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Re-examining And Extending Penrose's Growth Theory: Updating Penrose For The 21st Century

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ABSTRACT

Edith Penrose argued that firms face a constraint on organic growth because of growth activities in previous periods. Central to her ideas about growth is the distinction between managerial and entrepreneurial capabilities. Growth in previous periods creates adjustment costs which are associated with managerial capabilities *and* impacts on the growth opportunities which are associated with entrepreneurial capabilities. In this paper we revisit Penrose's work to examine *how* the nature of growth in previous periods may effect growth in the current period. Employing a panel of all commercially active enterprises in the private (non-government) sector in Sweden over a 10 year period our results indicate that previous organic growth acts as a constraint on organic growth, however, acquisitive growth may act as a catalyst for organic growth. Based on these findings, we suggest extensions Penrose's to growth theory.

INTRODUCTION

"The Theory of the Growth of the Firm" by Edith Penrose, first published in 1959, is a seminal contribution to management research, in particular the Resource-Based View (RBV) (Mahoney and Kor, 2004). Despite a rapidly growing body of empirical work on firm growth, which frequently references Penrose's work, little explicit testing of her ideas has been undertaken; an exception being Marris (1964) (Davidsson, Achtenhagen, & Naldi, 2006; Davidsson & Wiklund, 2000). We feel that this is unfortunate given that conceptual advancement in growth studies has been limited (Davidsson & Wiklund, 2000; Delmar, 1997; Storey, 1994) and Penrose's theory remains the most comprehensive theory of growth to date.

The focus of our paper is the relationship between previous organic (internal), current and previous acquisitive (external) growth and their effect on current organic growth. There are two main reasons for this approach. First, central to Penrose's theory is that opportunities for, and limits to, future growth are generated by the resource/capability accumulation of past growth. Second, a unique aspect of Penrose's work is the clear distinction made between these two modes of growth. She presented internal and external growth as two different strategic options. While each mode of growth presents unique opportunities and challenges to the firm, she noted that the basic principles of her growth theory apply to both modes. For example, the successful implementation of each requires entrepreneurial qualities in the firm and the access to managerial resources (Penrose, 1959: 128). Her arguments suggest that there are limits to both

organic and acquisitive growth, and that the use of one mode of growth may have consequences for the use of the other: “The significance of merger [and acquisition] can best be appraised in the light of its effect on and limits to internal growth” (Penrose, 1959: 5). In this paper we re-examine and extend Penrose’s growth theory by focusing on how previous organic growth and current and previous acquisitive growth influence current organic growth. We test our ideas on a panel of Swedish firms from 1987-1996.

When re-examining Penrose’s writings it is important to acknowledge that they are a product of her time (Lockett & Thompson, 2004). Her ideas were informed by inductive reasoning based on manufacturing companies in the 1950s, a time when growth opportunities were immense for manufacturing firms. Consequently, she explicitly states that her theory assumes that there are no external limits to the growth opportunities of firms. The assumption of unlimited growth opportunities does not hold today given slower economic growth and increased international competition. Similarly, free trade agreements, the internationalization of capital markets and the introduction of new financial instruments make firms’ evaluation of internal (organic) vs. external (acquisitive) growth opportunities different today. In effect, it has become both cheaper and easier to buy and sell companies. Arguably this may have decreased the problems associated with pursuing a strategy of growth through acquisition.

The remainder of the paper is structured as follows. In section 2 we outline our theoretical background and derive propositions in relation to both organic and acquisitive growth. In section 3 we present our data and methods. The results of our analysis are presented in section 4. Finally, in section 5 we discuss our results and highlight the implications of our work.

THEORETICAL BACKGROUND

Penrose was interested in the growth of firms as institutions. Influenced by the writings of Barnard (1938), Cyert and March (1955) and Simon (1947), she considered firms to be administrative entities, with the control over potentially valuable resources. It is the managers of the firm who make decisions about how firm activities and resources are deployed (Penrose, 1960: 2-3). The current and historical activities of the firm shape the firm’s future resources and knowledge and hence its future productive opportunity set – i.e. the firm’s resource base is unique and path dependent.

In addition to highlighting the importance of firm specific managerial knowledge Penrose identifies two types of firm-specific capabilities: entrepreneurial and managerial (or administrative) (Penrose, 1959: 35). Entrepreneurial capabilities are a function of imagination. Managerial capabilities are largely practical in orientation, and are associated with the execution of ideas. Entrepreneurial capabilities are a necessary condition for, and are positively related to, firm growth. Entrepreneurial capabilities are not a sufficient condition for firm growth as they must be accompanied by managerial capabilities for growth to occur.

Penrose’s emphasis on the importance of managerial resources was based on her view that the firm is not just a collection of individuals but “a collection of individuals who have experience working together” (Penrose, 1959: 46). Managers require experience of working together in a firm in order to be effective, which has important implications for the rate at which a firm expand its activities. The expansion of the management team, and hence the development of managerial capabilities, is inherently limited in the short run. Any expansion of resources will require effort on the part of existing managers to train new managers. The time and effort required to integrate new managers/operation are the adjustment costs of growth. Both organic and acquisitive growth and create adjustment costs.

Penrose proposed that the size of a firm’s productive opportunity set imposes a limit on its growth. The productive opportunity set, in turn, is determined by the ways in which managers are able to combine resources to produce productive services. At any given point the known productive services arising from a

given bundle of resources are unlikely to exhaust its full potential. There is always the potential for firm expansion.

