1. Introduction

Research into firm growth has been accumulating at a terrific pace, and is being published in a growing range of outlets, such as journals relating to the disciplines of economics, management, sociology, entrepreneurship, as well as disciplines as diverse as statistical physics and psychology.

The past few decades have witnessed much progress in empirical research into firm growth, in particular, for a number of reasons. First, datasets documenting economic phenomena are growing in terms of their level of detail, sample size and availability. The rise of information technology has played a major role in this trend. Many countries have statistical offices that undertake censuses of business firms and establishments, creating longitudinal databases that track individual firms over time, and make these records available to researchers (under restrictions of confidentiality, of course). Firms are required to provide information on themselves and their operations at a level of detail that is quite remarkable. For example, many firms are required to file financial reports that describe their operations not just at the aggregated level, but disaggregated by production plant or by line of business. Even ‘soft’ variables, such as entrepreneurial growth aspirations, are becoming commonplace in quantitative statistical analyses – these variables can be measured using subjective responses of individuals to large-scale questionnaires. A second development favouring empirical research into economics is that econometric techniques have kept pace with the availability of increasingly informative datasets. Modern econometric work is able to deal with such complicated issues of endogeneity, unobserved heterogeneity within individuals, and sample selection bias. The progress that has been made in this domain has been reflected by the number of Nobel memorial prizes awarded to econometricians in recent years. Breakthroughs in econometric theory have granted more legitimacy to empirical findings, and have also allowed researchers to investigate more elaborate hypotheses. Old results have been turned on their heads when new, improved statistical methods have been applied. A third major development is that continual increases in computational power have been able to match developments in databases and econometric techniques. Bootstrapping methods, for example, are particularly computationally intensive and their use has only become feasible thanks to developments in the performance of computers.
To keep up with developments in this field, we need an up-to-date catalogue of empirical work, as well as a coherent theoretical structure within which these new results can be interpreted and understood. The aim of this monograph is to provide such an overview. The need for such a book arises because it is increasingly difficult to keep abreast of the latest developments in the field. Empirical investigations into firm growth have multiplied, and this has often occurred in tangential directions. The matter is complicated further when one realizes that research methodologies can be quite different, and hence difficult to compare, following on from the intuition that firm growth can mean different things to different people. In reaction to this, Garnsey et al. (2006) write that ‘it is essential to have related explanatory concepts to guide inquiry and make sense of evidence. A mass of undigested empirical findings can be misleading.’ (p. 4). This book attempts to take stock of the major findings in the literature, and endeavours to provide coherent explanations for them, and to knit them together in such a way as to give the reader an all-round appreciation of the phenomenon of firm growth. The book also attempts to summarize the research into firm growth that has already been done, so that future researchers can expand upon this knowledge base to obtain further insights into the processes of firm growth and organizational development.

The rest of this introductory chapter is organized as follows. In section 1.1 we discuss the historical context in which firm growth is placed, discussing how the roles and incentives of growing firms have changed in recent economic history. Section 1.2 discusses the broad theoretical foundations that we consider as a helpful starting point for the book. Section 1.3 contains a practical discussion of how growth can be measured, before we launch into the main text of the book. An outline of the book is given in section 1.4.

1.1 FIRM GROWTH IN A HISTORICAL PERSPECTIVE

It is instructive to place firm growth in a historical perspective. In the past, a large size was a pre-requisite for security. Firms strove to become large in order to guarantee their future. The advantages of a large size were reinforced by the relatively backward state of financial markets. Large firms had the advantage of ‘deeper pockets’ into which they could delve during adverse business conditions. Another factor to be taken into consideration is that at the beginning of the twentieth century, the ‘Fordist’ brand of mass-production techniques were very much in vogue. During this period, the growth of firms was associated with economies of scale and lower unit
costs. Furthermore, as firms continued to expand they began to question the mono-product business model that had hitherto been the norm. In this vein, Du Pont de Nemours achieved legendary success by engaging in a diversified portfolio of activities arranged in the context of a decentralized and multidivisional organizational form. Other firms, from science-based industries in particular, began to diversify into new product markets, in search of opportunities for exploiting economics of scale and scope in production and for R&D (Chandler, 1992). In addition, it was conjectured (for example by Schumpeter) that it was primarily the large firms that were willing and capable of investing in R&D laboratories. Large size was therefore considered to be a sign of the accomplishment of a firm’s aspirations, and as the ultimate stage in a firm’s development.

The present business climate, however, is different from what it used to be in a number of ways. In contrast to the previous imperatives of scale and scope, contemporary strategists place more emphasis on flexibility and ‘lean’ production. There is evidence that firms’ hierarchies are becoming flatter, the CEO span of control is becoming broader, intermediate managers are being dispensed with, and divisional managers are receiving more authority, higher pay, and greater incentive pay as they become closer to the CEO (Rajan and Wulf, 2006). We are now in an age where downsizing and refocusing are celebrated strategies. A capitalism based on mass production and standardization has given way to an organization of production based on customization and product differentiation. Improvements in financial markets, and the aversion of shareholders to diversified firms (and conglomerates in particular) has brought on the disintegration of the large ‘Chandlerian’ firm. Information Technology has played a role in this, allowing firms to increase the flexibility of their production lines. In successful firms, evidence suggests that the introduction of productivity-enhancing Information Technology has been accompanied by widespread organizational change (Brynjolfsson and Hitt, 2000; see also Acemoglu et al., 2007). Furthermore, Information Technology has helped reduce transaction costs of dealing with other firms, thereby reducing the incentives for firms to be fully integrated along their respective production chains or ‘filières’. In the context of the ‘make-or-buy’ dilemma, firms need to be less cautious about dealing with suppliers through the market mechanism, even if this means the outsourcing of services from far-away continents. The fast pace of change in markets has led to the emergence of a new stereotype – the lean, flexible firm whose competitive advantage rests on a focus on a small number of core competences.

