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ORGANIC AND ACQUISTIVE EMPLOYMENT GROWTH:

RE-EXAMINING, TESTING AND EXTENDING PENROSE'S GROWTH THEORY

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ABSTRACT

Edith Penrose's theory of firm growth postulates that a firm's current growth rate will be influenced by the adjustment costs of, and changes to a firm's productive opportunity set arising from, previous growth. Although she explicitly considered the impact of previous organic growth on current organic growth, she was largely silent about the impact of previous acquisitive growth. In this paper we extend Penrose's work to examine that the relative impact of organic and acquisitive growth on the adjustment costs and productive opportunity set of the firm. Employing a panel of commercially active enterprises in Sweden over a 10 year period our results suggest the following. First, previous organic growth acts as a constraint on current organic growth. Second, previous acquisitive growth has a positive effect on current organic growth. We conclude that organic growth and acquisitive growth constitute two distinct strategic options facing the firm, which have a differential impact on the future organic growth of the firm.

Keywords: acquisitive growth; organic growth, resource-based view, Penrose.

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INTRODUCTION

The Theory of the Growth of the Firm by Edith Penrose, first published in 1959, is a seminal contribution to the field of management. Penrose's intention was to create a theory of firm growth which was logically consistent and empirically tractable (Buckley & Casson, 2007). Much attention, however, has been focused on her unintended contribution to the resource-based view (henceforth RBV) (e.g. Kor & Mahoney, 2004; Lockett & Thompson, 2004) rather than her firm growth theory. We feel that this is unfortunate because despite a rapidly growing body of empirical work, conceptual advancement in growth studies has been limited (Davidsson, Achtenhagen & Naldi, 2006; Davidsson & Wiklund, 2000; Delmar, 1997; Storey, 1994). The growth literature frequently references Penrose's work, but little explicit testing of her ideas has been undertaken. This is surprising given that Penrose's work remains the most comprehensive theory of growth to date. One explanation is that she did not formally present her arguments, favoring verbal exposition over formalized models (Lockett & Thompson, 2004; Lockett, 2005). However, the central propositions and conclusions of her theory can be operationalized and empirically tested.

Central to Penrose's growth theory are the adjustment costs (henceforth AC) of growth and the productive opportunity set (henceforth POS) facing the firm. The ACs of growth consist of the time and effort required to integrate new managers and operations in expanding the activities of the firm. The development of managerial resources takes time, which sets an ultimate limit to how fast firms can grow. ACs, however, only relate to firms that have been able to identify and exploit a growth opportunity. The identification and exploitation of growth opportunities is inextricably linked to managers' subjective assessment of their

productive opportunity set, which is influenced by the resources of the firm (Penrose, 1959: 85), including its knowledge base. Even operating with the same set of resources, different managers may generate entirely different services from these resources (Penrose, 1959; Kor, Mahoney & Michael, 2007). To date, empirical tests of Penrose's theory have been limited to the ACs of growth. We argue that a focus on ACs of growth, to the exclusion of any consideration of POSs, will provide only partial and potentially inaccurate insights into the growth of firms (see Geroski, 2005, for a critique of the focus on ACs).

To address this limitation we investigate the relative impact of ACs and POSs arising from a strategy of organic (internal) growth versus acquired (external) growth. Penrose made it clear that organic growth (henceforth OG) and acquisitive growth (henceforth AG) are two different strategic options facing the managers of a firm. She outlined clearly the effects of OG on ACs and POSs, and their subsequent effects on future organic growth. However, she was largely silent about the effects of AG. Central to Penrose's theory is that opportunities for, and limits to, future growth are generated by the resource accumulation of past growth. The past use of one mode of growth has consequences for future organic growth. Penrose was clear that previous OG may act as a constraint on current OG. Furthermore, she wrote that: "*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). Penrose did not, however, explain *how* AG influences ACs and POSs, and subsequently the future OG of the firm.

In revisiting Penrose's writings it is important to acknowledge that they are a product of her time (Lockett & Thompson, 2004), which necessitates a re-examination of her ideas when applying them to a contemporary context. Her ideas were informed by inductive reasoning based on her own observations of businesses and their environment. The 1950s was a period of sustained economic growth. Consequently, she explicitly states that her theory assumes that there are no external limits to the growth opportunities of firms. The assumption of unlimited

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growth opportunities does not hold today given slower economic growth and increased international competition. In comparison to the 1950s economic growth for European nations was much slower at the end of the 20th century.[1] In addition, financial liberalization and innovation during the last 20 years of the 20th century led to an increase in the availability of inexpensive debt. Low costs for debt encourages debt-financed takeovers just as a booming stock market cuts the cost of capital. Hence it became easier for firms to pursue a strategy of growth through acquisition.

We develop our arguments in relation to the OG and AG of firms by re-visiting and extending Penrose's work in light of recent developments in the areas of the RBV (see: Wernerfelt, 1984; Dierickx and Cool, 1989; Barney, 1986 & 1991); the RBV interpretation of acquisitions (see: Harrison, Hitt, Hoskisson & Ireland, 1991; 2001); and the organizational literature on path dependency and inertia (see: Cyert & March, 1963; Miller, 1994; Vermuelen & Bakerma, 2001). Consistent with Penrose our theoretical and empirical focus is on the growth of firm resources. Specifically, we focus on employment growth because we are primarily interested in extending Penrose's theory of growth, which concerns "the expansion of human and other resources" of the firm (Penrose, 1995, p. xi).

Our contribution is three-fold. First, we conceptually and empirically separate OG from AG. To our knowledge this is the first, broadly based empirical study to do so. Second, we theoretically explain *how* previous OG and AG affect future organic growth in terms of their relative effects on ACs and POSs. We feel that a major contribution of our work is the focus we bring to bear on the issue of POSs and their potential effects on the growth of the firm. Third, we empirically validate our model employing a ten year panel of commercially active

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[1] Annual growth in GDP per capita across the 16 most industrialized nations (13 of which were European) was 3.8% from 1950-1973 but only 2.1% from 1989-1999 (Kranz, 2004). However, the recent turmoil on financial markets has led to a restriction in credit, and a corresponding increase in the price of credit, which is having a detrimental impact on the ability of firms to raise credit in order to engage in acquisitive activity (see:
http://www.businessweek.com/investor/content/jul2009/pi2009077_750192.htm accessed 15/08/09).

enterprises in the private (non-government) sector in Sweden, which had 20 employees or more in the final year of our panel. Consequently, privately owned SMEs constitute the vast majority of our sample studied. Our dataset is unique in that we are able to decompose employment growth into its constituent elements, organic and acquisitive, and hence examine their interrelationships.

The remainder of the paper unfolds as follows. In section 2 we outline our theoretical background and derive hypotheses in relation to both OG and AG. 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 and limitations of our work.

THEORETICAL BACKGROUND

The origins of Penrose's work on growth can be traced back to her 1952 paper published in the *American Economic Review* (Penrose, 1952). In the paper she criticized the use of biological analogies of growth, re-asserting the importance of economic principles and human motivation for explaining firm growth. These principles were introduced in a subsequent paper in the same journal (Penrose, 1955). The culmination of her growth research was the publication of her seminal book *The Theory of the Growth of the Firm* and the associated case study on the Hercules Powder Corporation (Penrose, 1960).