The productive opportunity set of the firm may be influenced by two different resource-usage activities. First is the search for novel uses of existing resources. A firm's resources are never fully utilized and hence there is always some slack, which creates an opportunity for firm growth. In order for any excess capacity of existing resources to be exploited the resources may need to be combined with other available resources in order to generate productive services. Penrose highlights that firms attempt to discover more about the potential uses of their existing resource via research and other types of proactive searches. She represents this by arguing that managers frequently reflect: "...there ought to be some way in which I can use that" (Penrose, 1959: 77).

Second, existing resources may be used as a basis for growth through the application of the entrepreneurial judgment, or entrepreneurial capabilities, of managers. Managers make subjective evaluations of market conditions which are influenced by their perceptions. Based on the discovery of changes in customer preferences and innovation, managers choose to engage in the re-combination of existing resources to satisfy this perceived demand. Hence, opportunities for expansion are limited to the extent to which the managers of a firm perceive there to be opportunities, are willing to act on them and are able to capitalize on them with their own resources (Penrose, 1959: 84). Thus, the growth of the firm involves discovering new market opportunities and changing and using existing resources to match these opportunities.

The growth rate of a firm, therefore, is influenced by two factors. The first relates to the scope of a firm's productive opportunity set. The larger the productive opportunity set of the firm, the greater its potential for growth. The second factor is associated with the adjustment costs incurred by firms when they grow. Adjustment costs relate to the problems of expanding managerial capabilities. The rate at which the firm can develop its managerial capabilities sets an ultimate limit to its growth, even if the productive opportunity set is immense (the Penrose curve). Below we employ, and extend, Penrose's arguments about adjustment costs and productive opportunity sets to examine the relationships between previous organic and acquisitive growth on the one hand, and current organic growth on the other.

Previous Organic Growth

Organic growth creates adjustment costs for a firm due to the need to bring in and train new managers. Adjustment costs will be proportional to the rate of organic growth in previous periods. The quicker a firm tries to grow the more costly growth may be due to time compression diseconomies (Dierickx and Cool, 1989). However, the magnitudes of adjustment costs are subject to debate. Geroski (2005: 136) argues that the adjustment costs of expanding a business do not appear to be very high. He reaches this conclusion by arguing that if we accept the notion of adjustment costs then the evidence on corporate growth rates leads to the conclusion that in practice they leave relatively little in the way of discernable effects on the growth of firms.

Productive opportunities for a firm require the successful matching of perceived opportunities with combinations of resources. It is the matching of resources to perceived opportunities, rather than the size of the resource stock per se, which determines the scope of the firm's productive opportunities. The productive opportunity set can be expanded by increasing the knowledge base of a firm, which may lead to new insights into how to better utilize existing resources, and/or expanding the resource base of a firm, which may lead to more potential resource combinations, in turn creating new growth opportunities.

It is unlikely that the exact same set of resources can be used to expand the firm's productive opportunity set ad infinitum. Over time firms develop routines of limited scope, which constrain their

ability to recombine existing resources (Nelson and Winter, 1982), and previous activities and resource uses limit the possibility for learning outside of areas where the firm already holds prior knowledge (Teece, 1987; Cohen and Levinthal, 1990). Winter and Szulanski (2001) note that managers develop their business practices by honing increasingly detailed routines, adjusting and fine-tuning the same actions over and over again. Such path dependence leads firms to becoming increasingly myopic in their search for new ways of recombining existing resources (Levinthal & March, 1993). When searching for new opportunities, managers tend to search close-in before moving into uncharted terrains (Cyert & March, 1963). In a world where growth opportunities are limited, and there is competition for new opportunities, close-in growth opportunities will soon become exhausted. In order to find new growth opportunities firms will need to search further from their existing operations. Due to path dependence and myopia, however, the pursuit of growth opportunities in new fields of activity is inherently costly and difficult. In other words, the productive opportunity set of the firm may be smaller and more difficult to expand than Penrose assumed. Firm managers will find it increasingly difficult to maintain a high organic growth rate over time. Consequently, we expect firms that have exhibited high growth rates in the past to have already harvested the closer and easier growth opportunities.

The productive opportunity set facing a firm will also be influenced by the rate at which managers can develop new resources. The development of new resources through organic growth will be limited, both in terms of quantity and variety, in the short run. Penrose argues that the new resources will be close in to their existing operations because of path dependency (1960: 2-3). This point is echoed by Wernerfelt (1984) when he argues that tomorrow's strengths tend to be built on today's strengths. Even if new resources can be developed the impact on a firm's productive opportunity set is likely to be limited in the short run.

The arguments above suggest that previous organic growth will create adjustment costs. In addition, and arguably of greater importance, is that if new knowledge and resources generated through organic growth are likely to be similar to the firm's existing operations, previous organic growth will limit growth in the productive opportunity set of the firm. Consequently the managers of the firm will find it increasingly difficult to maintain the firm's current rate of organic growth. These arguments lead us to hypothesize that:

Hypothesis 1: There will be a negative relationship between the rate of organic growth in previous periods and organic growth in the current period.

