data for estimation is likely to present some well-known impediments, which include the potential for “creative accounting” by firms to reduce their tax bills and possible inconsistencies in the timing and methods of reflecting acquired assets in the companies’ books.

Working with listed companies is a second-best alternative to surveys of plant-level data (probably by far), as selection biases are inevitable. The requirements to list on the JSE include share capital of R25 million, three years profit history and pre-tax profit of R8 million or more. Also, the use of firms with a relatively long period of data only introduces further bias in selecting only well established firms. This is explored further now.

The firms with less than ten years of data are on average smaller and less profitable. Their average total assets were R2 200m, while the average for all firms was R12 606m and for those of firms with  $T > 10$  it was R14 651m. With regard to before-tax profit (operating income), the firms with shorter runs of data recorded on average R336m per year, compared with the overall average of R725m and the average for firms with longer runs of data available of R801m. Hence the results presented in Section 3 represent the larger, more established firms.

There are several limitations of the estimation models. First, the acquisitions growth and internal growth variables suffer from measurement errors, as the value of acquisitions is available in most cases of cash acquisitions but often unavailable when the methods of payment are ‘stock’, ‘cash and stock’ and ‘cash or stock’. In this case, Model 4 is affected and this is reflected in the low accuracy of the estimates. While the results for the impact of acquisitions growth are likely to be driven by cash acquisitions, combining all methods of payment may result in a weaker or ‘noisier’ overall effect. Divestments also need to be included more explicitly, since with the current model they appear as part of the internal growth (or shrinkage in this case).

Second, the effects of acquisitions on acquirer profitability may differ by method of payment. Loughran and Vijh (1997) find this to be the case for shareholder returns for a sample of acquirers and targets that were listed in the US over the period 1970 – 1989. Some of these effects may be captured by the shift and/or impulse dummies, but they offer a rough means of measurement.

Third, it is reasonable to suppose that firms gain experience from embarking on multiple acquisitions and this lessens any negative effects on the acquirers. The model does not cater for this issue, except possibly to a minor degree through the impulse dummy, but any possible cumulative effects from experience are not captured.

Fourth, any out-of-period acquisitions are not captured. Thus making the distinction between acquirers and non-acquirers is only based on the available observations. These limitations offer a broad scope for further research.

Fifth, a clearer picture may emerge if more features of the acquisitions are added – whether they are local or cross-border, whether the target is in an emerging or developed market and whether the merger is a horizontal, vertical or diversifying transaction in terms of industry. Also, divergence of acquisitions returns between various industries is likely and hence it warrants attention.

[Checks on the instruments are necessary. Also, the inclusion lagged growth (or lagged internal and acquisitions growth) as purely exogenous variables in the Arellano-Bond model may be causing some of the chaos.]

## **6. Conclusion**

The aim of this paper is investigating the effect of acquisitions on profitability of South African acquirers using an unbalanced panel of JSE listed companies over the period 1988 - 2012. The results from an instrumental-variables, fixed-effects model show that becoming an acquirer causes a downward shift in the firm's profitability, compared to non-acquirers. However, there are positive effects on profit in years when acquisitions are undertaken. The first finding is in line with the results of Dickerson et al (1997) for the UK, but the second one is contradictory. An attempt to decompose growth into acquisitions and internal components suffers from loss of accuracy but seems to imply a negative effect of acquisitions growth. Hence, this paper is a 'first hack' at this analysis and further, more detailed investigation into other features of the transactions and other models, which may improve the estimation of impacts, is necessary to bring clarity and aid in the explanation.

**Appendix A**  
**Summary Statistics**

Variable	Mean	Std Dev	Min	Max	Observations
Operating income (R mil)					
overall	724.879	3173.631	-7068	63962.92	N = 4545
between		2744.44	-285.9511	35652.67	n = 369
within		1779.626	-25326.83	29035.12	T-bar = 12.3171
Short-term borrowing (R mil)					
overall	751.6872	4653.338	0	123233	N = 4454
between		3035.931	0	37182.98	n = 369
within		3020.509	-30696.69	86801.71	T-bar = 12.0705
Long-term borrowing (R mil)					
overall	1167.477	7856.878	0	171376	N = 4479
between		4822.195	0	73736.18	n = 369
within		5759.448	-42365.05	134529.4	T-bar = 12.1382
Total (net) assets (R mil)					
overall	12606.16	67998.06	0	1503653	N = 4543
between		47927.38	12.15329	547892.4	n = 369
within		40067.47	-470749.1	968366.8	T-bar = 12.3117
profit					
overall	.0184575	2.112962	-133.5555	12.32588	N = 4535
between		.8552517	-15.91606	1.085154	n = 369
within		1.881704	-97.62102	16.74978	T-bar = 12.29
lev					
overall	.1899224	.5197378	0	30.11153	N = 4423
between		.2171673	0	3.05382	n = 369
within		.4783613	-2.863898	27.24763	T-bar = 11.9864
growth					
overall	.0636197	.5616946	-1.999934	1.999982	N = 3794
between		.1053568	-.3760759	.3563881	n = 240
within		.5529224	-2.290865	2.310931	T-bar = 15.8083
total acq value					
overall	206.5651	2617.37	0	125859.2	N = 3688
between		924.3788	0	10426.79	n = 240
within		2470.091	-10220.22	115639	T-bar = 15.3667
acq_growth					
overall	.0712873	1.777736	0	88.56088	N = 3683
between		.4878574	0	5.423648	n = 240
within		1.716286	-5.352361	83.42271	T-bar = 15.3458
int_growth					
overall	-.5409439	12.30042	-495.366	1.999982	N = 3683
between		3.060147	-29.04654	.3304994	n = 240
within		11.91737	-466.8604	30.4099	T-bar = 15.3458

Notes:

1. The 'operating income' variable measures pre-tax profit
2. profit = (operating income / average assets), where average assets = average of opening and closing value of assets for each year

3. 'lev' measures leverage or debt.  $lev = (ST \text{ borrowing} + LT \text{ borrowing}) / \text{total assets}$ , where the closing value of total assets for the period is used.
4. 'growth' is the growth of total assets (in each year), i.e. the difference between closing and opening values of assets as a proportion of average assets
5. 'total acq value' is the total value of acquisitions in each year, where the company concerned was an acquirer.
6. 'acq\_growth' measures the company's growth through acquisitions in each year. It is given by the total value of acquisitions as a proportion of average assets.
7. 'int\_growth' = change in total assets after subtracting the total value of acquisitions as a proportion of average assets.

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