Penrose's interest lay 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 – i.e. the firm's resource base is unique and path dependent. In addition to highlighting the importance of firm specific managerial knowledge Penrose

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identifies two types of firm-specific capabilities: entrepreneurial and managerial (Penrose, 1959: 35). Entrepreneurial capabilities are a function of imagination. Managerial (or administrative) capabilities are largely practical in orientation, and are associated with the execution of ideas. Entrepreneurial capabilities are a necessary but not 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 capabilities 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). The need for shared experience in order for managers to be effective has important implications for the rate at which a firm can 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 managerial resources will require effort on the part of existing managers to train new managers and creates the ACs of growth. We define the ACs of growth, consistent with Penrose (1959) and Geroski (2005), as the costs of managing the growth process, i.e. the time and effort required to integrate new people into the firm, not the direct costs of acquisition. Both organic and acquisitive employment growth creates ACs, which are negatively related to the future OG rate of the firm.

Penrose proposed that the size of a firm's POS is positively related to the ability of the firm to grow. The POS is determined by the ways in which managers are able to combine resources at their disposal 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. This is particularly the case with large firms relative to small firms because of the sheer diversity of resources they comprise. There is always the potential for firm expansion.

The POS 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 utilized fully and

hence there is always some resource 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 resources via research and other types of proactive search. 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 by the extent to which the managers of a firm perceive opportunities; are willing to act on them; and able to capitalize on them by using 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. First, firms incur ACs when they grow because of the need to train and integrate new managers and employees into the business. ACs relate to the utilization and development of managerial capabilities. Penrose argued that 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 (which has become known as the Penrose effect [Marris, 1964]). Second, and arguably of greater importance, the ability of a firm to grow is influenced by its POS. Penrose defines the POS of the firm as "*all of the productive possibilities that its 'entrepreneurs' see and can take advantage of*" (Penrose, 1959: 31). Penrose viewed people as being the most important resource in any

business, because it is their knowledge and insights that determine the future POS of the firm. She continues to argue that a theory of the growth of firms is essentially an examination of the changing POSs of firms (Penrose, 1959: 31-32). The larger the POS of the firm, the greater its potential for growth.

Managers face two strategic growth options: OG and AG. OG involves the internal generation of resources, e.g. by employing and training new staff. However, as many resources are non-standard, complex, involve tacit knowledge, and are firm specific, they are difficult to trade individually. Consequently, AG (one firm buys controlling interest in another firm and the acquired business is integrated within current operations or becomes a subsidiary of the acquirer's portfolio) may provide an attractive alternative to organic growth because it enables managers to acquire "bundles" of resources (Barney, 1986; Rumelt, 1987). Furthermore, a strategy of acquisition may enable a firm to take advantage of growth opportunities by accessing resources that are complementary in nature to the resources that the firm already controls (Harrison, et al., 1991; Harrison et al, 2001).

We anticipate, therefore, that the diversity of resources developed through strategies of OG and AG, respectively, are likely to be different. Furthermore, the ACs and POS associated with OG and AG are likely to be different, which has consequences for the future growth of the firm. We now explore how the firm's past OG and AG affects its future OG by re-examining and extending Penrose's arguments. Specifically, we examine the relative change in the ACs and POSs, and the subsequent effect on future organic growth, arising from the different strategies of OG and AG.

Before presenting our model of firm growth we feel it is important to position our work relative to two dominant growth literatures in management and economics: merger and acquisition (henceforth M&A) and diversification (interestingly both literatures explicitly, or implicitly, draw on ideas that are central to the RBV – see Lockett & Thompson, 2001). The

M&A literature, overwhelmingly focusing on samples of large publicly listed companies, indicates the financial returns to M&A activity are, on average, negligible at best (see King et al, 2004, for a review and meta analysis of the evidence). Similarly, the diversification literature, overwhelmingly drawing on studies of publicly listed companies, suggests that there is a curvilinear relationship between diversification and financial performance. The performance of the firm improves for increasing levels of diversification, up to a relatively modest level, and then tails off (see Palich et al., 2000, for a review and a meta analysis). Whilst these two bodies of literature are impressive, we view them as being tangentially related, but not core, to our research on growth for two main reasons.

First, our empirical context is the population of Swedish firms, which is dominated by private small and medium size enterprises (henceforth SMEs). Interestingly, recent evidence suggests that the financial returns to M&A activity of private firms may be much better than public firms (Fuller et al, 2002). Performance differences of M&A activity across public and private firms may be due to the nature of the acquisition bidding process and the existence of private information in the valuation of companies. Large public firms face the problem that the bidding process is likely to be more visible, attracting increased competition, and the potential synergies from an acquisition are less likely to be private, hence the target price of the firm will be bid up (Barney, 1988; Harrison et al, 1991 & 2001). This argument is consistent with Denrell et al's (2003) RBV argument that firms can only acquire other firms at less than their full market value if they have idiosyncratic resources which will add value to the acquired firm's resources (in the absence of serendipity). For this reason we anticipate that the M&A performance problems faced by larger public firms may be less prevalent with smaller private firms where the bidding process will be conducted in a less public manner and with a greater degree of private information. Similarly, private SMEs are more likely to be non-diversified in comparison to larger public firms, and so the negative performance

implications of diversifying above a relatively modest level are less likely to affect SMEs. Second, both literatures focus on the financial performance implications of growth, whereas we focus on the implications of previous growth on current growth. Hence, the M&A and diversification literatures employ a different dependent variable (financial performance) to our study (employment growth).

Previous Organic Growth and Its Effect of Future Organic Growth

Organic growth creates ACs for a firm because of the need to bring in and train new managers, which will be correlated to the rate of organic growth. The quicker a firm tries to grow the more costly growth may be due to time compression diseconomies (Dierickx and Cool, 1989). Although positive (i.e. AC $_{organic}$ > 0), the magnitude of AC are subject to debate. Penrose viewed AC as potentially significant, arguing that even if the productive opportunity set facing a firm is immense, the rate at which the firm can develop its managerial capabilities sets an ultimate limit to its growth. More recently, however, Geroski (2005), through his review of the empirical evidence on firm growth, has argued that the ACs of expanding a business do not appear to be very high and may have been overstated by Penrose. Arguably of more importance is the issue of the growth opportunities facing the firm, which we view as the dominant constraint on growth.

As a firm grows it accumulates resources, which in principle increases its potential resource combinations. There are many more ways of combining *2n* resources than *n* resources. However, because the POS is limited to those possibilities for combining resources that managers are able to see and willing to act upon, past growth does not necessarily provide the firm with an increasing number of new opportunities over time (Moran & Ghoshal, 1999). Firm growth requires 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 POS. The POS 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, however, that the exact same set of resources can be used to expand the firm's POS *ad infinitum*. Over time firms develop routines of limited scope, which constrain their ability to recombine existing resources (Nelson & 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 & 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). Over time, organic growth will lead to the repeated exploitation of existing resources, which may result in firms becoming "simple and inert" (Vermeulen & Barkema, 2001). Rigidities created by the repeated use of resources (Miller, 1994) will potentially hinder the future organic growth rate of the firm, especially in the face of a dynamic environment.