Current and Previous Acquisitive Growth

Although Penrose did not argue that firms delimiting themselves to organic growth may exhaust their growth opportunities, she did note that acquisitions could allow firms to break new paths of development and access new growth opportunities: "Acquisitions can be a means of obtaining the productive services and knowledge that are necessary for a firm to establish itself in a new field" (Penrose, 1959: 126). Furthermore, she argued that acquisitions may be best suited for those companies that lacked the ability to expand organically. She never, however, explicated how acquisitions would affect the firm's ability to continue to expand organically. As far as we are aware, later resource-based conceptualizations of firm growth have also failed to address this issue. In this section we re-examine and extend Penrose's arguments in relation to the relationship between acquisitive and organic growth.

Over time firms' develop firm-specific resources and capabilities which are path dependent. An acquisition represents an influx of new resources which increases the diversity of resources and knowledge within the firm. We argue that an acquisition may change the way in which the managers of the firm utilize their existing resources and capabilities (both managerial and entrepreneurial) and may impact future organic growth.

Penrose (1959) argues that an acquisition creates a challenge for managers in terms of how to manage the integration of the resources from two diverse firms. Managers' time (and hence managerial capabilities) will have to be devoted to integrating the resources of the acquired firm, creating adjustment costs. Consequently, managerial capabilities (pre-acquisition) which could be devoted to organic growth will be less than if the firm had not conducted the acquisition. Diverting managerial attention to managing the integration of the acquisition potentially retards post-acquisition organic growth (Penrose, 1959). This argument, however, requires two assumptions: (1) there are insufficient managerial resources in the firm to simultaneously manage post-acquisition integration and organic growth; and (2) the acquired firm does not add managerial resources. We argue these two assumptions may not hold for the following reasons. First, firms may actually have spare managerial capacity, which is probable if the firm has not utilized its organic growth potential fully in the past. Second, the acquisition will result in an increase in the managerial resources, from the acquired firm, which should help reduce the adjustment costs incurred by the acquirer.

In terms of the entrepreneurial capabilities of the firm, the diversity of resources generated by the acquisition will expand the productive opportunity set facing managers. When the resources and knowledge in a firm increases so does the amount and variety of productive services available from a particular resource.

“A firm is basically a collection of resources. Consequently, if we can assume that businessmen believe there is more to know about the resources they are working with than they know at any given time, and that more knowledge would be likely to improve the efficiency and profitability of their firm, then unknown and unused productive services may immediately become of considerable importance, not only because the belief that they exist acts as an incentive to acquire new knowledge, but also because they shape the scope and direction of the search for knowledge. The effort to discover more about the productive services of a resource may take the form of research into its characteristics or of research into ways of combining its known characteristics with those of other resources.”

(Penrose, 1959: 77)

She continued in her 1960 paper to state that the firm's productive opportunity set is shaped and limited by managers' ability to use the existing resources at their disposal. Firm development is an evolutionary and cumulative discovery procedure of 'resource learning' (Mahoney, 1995). As highlighted in the previous section, knowledge may be generated through the organic development of firm activities, e.g. through the introduction of new products (Kor and Mahoney, 2000). Knowledge developed through organic growth is likely to be close in to the firm's existing operations and incremental in nature.

Knowledge may also be gained by acquiring a firm. Knowledge that is gained through acquisition will be less likely to be path dependent and close-in to existing knowledge gained through organic growth. Therefore, acquisitions may lead to a greater variety of resources and knowledge than can be developed by expanding organically. This diversity facilitates new combinations of resources and knowledge and liberates new productive services to expand a firm's productive opportunity set. The new resources and knowledge may enable the firm to break away from established resource combinations, paths of actions and ways of thinking as indicated by exploratory learning (March, 1991). Acquisitions may help the firm to overcome the myopia and path dependence likely to be created by routinization, which enables the managers of the firm to pursue new growth opportunities that are different in nature from those previously pursued. We argue, therefore, that there are qualitative differences in the resources and knowledge that may be added to the firm through organic or acquisitive growth.

It is important to note, however, that the effects of acquisition will be temporal as the one off increase in knowledge and resources will lead to a temporary increase in the productive opportunity set of the firm. Over time the expanded opportunity set will be capitalized on and so the effect of the acquisition on current organic growth will diminish.

The arguments above suggest that, on the one hand, acquisitions may draw managerial resources and attention away from the resource combination needed to generate organic growth. Therefore, the adjustment costs associated with acquisitions will decrease the possibility of future organic growth. On the other hand, an acquisition may also enable the firm to discover radically new paths of resource combinations and thus open up new growth opportunities for the firm that are different from those previously pursued. The relative magnitude of the two effects will depend on the availability and importance of managerial and entrepreneurial capabilities of the firm. As we argued in conjunction with Hypothesis 1, there is reason to believe that in the modern economy, expanding the productive opportunity set of the firm may be a greater challenge than building managerial capacity. We argue, therefore, that the problems associated with the adjustment costs of acquisitive growth will be outweighed by the increase in the productive opportunity set of the firm. This suggests the following hypothesis:

Hypothesis 2: There will be a positive relationship between the rate of acquisitive growth in previous and current periods and the rate of organic growth in the current period.