Furthermore, 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. The development of similar, not complementary, resources will arguably hinder the expansion of the firm's productive opportunity set. This argument is

consistent with the literature on acquisitions that argues that it is complementarities and not similarities that create new opportunities for firms improved performance (see: Harrison et al., 1991; 2001).

Consequently, we believe that the POS of the firm may be smaller and more difficult to expand than Penrose predicted. The problem facing firm managers is that previous organic growth will only permit an incremental expansion of the firm's POS (i.e. $\Delta POS_{organic} \geq 0$), while simultaneously they exploit the POS through current organic growth. Consequently, firm managers will find it increasingly difficult to maintain a high rate of organic growth from one period to the next because firms that have exhibited high organic growth rates in the past will have already harvested the closer and easier growth opportunities. In order to sustain a strategy of organic growth, firms need to search further from their existing operations. However, due to path dependence and associated organizational rigidities, the pursuit of growth opportunities in new fields of activity is inherently costly and difficult.

In summary, previous organic growth will have the dual constraining effects of imposing ACs of managing the growth process and permitting only an incremental expansion of the firm's increasingly exhausted POS. Consequently, the managers of the firm will find it increasingly difficult to maintain the firm's current rate of organic growth. Hence:

> Hypothesis 1: *Ceteris paribus*, the greater the rate of organic growth in previous periods, the lower the rate of organic growth in the current period.

Previous Acquisitive Growth and Its Effect of Future Organic Growth

Although Penrose did not argue that firms limiting themselves to OG may exhaust all their growth opportunities, she did note that AG 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 AG may be best suited for those companies that lacked the ability to expand organically. However, she never explicated *how* AG would affect the firm's ability to continue to expand organically. Interestingly, 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 regarding the relationship between AG and OG. We focus our arguments, as in the previous section, on the effect of AG on the ACs and the POS of the firm.

On the downside, Penrose (1959) argued that AG creates ACs arising from the integration of two firms. ACs arise because managers' time (and hence managerial capabilities) will have to be devoted to integrating the resources of the acquired firm. Consequently, the diversion of managerial resources to managing the integration of the acquired firm, rather than to OG, may potentially retard post-acquisition OG (Penrose, 1959: 195). As with OG, we feel that Penrose may have overstated the problems associated with ACs of AG, i.e. the costs of managing the process of AG not the costs of the acquisition, for two main reasons.

First, firms may have spare managerial resources, which is probable if the firm has not utilized its OG potential fully in the past. The spare managerial resources may be employed in managing the integration of the new operations, and hence the ACs of AG will have less impact on the future OG of the firm. Second, AG will result in an influx of managerial resources, from the acquired firm, which should help reduce the AC incurred by the acquirer. Interestingly, Penrose articulates this argument herself stating that: *"Not only does a firm inherit the potentialities of growth of the firms it acquires, but a merger tends also to leave pools of unused productive services available to the combined firm which would not have been available in the independent firms"* (Penrose, 1959: 195). Empirical support for this argument has been provided by Graebner (2004), who in a case study of eight acquisitions, found that the continued engagement by the acquired firm's leadership was crucial to post-

acquisition performance. Consistent with the above, Geroski's (2005) review of the empirical evidence on growth suggests that not only have the ACs of growth been overstated (i.e. are lower than Penrose predicted), but that their magnitude is not directly related to the level of previous growth.

We argue that the dominant effect of AG will be felt in terms of the expansion of the firm's POS. In highly competitive environments, which mirror more closely the present time than when Penrose was writing, there is an increasing acceptance that it is difficult for a single firm to try and possess all the resources required to compete effectively (Child & Faulkner, 1998; Dyer & Singh, 1998; Pfeffer & Salancik, 1978). As a consequence, acquisitions have become an increasingly popular means for firms looking to re-shape their resource and knowledge bases (Ireland et al., 2001). AG will lead to an influx of new resources *and* new knowledge, which increases the diversity of the resource-base of the firm *and* enables managers to gain new insights into how they can utilize their existing and new resources. As such, AG may be viewed as a strategy to re-shape a firm' resource-base and the resulting resource combinations.

AG involves the acquiring firm buying a bundle of productive resources (i.e. the acquired firm), which when combined with the acquiring firm's resources, creates new resource-combination possibilities. In contrast to OG, with its development of path dependent resources, AG presents an opportunity for the firm to bring in new non-path dependent resources. The effect of an influx of new resources on the firm, creating resource diversity and the potential for new resource synergies, will lead to an expansion of the firm's POS (Harrison et al., 2001; Wang & Zajac, 2007). We believe that the effect will be particularly pronounced for SMEs because, due to their limited resource-bases, any influx of new resources will lead to an non-incremental increase in the diversity of an SMEs resource-base and hence its POS.

As highlighted above, a firm's POS is a function of its resource-base *and* knowledge about how to use it. Managers do not have perfect information and believe that there is more to know about the resources they have at their disposal at any given time (Penrose, 1959). An increase in knowledge will enable managers to utilize their existing resources more effectively. New knowledge generated via OG, e.g. through the introduction of new products (Kor & Mahoney, 2000), will be path dependent in nature and close to the firm's existing knowledge base. In contrast, AG may lead to the introduction of new non-path dependent knowledge to the firm. The new knowledge will better enable managers to engage in "resource learning" (Mahoney, 1995) and to conceive new resource-combinations. Consequently, new knowledge from AG may play an important role in the development of new productive services, and shaping the POS of the firm (Penrose, 1959: 77).

It is important to note, however, that the effects of acquisition will not be permanent. The increase in knowledge and resources will lead to a one off expansion in the POS of the firm. Over time the new POS will be capitalized on and so the effect of the acquisition on current OG will diminish. AG, therefore, will have a short run effect on the OG rate of the firm, but in the long run its effects will be diminished.

The arguments above suggest that the ACs of AG, while positive (i.e. AC $_{acquisition}$ < 0), may have been overstated by Penrose. We believe that the dominant effect of previous AG on the future OG of the firm will be in terms of the change in the firms POS. A strategy of acquisition, particularly for SMEs, may also enable the firm to discover new paths of resource combinations and thus open up new growth opportunities for the firm that are different from those previously pursued. Furthermore, previous AG will not lead to the exhaustion of the increased POS because it is the result of bringing together established operations. Thus, we expect that the negative effect of the AC of previous AG to be more than offset by the potential positive effect from the increase in the firm's productive opportunity set, which will

not be exploited by previous AG (i.e. AC $_{acquisition}$ < ΔPOS $_{acquisition}$). Consequently, we argue that current acquisitive growth will have a positive effect on future organic growth. Hence:

> Hypothesis 2: *Ceteris paribus*, the greater the rate of acquisitive growth in previous periods, the greater the rate of organic growth in the current period

Our model is summarized in figure 1.

Insert Figure 1 about here

DATA AND METHODS

The Sample

The data set comprises a ten year panel (1987-1996) of all commercially active enterprises in the private (non-government) sector in Sweden that had 20 or more employees in the last period of our study and which had appeared in the underlying data base for at least one year prior to the last period. There are 11,525 such enterprises. Annual data for all enterprises have been compiled for every year of the period. Start-ups during this period are included if they fulfill the size criterion for the final year, as are a small number of 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 the final period. No upper size limit has been employed but because of the typical, skewed, distribution of firm sizes, SMEs dominate the data and will drive the results.