DATA AND METHODS

The data set comprises all commercially active enterprises in the private (non-government) sector in Sweden that in November 1996 had at least 20 employees. With respect to that category, we are dealing with a census study of firms in existence 1996. There are 11 748 such enterprises. Annual data for all enterprises have been compiled for the 1987-1996 period. In existence the entire period were 8,562 firms. Start-ups during this period are included if they fulfil the size criterion for the final year, as are previous government sector firms that by the final year have transferred to the private sector. Firms that dissolve during the period are excluded regardless of their previous size and growth, as are surviving firms that previously may have had more than 20 employees but do not reach that number in 1996. No upper size limit has been employed.

Penrose was interested in growing firms only. In the *Theory* she states that: "These are the types of firms we are concerned with. ... It merely provides us with a class of firms which are capable of growing. In the absence of such firms there would be no need for a theory of growth." (1959: 33) For this reason we took the population of firms and then restricted our sample for analysis to be those firms that actually grew over the period 1987-1996. That is, to have grown over the period was a necessary condition to be included in the sample. The resulted in a sample of 6433 firms that had grown over the period, 2129 of the firms had not grown and hence were not included in our sample.

In order to accurately examine our hypotheses it was necessary to split the sample according to growth rates in each year. All firms that grew over the period 1987-1996 we term sample 1. Sample 2 consists of those observations where the current growth rate in year t was greater than zero. Sample 3 consists of those observations where the growth rate in year t was equal to or less than zero. By sub-dividing the sample of growing firms we are attempting to more closely focus on current growth. The splitting of the sample results in the creation of unbalanced panels, a topic we discuss later in the model specification section.

The data

The data were taken from *Statistics Sweden* (i.e., the official ‘Bureau of Census’). Their registers are complete in the sense that all legal commercial activity is represented, whether run as sole proprietorship, partnership, limited liability company or some other legal form. Data originate from different sources such as tax authorities and mandatory surveys. Updating is frequent, and generally speaking, the registers are of a very high standard by international comparison. Data from three different registers, and ten annual versions of each, have been utilized in developing the data set. For a more elaborate description of the data set see Anonymous (1997).

The unit of analysis in our study is the enterprise (or firm). Codes for enterprises, however, may be changed because of an ownership change, industry re-classification, or spatial relocation. This may make what in reality is an on-going business to appear in the registers as a close down and a start-up. Identification codes for establishments are relatively more insensitive to changes of the mentioned kind. We have therefore not accepted company code as the criterion for tracking enterprises over time. Rather, constellations of establishments (and their employment) associated with a certain company code are regarded as ‘the same’ company if they appear together in the next annual version of the register under a different company code.

In order to investigate the growth of firms we focus on employment as a measure of firm size. In the literature, the most common indicators of growth are sales and employment (Delmar, 1997). In the choice between these indicators we favor employment growth as it more closely than sales growth reflects expansion of the resources and managerial capacity of the firm as emphasized in Penrose’s theory. When assessing employment growth our interest is directed towards genuinely new jobs, that is jobs created via organic growth. In the present study we have the unique feature of being able to separate organic growth from acquisitive growth. The partition of the different types of growth was achieved by keeping track over time of the status and size changes of all establishments that are associated with a firm and classifying them into five categories: original, previously acquired, previously created, acquired this year, and created this year. We calculate annual organic growth = total employment_(t) - total employment_(t-1) - the change in employment in associated with establishments acquired or divested during this year (importantly, it is only in the year of the acquisition / divestment that the acquired units are disregarded. Their development during subsequent years form part of the firm’s organic growth). We use, however, the rate of organic employment growth as we are interested in the rate of growth rather than absolute growth.

The Model

The model we test empirically is stated below in equation 1.

$$rateorggrowth_{it} = \sum_{j=0}^{j=3} \alpha_j \sum_{j=1}^{j=3} \beta_j [rateorggrowth_{it-j}] + \sum_{j=0}^{j=3} [rateacquisgrowth_{it-j}] + \theta X + e_{it} \quad (1)$$

Where $rateorggrowth_{it}$ is the rate of organic growth for firm i in year t ; $rateorggrowth_{it-j}$ is the rate of organic growth for firm i in year $t-j$ (j ranges from 1 to 3); $rateacquisgrowth_{it-j}$ is the rate of acquisitive growth for firm i in year $t-j$ (j ranges from 0 to 3); and X is a vector of firm variables. The vector firm variables includes: the age of the company – this variable is truncated at 1972 due to data availability, firm size as measured by total employment, the total number of firm establishments, whether or not the firm is part of a larger corporate group or independent, whether or not the firm is foreign owned, year dummies and industry dummies. A full description of all variables is provided in the next section.

In order to test the model presented in equation 1, on the effect of acquisitive and organic growth in previous periods on organic growth in the current period, we created a series of lagged variables. The

creation of lagged independent variables (lagged on the dependent variable), however, may be problematic because the variables, and also the associated error terms, may be correlated. When the variables are correlated to the errors in a regression model a potential solution is to create estimates (or instruments) of the regressor variables. The instruments should be uncorrelated to the error terms but fully correlated to the regressor variables. This approach is suggested by Anderson and Hsiao (1981).

In addition to the creation of lagged variables it is also important to select an appropriate statistical technique for empirically validating the model. One approach would be to run a simple OLS analysis. This approach, however, assumes that the variance of the firm-specific fixed effects is zero. That is, there are no unobserved firm-specific fixed effects that are correlated with both the dependent and independent variables. We feel that this assumption is unrealistic as there may well be firm-specific fixed effects, correlated with current and historic growth, due to the heterogeneity of firm resource and knowledge bases. As a result the averages of the dependent variable will be different for each firm but the variance of the errors will not. A potential solution here is to employ a panel data approach using first difference terms. As firm-specific fixed effects are by definition relatively constant over time, employing first difference terms enables us to eliminate any such effects from our analysis.

For the reasons provided above we employ a dynamic panel data analysis, with first difference terms and instrumental variables, to investigate equation 1. The transformation of equation 1 into first differences, using a set of instruments for the first differences of the lagged dependent variable, results in the equation 2. The advantage of the consistent estimator is that as sample size increases the consistent estimator approaches the real value.

$$\begin{aligned}
 \text{rateorggrowth}_{it} - \text{rateorggrowth}_{it-1} = & \sum_{j=0}^{j=3} \alpha_j [\text{rateacquisgrowth}_{it-j} - \text{rateacquisgrowth}_{it-j-1}] + \\
 & \sum_{j=1}^{j=3} \beta_j [\text{rateorggrowth}_{it-j} - \text{rateorggrowth}_{it-j-1}] + \quad (2) \\
 & \theta D.X + \mu_{it}
 \end{aligned}$$

In equation 2 $\theta D.X$ is a vector of first differenced variables, as outlined above, and μ_{it} is the first differenced error term.

We tested our model on three different samples (sample 1, 2 and 3). The subdivided samples (2 and 3) resulted in the creation of unbalanced panels as a unit may switch samples according to their growth rate in year t. An important issue here is whether or not to proceed with a balanced or unbalanced panel for the analysis. The advantage of employing an unbalanced panel is that it maximizes the amount of data that is used to estimate a model. Arellano and Bond (1991) argue that nothing fundamental changes in the econometric methods provided a minimum number of continuous time periods are available for each unit. For each of our observations we have a minimum of four years of data, as that is the requirement when we include the lagged variables.

The Measures

Rate of organic growth is measured by first separating employment changes due to acquisitions and sell-offs from organic employment changes in a given year, then dividing this organic size change by total employment in that year.

Rate of acquisitive growth is measured by first separating employment changes due to acquisitions and sell-offs from organic employment changes in a given year, then dividing the acquisitive size change by total employment in that year.

Firm age is a recurrent variable in most studies of growth. Normally, younger firms are more prone to grow than older more established firms. Further, one study found that young firms that grow have twice the probability of survival to that of young non-growing firms (Phillips & Kirchhoff, 1989). We measure the age of the firm in years since the firm started operations, this is truncated at 1972 for data reasons.

Firm size was chosen based on its supposed importance to growth and employment creation (Dunne & Hughes, 1996; Storey, 1995; Wagner, 1992). We measure firm size in terms of the total number of employees in the firm.

Number of establishments is the total number of establishments run by the firm.

The organizational form of the firm likely affects its growth performance, i.e. is the firm acting as an independent actor or is it part of business group and how does this affect its possibilities to grow? It can be assumed that independent firms are more flexible whereas firms affiliated with a group have better access to resources. Therefore the implications for growth are mixed (cf. Morris & Trotter, 1990; Barney, 1991). To capture this we include the following two control variables:

Corporate group is a dummy variable we coded 0 for independent companies and 1 if the company was part of a group.

Foreign owned firm is a dummy variable we coded 1 if the company was a subsidiary of a foreign firm and 0 if it was not. We supplemented this information from a different source because firms with foreign ownership do not necessarily appear as belonging to a corporate group and may therefore appear as “false independents”.

Industry dummies were included for two reasons. First, the absolute majority of research on growth firms has been performed on firms in the manufacturing industry (Delmar, 1997), and little has been done on the service industry. Second, the importance of the service industry as employment creator has increased drastically during the last decades. In order to control fully for industry differences we constructed a range of industry dummies using a classification of 17 different industries.

Year dummies were created and include for each year covered by the sample to control for time related effects. We chose to make the first period of the study the base group (1987). All the year dummies were named as year followed by the last two digits of the particular year. Due to the large number of year dummies we do not report individual year dummies in our analysis.

RESULTS

The descriptive statistics for the three samples are presented in Table 1. Sample 1 consists of all firms that grew over the period 1987-1996. The mean rate of organic growth for sample 1 was 0.109 (standard deviation 0.764), with the mean rate of acquisitive growth at 0.016 (standard deviation 0.215). Sample 2 consists of all observations where growth in year t was positive. The mean rate of organic growth was 0.308 (standard deviation 1.070) and the mean rate of acquisitive growth was 0.018 (standard deviation 0.280). Finally, sample 3 consisted of all observations where growth in year t was non-positive. The mean rate of organic growth for sample 3 was 0.070 (standard deviation 0.110) and the mean rate of acquisitive growth positive at 0.015 (standard deviation 0.132). Interestingly these statistics indicate that there was only a marginally larger amount of acquisitive growth for sample 2 (mean = 0.018) as compared to samples 1 (0.016) and 2 (0.015).

Insert Table 1 about here

Table 2 displays the results from the dynamic panel data analysis. Model 1 presents the estimation of our model of growth (equation 2) employing sample 1, model 2 employing sample 2 and model 3 employing sample 3. It is interesting to note that although sample 1 consists of only those firms that grew over the ten-year period, in each year only 47% of these firms actually exhibit organic growth (13,335 yearly growth observations used in Model 2), whereas 53% shrink or remain stable (14,838 yearly observations used in Model 3). As argued above, given that our aim is to test hypotheses related to Penrose's growth theory which she explicitly stresses only relates to growing firms, the focus of our analysis is on Model 2 in the centre column.