The data

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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. Specifically, for us to accept at t_1 that firm A_{t0} is the same unit as firm B_{t1} the following has to apply: (i) at least 50% of the former employment in A is now found in B; and (ii) this same employment constitutes at least 50% of B's total employment. This criterion is programmable and can establish unique links in the great majority of cases. Because of mergers and splits the above criteria do not always lead to a unique and satisfactory solution. In these cases the two foremost business data experts at Statistics Sweden used a manual procedure for deciding, according to their best collective judgment, which of several links should be used, or neither. For any individual year 0.7% was the maximum fraction of cases

for which a link was accepted on the basis of manual inspection rather than fulfilling both of the "50%" criteria.

In order to investigate the growth of firms we focus on employment as a measure of the growth in firm resources. 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 for four reasons. First, employment growth reflects, more closely than sales growth, the expansion of the resources and managerial capacity of the firm as emphasized in Penrose's theory. Penrose explicitly states that her theory concerns the expansion of "*human and other resources*" (Penrose, 1995, p. xi). Total asset value is a conceivable but as we see it weaker alternative, as it is more sensitive to industry differences in capital intensity and therefore arguable scores worse on measurement invariance (Byrne & Watkins, 2003). Second, adjustment costs as defined by Penrose are largely attributable to the time and effort needed to integrate new people into the organization. Thus, employment growth has the advantage of being directly related to adjustment costs. Third, in their recent assessment of different growth indicators, Shepherd and Wiklund (2009) found that among five different growth indicators (employment, sales, equity, assets, and profits), employment growth was the measure showing most instances of concurrent validity, having higher generality and robustness than the other measures. They also advised against the use of multi-item growth indicators because the correlation among growth indicators is typically low. Fourth, while sales growth data is available for a subset or our data (approx. 50 percent) it is a non-random subset by firm size, industry and time period so relying on sales growth data would introduce biases.

The Model

In this section, we describe the empirical strategy we used to identify the conditional (direct) and unconditional (indirect) effects of acquisition growth on organic growth. The model we estimate is as follows:

$$OG_{it} = \beta_1 OG_{t-1} + \beta_2 AG_{t-1} + \gamma' X + \delta D + \varepsilon_{it}$$

(1)

In the above equation i and t index firms and time periods respectively, OG denotes organic growth, AG is acquisition growth, D is the full set of time and industry dummies and ε is a random error term. X is a vector of control variables hypothesized to impact on firm growth, including terms for firm age and initial size, and dummy variables indicating if the firm is foreign-owned and if it is part of a corporate group. The quadratic relationships between age and growth and size and growth is well-documented in the literature (e.g. Evans, 1987), hence we include linear and quadratic terms for both age and size.

The lagged dependent variable OG_{it-1} captures the effects of past organic growth on current organic growth. Negative and significant coefficients on these variables would be consistent with Hypothesis 1, which postulates that past organic growth constrains current organic growth.

The coefficients on AG_{it-1} give the unconditional effects of past acquisition growth on current organic growth. Positive and significant coefficients on these variables would lend empirical support for Hypothesis 2, which posits that past acquisition growth has beneficial effects on future organic growth.

The Measures

The different measures that we employed in our analysis are detailed below and summarized in Table 1. All variable names are provided in italics.

Our study has 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 the current year, and created the current year. *Organic growth* is measured as total employment$_{(t)}$ - total employment$_{(t-1)}$ - the change in employment in associated with establishments acquired the current year; i.e., acquisition growth$_{(t)}$. *Acquisitive Growth* is measured as the addition to employment through acquisition (or merger) in year t. Employment changes in these units in subsequent years will then form part of the firm's organic rather than acquisition-based growth.

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, which we log transformed, in the initial year of our study.

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 & Kirchoff, 1989). We measure the age of the firm in years since the firm started operations. This variable is truncated at 24 years because the underlying data base was first set up in 1972, i.e., 24 years prior to our end year, 1996.

Foreign owned firm. This was a dummy variable we coded 1 if the company was a subsidiary of a foreign firm and 0 if it was not. Related to the business structure is the question of how the organizational form of the firm 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).

Corporate ownership. This is a dummy variable we coded 1 if the company was part of a corporate group and 0 else. The inclusion of this variable could be important because corporate management considerations are likely to affect the growth strategy of the firm.

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 that included the following industries (the proportion of observations in each category is given in parentheses): high tech manufacturing (2.7%), wood, pulp and paper (5.6%), engineering industry (14.7%), mining and steelworks (1.8%), other manufacturing (11.7%), technical consultants (4.6%), other knowledge-intensive services (3.2%) banking, insurance and finance (3.4%), construction (8.8%), retail and wholesale (24.6%), hospitality (4.2%), transportation and communication (6.7%), education and healthcare (3.5%), other services (2.8%), farming fishery forestry (1.1%), and other/unclassified (0.6%). The variables were coded 1 for being in the industry sector and 0 for not being in the industrial sector. Retail and wholesale, containing the largest number of cases, was the base category as recommended in the literature. Due to the large number of industry dummies we do not report individual industry dummies in our analysis.

Year dummies. As with industry we created dummy variables for each year covered by the data set to control for time related effects. We chose to make the first period of the study the base group (1987). Due to the large number of year dummies we do not report individual year dummies in our analysis.

RESULTS

The descriptive statistics for the continuous variables are presented in Table 1. The mean rate of organic growth was 0.054 (standard deviation 0.352), and the mean rate of acquisitive growth was 0.103 (standard deviation 0.637). The mean (log of) initial size is 3.74, with 64.4% of the sample having between 20-49 employees, 29.4% between 50-249 employees and 6.2% of the sample being larger than 250 employees. The average age of firms in the sample was 12 years (standard deviation 6.984). In terms of ownership 38% were independent firms and 62% were part of a larger corporate group. Finally, 87.6% of the firms were Swedish owned, with only 12.4% being foreign owned.

Insert Table 1 about here

Table 2 presents evidence relating to the frequency of acquisition for firms that are organic growers and organic non-growers. We performed this analysis to identify whether or not there are systematic differences in the propensity of organic growing versus non-organic growing firms to undertake a strategy of acquisitive growth. Specifically, we tabulated organic growth in years t and t-1 against acquisitive growth in the current period. The descriptive statistics do not suggest any systematic differences.

Insert Table 2 about here

Our empirical strategy involves simultaneously controlling for two potential sources of bias: selection and individual firm differences. First, to address the problem of selection bias, as firm growth is observed only in firms that have survived, it is necessary to assess and

correct the selection bias due to survivorship. A popular method for correcting selection bias is the Heckman approach (1976, 1979). However, this method is only appropriate in cross sectional models and cannot be used with panel data where different firms drop out of the sample at different points during the sample period. Fortunately Wooldridge (1995) modifies Heckman's approach to panel data models with unobserved firm specific effects. The procedure involves two steps: in the first step, the selection equation is estimated by standard Probit for each time period t=1, 2, …T and the inverse Mills ratio for surviving firms, say $\hat{\lambda}_{it}$, is generated. In our paper we include firm size and age as well as ownership and industry dummies in the probit regressions. Thus for each time period we estimate the equation$Pr[S_{it} = 1] = F(x_{it}\delta_t)$ using standard probit where S is a binary variable indicating whether the firm survives at time t or not, and F denotes the standard normal cumulative distribution function. Based on the estimates from the probit regression the inverse Mills ratio can be constructed (again for each time period) as $\hat{\lambda}_{it} = \frac{f}{1-F}$ where F is as defined above and f is the standard normal probability distribution function. In the second step of the estimation, the matrix of inverse Mills ratio defined for each time period as $\Lambda_{it} = \left(0 \quad \hat{\lambda}_{it} \quad 0 \quad 0 \right)$ is included in the original model (1) to correct for the selection bias, and the extended equation is estimated using firm specific fixed effects (the within estimator). Second, to control the problem of unobserved firm differences, our analysis employs firm-specific effects.

Finally, we also test the robustness of our results by investigating whether the relationships between organic and acquisitive growth vary by firm size and age. To this end, we divide our data set into young and old, and small and big firms, and estimate our model on each sub-group separately.[2] Small (big) firms are defined as those below (above) the median employment level in the data. Similarly, young (old) firms are defined as those below (above)

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[2] We would like to thank a reviewer for this helpful suggestion.

the median age in the data. The results of our regression models, which include selection-bias corrected estimates with firm-specific effects, are presented in Table 3.[3] All specifications include the full set of time and industry dummies. We discuss these results below.

Insert Table 3 about here

First, the results indicate that organic growth in the previous period exerts detrimental effects on current growth. The full sample model 1 shows that the coefficient is negative and statistically significant at the 1% level. Furthermore, the negative and statistically significant result holds across Models 2-5, i.e. across small, large, young and old firms. In terms of the substantive significance of the result, based on Model 1 suggests that a 10 percentage point increase in the organic growth (t-1) will lead, on average, to a 0.958 percentage point reduction in organic growth in the current period. The results are consistent with H1.

Second, the results indicate that acquisitive growth in the previous period exerts a positive effect on organic growth in the current period. The coefficient for acquisitive growth (t-1) is positive and significant at the 1% level. Furthermore, the positive and significant relationship is robust as it holds across Models 1-5, i.e. across small, large, young and old firms. The substantive significance of the result, based on Model 1 suggests that a 10 percentage point increase in the acquisitive growth (t-1) will lead, on average, to a 0.917 percentage point increase in organic growth in the current period. Interestingly, the effect size is more 2.5 times higher for small firms (Model 2) than for large firms (Model 3). This result attests to the

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[3] By employing a fixed effects model we control for time-invariant unobserved firm heterogeneity which are correlated with the independent variables. Note that the within-transformation removes the time-invariant components of the model.

importance of resource diversity in promoting organic growth. The results are consistent with H2.[4]

Curvilinear effects

Although H1 and H2 hypothesize linear relationships, between OG_t and OG_{t-1} and AG_{t-1} respectively, as an additional robustness check for our model we also tested for presence of curvilinearity by including a quadratic term for both OG_{t-1} and AG_{t-1} and re-ran the analysis on the complete sample, the results of which are presented in Table 4.

Insert Table 4 about here

Interestingly the results indicate that the presence of a curvilinear relationship between OG_t and OG_{t-1} (significant at the 1% level) but no curvilinear relationship between OG_t and AG_{t-1}. Although the linear relationship between OG_t and OG_{t-1} (H1) indicates, on average, that there is a trade off between previous and current organic growth, the positive and significant coefficient of the quadratic term suggests that for firms with very high growth rates, on average, the trade off does not exist. A plot estimate of the linear and quadratic marginal effects relationships between OG_t and OG_{t-1} are presented in Figure 2. The U shaped quadratic relationship indicates that for OG_{t-1} growth rates of 0-30% the linear and quadratic relationships are the same. Therefore, the linear relationship holds for the vast majority of firms in our study. However, for the more exuberant growers the growth constraint is less pronounced through the OG_{t-1} range 30% through to the turning point of 66%, with the marginal effect becoming positive thereafter for the very rapid growers. The presence of a U-

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[4] We have experimented with using further lags of growth in our model (t-2 and t-3), and found that the conclusions of paper are robust to such changes of specifications. However, we chose to confine our analysis to the case of one lag (t-1) because the use of further lags entails the loss of substantial number of observations.

shaped relationship OG_t and OG_{t-1} indicates that the very fast growing firms may not be subject to the Penrose effect. We discuss the theoretical implications of curvilinearity in the discussion section.

Insert Figure 2 about here

DISCUSSION

In this paper we have revisited Penrose's ideas to examine how the resource/capability accumulation process influences firm growth. Specifically, we have examined how the adjustment costs and productive opportunity set of the firm in terms of past organic and acquisitive growth influence current organic growth, both directly and indirectly. In doing so, we have followed in the footsteps of Penrose and her intentions for developing a theory of the growth of the firm. Our reading of Penrose's work tells us that she clearly makes the distinction between organic and acquisitive growth and that the main interest of her work lies in understanding how past organic and acquisitive growth affects future organic growth. To date, applications of Penrose's theory have typically been limited to a focus on the effects of AC, which has led to a number of scholars criticizing the lack of applicability of Penrose's growth theory (e.g., Geroski, 2005; Marris, 2002). Consistent with Penrose's theory, we utilized a dual focus on ACs and POSs.

In order to appropriately deal with both these issues, we conceptually and empirically separated OG from AG. We hypothesize and empirically find that the effects of organic growth and AG on subsequent OG are qualitatively different. We interpret this as reflecting differences in the AC and POS that result from these two forms of growth. Consequently, a firm's strategic choice of mode of growth has consequences for its future amount of OG.

Previous growth research has typically failed to separate the two modes of growth. We believe that our delineation of these two modes of growth is an important contribution to the literature interested in applying and testing Penrose's growth theory, but also to growth research in general. Therefore, we encourage future studies to pay much greater attention to the differences between OG and acquisitive growth in order to further our understanding of firm growth. These two modes are fundamentally different. Others have noted that there are several conceptual and empirical challenges to the study of firm growth (Davidsson & Wiklund, 2000). Our conceptual and empirical separation and clarification of organic and acquisitive growth address some of those challenges.

In revisiting Penrose's theory, we also believe her theory of growth does need modification. We believe that the nature of the modification relates to bringing to the fore aspects of her theory that are currently less emphasized.

First, our results are robust and consistent with hypothesis H1, indicating a direct and negative relationship between previous OG and current OG. Firms that have expanded organically in the past will find it more difficult to expand organically in the current period. This finding supports that argument that ACs do matter for the growth of firms (e.g. Garnsey, Stam & Heffernan, 2006; Tan & Mahoney, 2007). However, irrespective of the magnitude of ACs we feel that Penrose overestimated the ease at which the management of a firm can extend its POS set by recombining the existing resources and those generated by the internal growth process. Expressed differently, industrial firms in the post-WWII era, on which Penrose bases her theory, operated in an environment where growth opportunities were immense and competition limited. They did not face the external growth restrictions that firms face today. In comparison, contemporary firms need to extend their operations into new areas in order to continue their OG, which is difficult and costly due to myopia and path dependence. Therefore, 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 POS. AG is one strategic option for firms wishing to increase the POS of their firm.