Insert Table 2 about here

Focusing on model 2 we find that the industry dummies and year dummies are significant. In addition, firm size (as measured by total employment) is positively related to the rate of organic growth, whereas firms operating through multiple establishments and those that are foreign owned grow less.

Hypothesis 1 predicts a negative relationship between previous organic growth and current organic growth. Our results in model 2 indicate that organic growth in a previous period has a significant negative effect on organic growth in the present period. The size effect is roughly similar irrespectively of if the lag is 1, 2, or 3 years. This finding supports Hypothesis 1. Notably, we do not find the same statistical significance in model 1 and model 3. It should be noted that although the coefficients for previous organic growth are not statistically significant in Model 1 they are similar in magnitude to Model 2 but have larger standard deviations. This indicates that although the effect size (or substantive significance) of the variables for previous organic growth may be similar to Model 2 there is a greater variability in the result which arguably accounts for the lack of statistical significance.

Hypothesis 2 predicts a positive relationship between acquisitive growth in the current and previous periods and organic growth in the current period. The results of Model 2 indicate a positive and statistically significant relationship between acquisitive and organic growth supporting Hypothesis 2. Furthermore, acquired growth in the most recent periods also seems to counteract organic shrinkage – as evidenced in model 3. It is no surprise that the results of Model 3 are replicated for the full sample (Model 1). The positive effect of acquired growth on organic growth seems to be strongest in the most recent periods. In Model 2, the coefficients become smaller the longer the lag and fewer of the effects are replicated in models 1 and 2 the longer the lag. As with our discussion of the results relating to Hypothesis 1 it is interesting to note that the effect sizes in model 1 for acquisitive growth are similar to Model 2. Again the large standard deviations are arguably driving the lack of statistically significant results.

Finally, it is interesting to note that our results attest to the importance of separating out those firms that are growing in the current period from those that are not in order to test Penrose's ideas. The differences between the models 1-3 highlight the importance of only focusing on growing firms.

DISCUSSION AND IMPLICATIONS

In this paper we have revisited Penrose's ideas to examine how the resource/capability accumulation process influences corporate growth. Specifically, we have examined how previous organic growth and acquisitive growth influences the current organic growth of the firm. Our findings lead us to two conclusions.

First, we find evidence to support the argument that those firms that have expanded organically in the past will find it more difficult to expand organically in the current period. This finding is consistent with the notion that it is increasingly difficult for firms to maintain a high organic growth rate. Regardless of

whether the adjustment costs associated with developing the management of the firm are accurately described by Penrose, or exaggerated as suggested by Geroski (2005), such negative effects of recent organic growth can not be explained by the adjustment costs alone. Consequently, we feel that Penrose overestimated the ease at which the management of a firm can extend its productive opportunity set by recombining the existing resources and those generated by the internal growth process.

Second, we find evidence that those firms that have expanded acquisitively in previous periods will find it easier to grow organically in the current period. Previous and current acquisitive growth are positively related to organic growth in the current period. To some extent, these results run counter to Penrose's original formulation of the theory, suggesting that she overestimated the adjustment costs associated with acquisitions. The diversification of the firm's resource and knowledge bases expands the productive opportunity set of the firm, thus promoting organic growth.

Implications for Theory

We feel as though our findings should promote a re-examination of Penrose's ideas in order to bring to the fore aspects of her theory that are currently less emphasized. In particular, three specific areas of the theory need re-emphasis.

First, there is a need to relax Penrose's assumption that growth opportunities always exist and can be pursued - as long as firms are able to match these opportunities with combinations of resources. We argue that it is more realistic to assume that growth opportunities are restricted, therefore, in order to continue to grow firms need to devote attention and effort to developing and extending their productive opportunity set.

Second, as Penrose notes, entrepreneurial capabilities are needed in order to find ways of recombining resources to take advantage of growth opportunities. However, rather than assuming that firms are "enterprising and possess competent management" (1959: 32), we argue that entrepreneurial capabilities vary across companies and over time. Building on recent developments in entrepreneurship research, we argue that such entrepreneurial capabilities can serve the dual purpose of extending growth opportunities *and* finding new growth opportunities. In this context, the Entrepreneurial Orientation (EO) concept appears particularly relevant. Several empirical studies have shown that EO varies across firms, and has a positive effect on growth (e.g., Wiklund, 1999), which has also been supported by meta-analysis (Rauch, Wiklund, Lumpkin & Frese, 2004). EO captures aspects of internal resource recombination (the innovation dimension of EO) as well as external aspects of extending the firm's opportunity space (the pro-activeness dimension of EO).

Third, Penrose's theory in relation to how new resources and competencies brought into the firm can be productively used and combined needs updating. The problems of path dependence and myopia are likely to be pervasive in a way that Penrose did not foresee when the assumption that growth opportunities always exist is relaxed. Consequently the importance of previous growth (organic or acquired), and the characteristics of the resources thus brought into the firm, are related to the future opportunity set facing the firm. For example, March (1991) demonstrates that there are strong pressures within organizations to exploit already existing competencies, technologies and resources rather than exploring new ones, leading to limitations in the variety of the resource and knowledge bases of the firm. One way of overcoming this homogenization of resources is to bring outsiders into the firm.