Second, we argued and found that the problems associated with the ACs of AG will be outweighed by the increase in the POS of the firm. Our results are robust and consistent with hypothesis 2, indicating a positive relationship between previous AG and current OG. To some extent this finding counters Penrose's original formulation of the theory, suggesting that she overestimated the ACs associated with acquisitions. If the AC associated with acquisitions were substantial, the firm would not be able to develop its managerial capacity to simultaneously acquire another firm and foster OG. Initially, management would be occupied with conducting the acquisition and later they would need to devote substantial time and effort to integration. We have argued and found empirical support for the counter-argument that acquisitions can lead to diversification of the firm's resource and knowledge bases, which expands the POS set of the firm. The firm can then benefit from this extended opportunity set by growing organically. In Penrose's treatment of acquisitive growth, she did not explicitly examine the relationship between AG and OG. Our results demonstrate clearly that previous AG, on average, has positive effects on future OG. AG can stimulate OG. For this to be the case the ACs of AG must be outweighed by the corresponding increase in the firm's POS.

Third, as Penrose notes, entrepreneurial capabilities are needed in order to find ways of recombining resources to take advantage of growth opportunities. Similar to Shepherd and Wiklund (2009), we believe that entrepreneurial capabilities and resource recombination can explain our finding of positive implications of acquisitions. Given that the acquisition literature finds that, on average, acquisitions have neutral or negative effects on the financial

performance of the acquiring firm (see the meta-analysis by King, *et al.,* 2004), our positive results of acquisitions may be surprising. To some extent, our results can be explained by methodological differences between this study and studies aimed at explaining acquisition performance, including the sample studied (mainly small, non-listed firms instead of large, listed firms) and the outcome variable (organic growth instead of stock market performance). Our results comparing small and large firms are consistent with the argument that acquisitions may have a greater liberating growth effect on small firms with narrow resource bases than larger firms with more diversified resource-bases (see: Models 2-3 in Table 3). It is the ability of the acquiring firm to discover and conduct productive resource combinations which determines the extent to which the growth potential of an acquisition becomes realized (Shepherd and Wiklund, 2009).

Fourth, we argue that Penrose's theory in relation to how new resources and knowledge are developed or acquired 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 of unlimited growth opportunities is relaxed. The importance of previous growth (organic or acquired), and the characteristics of the resources thus brought into the firm, are related to the future POS 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. Similar to Penrose, March (1991) notes that these newcomers are likely to be less knowledgeable than existing staff about the firm's operations, but the variety of their knowledge that they bring outweighs their lack of knowledge. This speaks to the qualitative differences between OG generating limited variety in the resource base and AG generating greater variety and thus greater chances of extending the POS of the firm. We

argue that these insights from organizational learning will hold important insights into the differences between OG and AG and their effect on the future growth of the firm.

Future extensions to Penrose's work

In this section we expand our discussion to outline potential future extensions of Penrose's work. We begin by returning to the U-shaped relationship between previous OG and current OG and then comment on relaxing the assumption that the firm is the appropriate unit of analysis for examining growth.

As part of our robustness checks we found the existence of a U-shaped relationship between previous OG and current OG, whereby for very exuberant growers (over 66% growth) the growth constraint was relaxed (but still present). This finding extends Penrose's work, which assumed a linear relationship, and opens up interesting theoretical implications for future research. We suggest that the U-shaped relationship may be due to two factors.

First, in addition to AC being lower than Penrose (1959) predicted, the magnitude of AC is not directly related to the level of previous growth (Geroski, 2005). Therefore, the AC associated with high levels of previous growth may be proportionally lower, on an employee by employee basis, than low levels of previous growth. The magnitude of ACs being determined by the managerial capabilities of the firm. Firms which have engaged in high levels of AG may be better able to develop the skills to manage such transactions and so face less ACs.

Second, and arguably of more importance, is the nature of the firms POS. Firms which are able to grow rapidly will have large POSs. Where the POS is sufficiently large, the firm will only be able to capitalize on a small proportion of available growth opportunities in the short run. Consequently, the firm will be insulated from the problem of their POS becoming

increasingly exhausted and its associated constraint on future organic growth in the short run.[5] This raises interesting questions as to what determines the POS of firms. There are two possible explanations. First, certain competitive environments will present greater growth opportunities than others and hence, *ceteris paribus*, act to increase a firm's POS. Second, and arguably of more importance, is the firm's ability to expand its POS irrespective of its current competitive environment. This relates back to Penrose's key distinction between the managerial and entrepreneurial capabilities of the firm, and her emphasis on entrepreneurial capabilities being central to firm growth. As managerial capabilities are practical in orientation they are more easily developed than entrepreneurial capabilities which are a function of the imagination (Penrose 1959). Consequently, entrepreneurial capabilities the key resource (being: valuable, rare, imitable and non-substitutable in RBV parlance) that differentiates firm's abilities to overcome a growth constraint.

The importance of manager's subjective assessments of the resources at their disposal, allied to their imagination, raises interesting issues for both future developments of Penrose's growth theory and the RBV (Kor et al., 2007). We feel that researchers need attend more closely to the processes by which managers make decisions about resources and growth. To date insights from cognitive theory have been applied to modeling managers mental models of the competitive landscape (see: Porac and Thomas, 1994; Porac, Thomas and Baden-Fuller, 1989; Porac, Thomas, Wilson, Paton & Kanfer, 1995; Hodgkinson, 1997). We contend that a cognitive perspective on firm growth and the RBV can help to overcome these limitations and can open avenues for further research. Future work needs to embrace the importance of manager's subjective decisions about the functionality of resources at their disposal rather than reify resources as objective entities waiting to be discovered through some formal analysis. In reality resources may only exist in the eye of the beholder, which is

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[5] We state in the short run because we only look at the effect of period t-1 on period t. It is important to note that our analysis does not employ a time series approach.

consistent with Wernerfelt's (1984) argument that a resource is *anything* that is a strength or weakness of the firm. Resource functionality remains an under-researched aspect of the RBV (Lockett, *et al*, 2008).

In this paper, building on the work of Penrose, we have taken the firm as the unit of analysis, however, recent developments in economics and management have highlighted that organizational boundaries are becoming increasingly blurred (Powell, 1990). An interesting direction for future developments of Penrose's growth theory will be to relax the assumption that the firm is the unit of analysis in order to examine the role of alliances and networks between firms. Below we outline the implications of two specific forms of network arrangement (which incorporate alliances): relational networks and modular production networks (see Sturgeon, 2002, for a review).

Relational networks are based on organizations with complementary strengths, recognizing their interdependence on one another, and linking together for mutual benefit in an open-ended manner (see: Powell 1990 for a review). In many knowledge rich environments, such as high tech industries, relational networks have developed (which are commonly geographically clustered) in order to promote knowledge flow between firms in order to foster innovation (e.g. in the case of Silicon Valley see: Saxenian, 1991 & 1994). The access to more diverse sources of information may have a positive impact on expanding the POS of the firm as managers become more aware of new market opportunities and/or are able to access complementary knowledge. As such, relational networks firms may be enable firms to avoid making acquisitions in order to gain access to new sources of information in order to expand the POS of the firm. Arguably future studies on firm growth should examine the potential role of relational networks (which encompass alliances) in relaxing the growth constraint on firms.