Finally, we also wish to make a methodological note related to Penrose's theory. There is no lack of empirical studies attempting to explain variation in growth rates across firms. Hosts of independent variables have been tested. In this paper, we have taken a quite different approach. Rather than examining a set of independent variables we instead focused attention on how previous growth (organic and

acquisitive) affected future growth. We did so because, according to Penrose's theory, both opportunities for and limits to future growth ultimately depend on the resource and capability accumulation of past growth. We believe that this provides a novel and interesting alternative in studies of growth, particularly relevant in relation to Penrose's theory.

Implications for Practice

Our work has implications for practice. In particular, we feel that a strategy of acquisitions may be a way in which the managers can rejuvenate a firm. Over time a firm will exhaust its opportunity set, capitalizing on the easiest opportunities first and then moving to increasingly more difficult opportunities over time. A strategy of acquisition by a firm will enable the firm to assemble a new set of resources/capabilities, in a timely fashion, which will change the productive opportunity set facing the firm. That is by acquiring a new set of resources/capabilities a firm can change the nature of its productive opportunity set. By acquiring new resources/capabilities firms may be able to recombine existing and new resources in such a way as expand the opportunities for organic growth. Arguably the costs of acquiring and integrating firms have fallen over the last 30 years. Therefore, the administrative costs to which Penrose refers have consequently fallen over time, which now increases the attractiveness of a strategy of acquisition.

REFERENCES

- Anderson, T. W. and Hsiao, C. 1981. Estimation of dynamic models with error components. *Journal of the American Statistical Association*. 76: 598-606.
- Anonymous, X.. 1997. High-growth SMEs: Feasibility analysis for the Swedish study, mimeo prepared for the OECD Working Party on SMEs. Paris: OECD.
- Arellano, M. and Bond, S. 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations, *Review of Economic Studies*. 58: 277-297.
- Bailar, J.C. and Mosteller, F. 1998. Guidelines for the statistical reporting in articles for medical journals: amplifications and explanations. *Annals of Internal Medicine*. 198: 266-273.
- Barney, J. 1991. Firm resources and sustained competitive advantage, *Journal of Management*, 17: 99-119.
- Barnard C.I. 1938. *The Functions of the Executive*. Cambridge, MA: Harvard Business School, Press.
- Cohen, W. M. and Levinthal, D. A. 1990. **Absorptive capacity: A new perspective on learning and innovation**. *Administrative Science Quarterly*. 35: 128-152.
- Cyert RM and March JG. 1955. Organization structure and pricing behavior in an oligopolistic market, *American Economic Review*. 45: 129-139.
- Cyert, R. M. and March, J. G.. 1963. *A Behavioral Theory of the Firm*. Englewood Cliffs: Prentice-Hall.
- Davidsson, P., Achtenhagen, L., & Naldi, L. (2006). What do we know about small firm growth? In S. Parker (Ed.), *Handbook of Entrepreneurship Research: The Live Cycle of Entrepreneurial Ventures* (Vol. 2, pp. 361-398). New York: Springer.

- Davidsson, P. and Wiklund, J. (2000). Conceptual and empirical challenges in the study of firm growth. In D. Sexton & H. Landström (Eds.), *The Blackwell Handbook of Entrepreneurship* (pp. 26-44). Oxford, MA: Blackwell Business.
- Delmar, F. 1997. Measuring growth: Methodological considerations and empirical results. In R. Donckels & A. Miettinen (Eds.), *Entrepreneurship and SME Research: On its Way to the Next Millennium*: 190-216. Aldershot, VA: Avebury.
- Dierickx I and Cool K. 1989. Asset stock accumulation and sustainability of competitive advantage. *Management Science*. 35: 1504-1511.
- Dunne P. and Hughes A. 1996. Age, size, growth and survival: UK companies in the 1980s, *Journal of Industrial Economics*, XLII(2): 115-140
- Geroski, P. 2005. Understanding the implications of empirical work on corporate growth rates. *Managerial and Decision Economics*. 26: 129-138.
- Kor, Y.Y. and Mahoney, J.T. 2000. Penrose's resource-based approach: the process and product of research creativity. *Journal of Management Studies* 37: 99-139.
- Levinthal, D.A. and March, J.G. 1993. The myopia of learning. *Strategic Management Journal*. 14: 95-112.
- Lockett, A. 2005. Edith Penrose's legacy to the resource-based view. *Managerial and Decision Economics*, 26: 83-98.
- Lockett, A. and Thompson, S. 2004. Edith Penrose's contributions to the resource-based view: An alternative perspective'. *Journal of Management Studies* 41: 193-204.
- Kor, Y. and Mahoney, J. 2004. Edith Penrose's (1959) contributions to the Resource-based View of the Strategic Management'. *Journal of Management Studies* 41: 183-192.
- Mahoney, J. T. 1995. The management of resources and the resource of management. *Journal of Business Research* 33: 91-101.
- March, J. G. 1991. Exploration and exploitation in organization learning. *Organization Science*. 2: 71-87.
- Marris, R. 1964. *The Economic Theory of Managerial Capitalism*. London: MacMillan.
- Morris M.H. and Trotter J.D. 1990. Institutionalizing entrepreneurship in a large firm: A case study at AT&T, *Industrial Marketing Management*, 19: 131-139.
- Nelson, R. R. and Winter, S. G. 1982. *An Evolutionary Theory of Economic Change*, Cambridge: The Belknap Press
- Penrose, E. T. 1959. *The Theory of Growth of the Firm*. Blackwell: Oxford.
- Penrose, E. T. 1960. The growth of the firm: a case study: The Hercules Powder Company. *The Business History Review*. 34: 1-20.

- Phillips, B. D. and Kirchoff, B. A. 1989. Formation, growth and survival; small firm dynamics in the US economy, *Small Business Economics*, 1: 65-74.
- Rauch, A., Wiklund, J. Lumpkin, G.T. & Frese, M. 2004. Entrepreneurial Orientation and Business Performance: Cumulative Empirical Evidence. In *Frontiers in Entrepreneurship Research*. Wellesley, MA, Babson College.
- Rugman, A.M. and Verbeke, A. 2002. Edith Penrose's contribution to the resource-based view of strategic management. *Strategic Management Journal*. 23: 769-780.
- Rugman, A.M. and Verbeke, A. 2004. A final word on Edith Penrose. *Journal of Management Studies*. 41(1): 205-217.
- Simon, H. A. 1947. *Administrative Behavior*. New York: Macmillan.
- Storey, D. J. 1994. *Understanding the Small Business Sector*. London: Routledge.
- Storey, D.J. 1995. Symposium on Harrison's "lean and mean": A job generation perspective, *Small Business Economics*, 7(5): 5-8.
- Teece, D. J. (1987). Technological Change and the Nature of the Firm, in D. Teece (ed.), *The Competitive Challenge*, pp. 256-281. Harper and Row: New York
- Wagner, J. 1992. Firm size, firm growth and persistence of chance. Testing GIBRAT's law with establishment data from lower Saxony, 1978-1989, *Small Business Economics*, 4: 125-131
- Wiklund, J. 1999. The sustainability of the Entrepreneurial Orientation - Performance relationship. *Entrepreneurship Theory and Practice*, 24(1), 37-48.
- Winter, S. G. and Szulanski, G. (2001), Replication as Strategy, *Organization Science*, 12, 6, p. 730-743

TABLE 1: DESCRIPTIVE STATISTICS

Variable	N	Mean	Std. Dev.
SAMPLE 1			
rate of organic growth	28,173	0.109	0.764
rate of acquisitive growth	28,173	0.016	0.215
Age	28,173	17.213	8.304
firm size	28,173	99.315	422.608
number of establishments	28,173	3.156	15.970
corporate group	28,173	1.216	1.205
foreign owned	28,173	0.108	0.311
SAMPLE 2			
rate of organic growth	13,335	0.308	1.070
rate of acquisitive growth	13,335	0.018	0.280
Age	13,335	16.559	8.275
firm size	13,335	87.101	402.922
number of establishments	13,335	2.649	13.710
corporate group	13,335	1.194	1.191

Foreign owned	13,335	0.100	0.299
SAMPLE 3			
rate of organic growth	14,838	-0.070	0.110
rate of acquisitive growth	14,838	0.015	0.132
age	14,838	17.801	8.287
firm size	14,838	110.291	439.272
number of establishments	14,838	3.612	17.746
corporate group	14,838	1.236	1.218
Foreign owned	14,838	0.116	0.320

TABLE 2: MODELS OF GROWTH ORGANIC GROWTH RATES

Dependent variable = rate of organic growth year t	Growers 1987-1996 (Model 1)	Growers in year t (Model 2)	Non-growers in year t (Model 3)
Model Variables			
rate of organic growth year t-1 (IV)	-0.634 (0.420)	-0.701** (0.243)	-0.048 (0.219)
rate of organic growth year t-2 (IV)	-0.628 (0.431)	-0.691** (0.250)	-0.052 (0.222)
rate of organic growth year t-3 (IV)	-0.622 (0.428)	-0.672** (0.249)	-0.064 (0.220)
rate of acquisitive growth year t	0.856*** (0.068)	0.952*** (0.052)	0.520*** (0.046)
rate of acquisitive growth year t-1	0.640 (0.366)	0.856*** (0.106)	-0.627 (0.336)
rate of acquisitive growth year t-2	0.674 (0.407)	0.839*** (0.135)	-0.419 (0.337)
rate of acquisitive growth year t-3	0.706 (0.473)	0.708** (0.230)	-0.156 (0.328)
Control Variables			
age	-0.057 (0.043)	0.114*** (0.022)	-0.170*** (0.037)
firm size	0.001*** (0.000)	0.001*** (0.000)	0.000 (0.000)
number of establishments	-0.016*** (0.002)	-0.019*** (0.003)	-0.006** (0.002)
corporate group	-0.017 (0.018)	-0.023 (0.019)	-0.001 (0.014)
Foreign owned	-0.079 (0.062)	-0.191* (0.090)	-0.012 (0.051)
industry dummies	Significant	Significant	Significant
year dummies	Significant	Significant	Significant
n	28,173	13,335	14,838
Groups	6433	5670	5783
Sargan test	4.55	10.07	9.38
1st order serial correlation	-1.73	-1.88	1.80
2nd order serial correlation	-0.33	0.56	1.37

Standard errors in parentheses.

Significance levels: *p<.05; **p<.01; ***p<.001

(IV) indicates the use of an instrumental variable