In modular production networks the lead firm (e.g. Apple) engages in the innovation, design and marketing of new products but out sources production, on the basis of market

relationships, to turn key suppliers who engage in contract manufacture (Sturgeon, 2002). As such, the lead's sole attention is focused on how to develop the POS of the firm whilst outsourcing many of the problems of managing the growth process of manufacturing operations to external firms. By outsourcing production the lead firm may be better able to reap the value from innovation while spreading the risks from volatile demand (Venkatesan, 1992). In modular production networks the full employment effects of the lead firm's activities will not be fully accounted for in their change in employment. Therefore, future research into firm growth may need to embrace the changing nature of production, and the role of modular production networks, by focusing on employment effects across the whole network.

Managerial implications

We feel that our work has implications for managers. First, our empirical evidence suggests that the important role the POS of a firm may play in constraining or enabling the future organic growth of the firm, and the importance of the ACs of growth may have been overstated by Penrose (1959). Therefore, managers need to focus their attention on how they can influence the expansion of the firm's POS over time. If diversity and synergy within a firm's resource base will lead to a larger POS, and hence enhanced opportunities for future growth, firm managers need to think how they can achieve diversity and synergies within their resource base. If firms exclusively rely on organic growth then managers need to be alert to the potential problems of the path dependence, and the potential for limited learning outside of areas where the firm already holds prior knowledge (Teece, 1987; Cohen & Levinthal, 1990).

Second, and related to the above point, our findings attest to the importance of acquisitive growth as a means of expanding the firm's POS and hence future organic growth. We feel

that acquisitive growth may be a strategy for overcoming the problems of path dependence associated an exclusive focus on organic growth. The acquisition, in effect, should be viewed as a strategic option for managers to break the path dependence of the firm, and its associated development of close in resources, to permit broadening of the resource base and the potential to create new synergies. The issue facing firm managers is how to develop the necessary skills to a strategy of acquisitive growth, and hence stimulate future organic growth, in a profitable manner. Clearly, any strategy of acquisition should be predicated on the existence of resource synergies between the two companies, which if private will be more likely to lead to positive financial returns (Harrison et al, 1991; 2001). This will require managers to have a good understanding of the nature of both their own firm's resource-base and the target firm's resource-base, which is a fundamental element of any RBV-based strategy (Lockett, *et al*., 2009).

Finally, the existence of a curvilinear relationship between previous and current organic growth suggests that some firms may have sufficiently large POS that they do not face a growth constraint. Furthermore, the ACs of organic growth do not appear to be problematic for hindering future growth**.** In the growth rate range 0-66% (see Figure 1) there is a trade off between previous organic growth and current organic growth (the quadratic and linear relationship being effectively the same up to a growth rate of 30% per annum). However, for growth rates above 66% the growth constraint does not bite. This finding raises interesting managerial issues as to why some firms are able to develop much larger POSs than others, and to what extent they are able to sustain very high growth rates in the medium to long run. Anecdotal evidence of firms such as Microsoft and Google indicates that a small number of firms in fact achieve extraordinary growth rates over extended periods of time exploiting opportunities that appear more or less inexhaustible. These firms also face managerial challenges, but these are different in nature – more closely associated with the problems of

integrating new people into the business (cf. e.g., Hambrick & Crozier, 1985). Stated differently, the managerial problems of these firms are more similar to those noted by Penrose.

Limitations

As with all empirical research there are limitations associated with our work. First, on the basis of theory, we make assumption concerning the nature of the resources that are added to the firm through organic and acquisitive growth respectively, but these resources remain unobserved. We share this limitation with the vast majority of growth studies. More detailed information about the nature of resources involved in growth (e.g. resource complementarities) would have provided a deeper understanding of how previous growth mode can help fuel future OG. The nature of resources falls into the category of unobserved heterogeneity together with other unobserved variables (see the comment below about control variables). The effect of this is attenuation of results, i.e., results are weaker than they would have been had these variables been included. The risk that it would lead to spurious results, however, is small. For example, the issue of resource complementarities is likely to influence the decision of acquire a firm or not. This effect is absorbed in our acquisitive growth variable. Further, firms are likely to differ in their ability to select and integrate acquired firms. Variance in this ability would lead to spurious results only if it systematically affected the ability to generate OG in future periods and not in present and past periods (we control for the latter). This is an unlikely scenario. The limited evidence on firm growth based on samples dominated by small and mediums-sized firms suggests that penetration and related diversification strongly dominate (Levie, 1997). Therefore, we feel confident that our results are not driven by the omission of the variables measuring the nature of resources acquired in the growth process.

The second limitation relates to the generalizability of our data. The data includes all commercially active enterprises in the private (non-government) sector in Sweden from 1987-1996 and raises issues about the age of the data and its geographic focus. First, the age of the data is only problematic if the conditions in Sweden during that period deviate from other contexts where the theoretically suggested relationships are supposed to hold. Second, the geographic focus of the data means that Swedish firms may pursue growth across national borders in ways that we fail to observe. This, however, is likely to have a limited influence on our results. Swedish exports can be largely attributed to a small number of very large multi-nationals, whereas our sample mainly consists of small firms, many of them in the service industries. We note that in a similarly composed sample of Swedish firms used by Naldi (2008) the average export share of sales was 12 percent. Clearly, the reliance on data from a single economy also limits statistical generalization to other countries. Although we have derived our hypotheses from theory and found support for them, care must be taken in generalizing findings beyond Sweden or countries with similar features.

Finally, due to the panel nature of our data we were only able to collect data for a limited number of control variables in our analysis (e.g. size, age, foreign and corporate). Ideally we would have liked to include a greater range of control variables to account for the potential influence of other firm level factors. However, our panel data approach employing fixed effects means that we minimize any potential problems arising from the omission of relevant control variables if they are constant over time and correlated with the independent variable.

CONCLUSIONS

Although Penrose's theory is the most comprehensive theory of firm growth to date, surprisingly little work has been focused on extending and testing her theory. Relying on Penrose's central concepts of ACs and the firm's POS, we argue and find that OG and AG are

qualitatively different phenomena and have different effects on the future OG of the firm. This leads us to conclude that these elements of Penrose's theory have received insufficient attention in the literature on firm growth to date. At the same time, on the basis of our findings and recent theoretical development, we suggest specific extensions to Penrose's theory.

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FIGURE 1
Model of Firm Growth

GROWTH TYPE	GROWTH PROCESSES	GROWTH OUTCOME

| ORGANIC GROWTH YEAR t-1 | Incremental expansion of POS and positive ACs | HYPOTHESIS 1: NEGATIVE EFFECT ON ORGANIC GROWTH YEAR t |
| ACQUISITIVE GROWTH YEAR t-1 | Non-incremental expansion of POS and positive ACs: POS effect dominant | HYPOTHESIS 2: POSITIVE EFFECT ON ORGANIC GROWTH YEAR t |
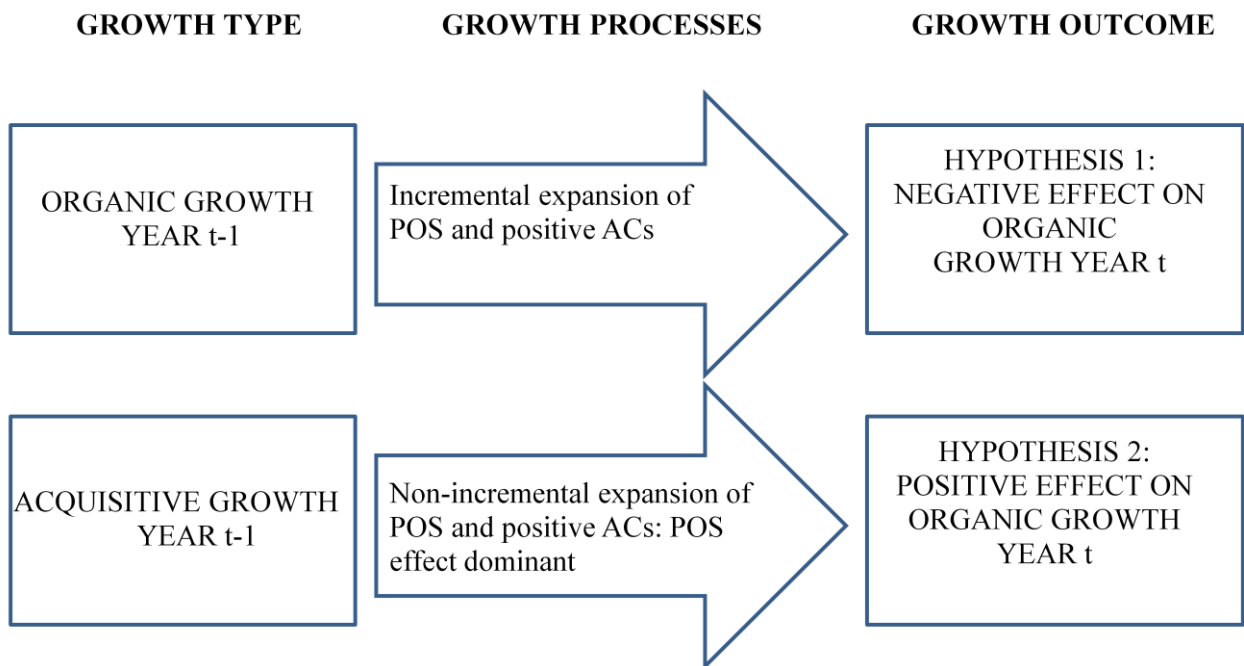
TABLE 1
Descriptive Statistics for Continuous Variables

Variable	Definition	Mean	Std. Dev.	Minimum	Maximum
Organic growth	Change in the log of organic employment	0.054	0.352	-4.060	7.091
Acquisitive growth	Log of employment due to acquisition	0.103	0.637	0.000	9.455
Size	Log of total employment (organic and acquisition) in the past year	3.740	1.146	0.000	10.331
Age	Years since establishment	12.077	6.984	0.000	24.000
Number of total observations		103136			

TABLE 2
Frequency of Acquisition of Growers and Non-Growers

	No acquisitive growth year t	Acquisitive growth year t
No organic growth year t	32177	830
Organic growth year t	23193	611
No organic growth year t-1	32717	901
Organic growth year t-1	22653	540

Note: As growth rates can only be calculated for surviving firms and firms with two or more consecutive observations, the number of observations in Table 2 is smaller than the total number of observations.

TABLE 3
Acquisition growth and organic growth:
Selection-bias corrected estimates with firm-specific fixed effects

COEFFICIENT	MODEL 1: ALL	MODEL 2: SMALL FIRMS	MODEL 3: BIG FIRMS	MODEL 4: YOUNG FIRMS	MODEL 5 OLD FIRMS
Organic growth (t-1)	-0.0958***	-0.0671***	-0.0756***	-0.0975***	-0.0953***
	(-25.2)	(-12.1)	(-14.4)	(-17.8)	(-17.8)
Acquisition growth (t-1)	0.0917***	0.223***	0.0865***	0.0942***	0.0904***
	(46.3)	(25.4)	(48.0)	(25.6)	(43.9)
SIZE (t-1)	-0.390***	-0.633***	-0.230***	-0.463***	-0.205***
	(-54.5)	(-49.8)	(-22.6)	(-80.4)	(-35.6)
SIZE (t-1) squared	0.0345***	0.0593***	0.0173***	0.0416***	0.0167***
	(42.3)	(24.0)	(17.9)	(60.3)	(27.3)
Age	-0.0521***	-0.0232***	-0.0310***	-0.102***	-0.0318
	(-6.60)	(-7.01)	(-5.12)	(-6.60)	(-0.46)
Age squared	0.000902***	0.000394***	0.000540***	0.00337***	0.000598
	(7.38)	(5.87)	(5.88)	(6.32)	(0.39)
Foreign-owned	0.0134	0.0144*	0.00366	0.0170**	0.0184***
	(1.54)	(1.68)	(0.50)	(2.00)	(5.06)
Corporate	0.00633	-0.00207	0.0407***	0.0179**	0.0382***
	(0.69)	(-0.15)	(5.31)	(2.52)	(8.18)
Selection-bias correction term	-0.655***	-0.265***	-0.380***	-0.393***	-0.0480
	(-5.42)	(-5.87)	(-4.17)	(-5.87)	(-0.61)
Observations	103136	49980	53156	57846	45290
R-squared	0.16	0.25	0.11	0.19	0.14

Notes:
(i) Robust t statistics in parentheses
(ii) *** p<0.01, ** p<0.05, * p<0.1 two tailed tests.
(iii) All specifications include the full set of time and industry dummies.
(iv) Small (big) firms are defined as those below (above) the median employment level in the data.
(v) Young (old) firms are defined as those below (above) the median age in the data.

TABLE 4
Acquisition growth and organic growth:
Selection-bias corrected estimates with firm-specific fixed effects

COEFFICIENT	MODEL 6: ALL
Organic growth (t-1)	-0.117***
	(-31.0)
Organic growth (t-1) squared	0.0880***
	(39.4)
Acquisition growth (t-1)	0.0967***
	(16.9)
Acquisition growth (t-1) squared	-0.00162
	(-1.33)
SIZE (t-1)	-0.545***
	(-67.1)
SIZE (t-1) squared	0.0433***
	(46.0)
Age	-0.0670***
	(-3.56)
Age squared	0.000984***
	(3.14)
Foreign-owned	0.0304***
	(4.45)
Corporate	0.00545
	(0.60)
Selection-bias correction term	-0.783***
	(-4.25)
Observations	103136
R-squared	0.19

Notes:
(i) Robust t statistics in parentheses
(ii) *** p<0.01, ** p<0.05, * p<0.1 two tailed tests.
(iii) All specifications include the full set of time and industry dummies.

FIGURE 2
Linear and Quadratic Models of the Relationship between
Previous and Current Organic Growth