More generally, the fast pace of the information age has changed the way firms operate, bringing customers closer to their suppliers and shortening product cycles. Industries are becoming more and more turbulent and the
The growth of firms is becoming increasingly fierce. The focus of investors on a firm’s market value, and current incentive schemes in place within firms, put pressure on managers to satisfy short-term goals – ‘in the eyes of today’s top management, “long term” means about 18 months.’ (Marris, 1999, p. 56). This short planning horizon is balanced, somewhat paradoxically, against the need for large-scale R&D projects that can have pay-back times of 10–15 years, or even more (Grabowski et al., 2002).

The globalization of business operations and the rise of multinational enterprises (MNEs) is another challenge that is gaining increasing importance. Large firms, in particular, now face competition on a global scale. Firms must look for business opportunities overseas, and must also face the threats coming from overseas rivals even in their own domestic markets. In order to maintain or create competitive advantage, firms nowadays have to look for business opportunities in foreign markets, using strategies such as exporting, joint ventures or even greenfield construction of production plants overseas through foreign direct investment (FDI).

The development of financial institutions and the increasing availability of external finance is another factor that has enabled firms to accelerate their expansion projects – whether it be ‘organic’ growth or growth by merger and acquisition. In the past, financial markets were not developed, and it was suggested that firm growth came about by reinvesting retained profits into the firm (Chandler, 1992). These days, however, small firms can turn to venture capitalists or specialized stock markets to realize their high growth ambitions. In addition, a large number of government schemes are in place to ease financial constraints on new firms. We have entered the era of the ‘entrepreneurial society’ (Audretsch, 2007). Indeed, many economists now seem to consider that access to finance is the small firm’s birthright.

In the light of this discussion, it would appear to be necessary to take a new look at the subject of the growth of firms – a subject which still, arguably, remains dominated by the seasoned works of Gibrat (1931), Penrose (1959) and Marris (1964).

1.2 THEORETICAL FOUNDATIONS

Early theoretical work into the size and growth of firms was placed in a comparative statics framework, and by reason of its static nature did not really deal with the dynamic phenomenon of growth. Firms were supposed to be at their ‘optimal size’; and if they weren’t there already, they were assumed to grow instantaneously to reach it. In this way, firm growth received a cursory treatment as an appendage to the optimal size theory. Firms were considered to grow only inasmuch as this enabled them to
reach their optimal size. However, dissatisfaction with this theory of firm behaviour has grown in recent decades. Notions of an ‘optimal size’ have been rejected in almost any interpretation of the phrase that one might subscribe to (see section 8.1).

Growing dissatisfaction with the conventional static approach of economic theory has led to the ascendency of new themes in theoretical work. Emphasis has been placed on the prevalence of uncertainty, change and bounded rationality in the context of a turbulent and restless economy. It has been suggested that firm growth has replaced firm size as the central variable in industrial economics (Marris, 1999).

Uncertainty, and also bounded rationality on the part of firms, are important foundations for an analysis of firm growth, because growth inevitably involves expansion into new areas. Uncertainty is magnified, of course, in dynamic markets that are continually being transformed by technological innovation and competition. In addition, we note that the firm itself is changing, through growth, in ways it cannot foresee.

Path-dependency is also an important theme. Firms can be seen as bundles of specific capabilities, or as the repositories of organizational routines (Nelson and Winter, 1982; Dosi et al., 2000). Firms tend to be specialized in what they do and they cannot easily change from one day to the next. What a firm did in the past defines what it can do in future, and so a firm’s growth opportunities are very much constrained by its current production activities. Competitive advantage rests to a large extent on accumulated firm-specific resources as well as production capabilities that have been carefully developed over time, and the gradual nature of this process places a limit on the ability of firms to adapt rapidly to a changing environment.

In addition, we feel it is necessary to recognize the great heterogeneity that exists between firms, whether we consider productivity levels, profitability, or a large number of other key dimensions. As Griliches and Mairesse (1995) explain (p. 23):

We also thought that one could reduce aggregation biases by reducing the heterogeneity as one goes down from such general mixtures as ‘total manufacturing’ to something more coherent, such as ‘petroleum refining’ or the ‘manufacture of cement’. But something like Mandelbrot’s fractals phenomenon seems to be at work here also: the observed variability-heterogeneity does not really decline as we cut our data finer and finer. There is a sense in which different bakeries are just as much different from each other, as the steel industry is from the machinery industry.

(See also Dosi and Grazzi (2006) for further evidence of pervasive heterogeneity of firms, even at finely disaggregated levels.) We should
be cautious of notions of a ‘representative firm’ which might lead us to overlook this heterogeneity.

Although the notion of the ‘representative firm’ has been qualified (if not discredited) in theoretical discourse, it can still be seen to persist in a nuanced form in empirical work. The hypothesis of the ‘representative firm’ in empirical research can be found implicitly in conventional regression estimators that focus on summary point estimates corresponding to ‘the average effect for the average firm’. This approach is particularly ill-suited for looking at the relationship between innovation and firm growth, for example, because innovating firms have fundamentally heterogeneous performance differences – a small minority of firms doing spectacularly well whilst in most cases R&D efforts will yield nothing substantial. As is evident from the ‘tent-shaped’ plots of the firm growth rates distribution (introduced into economics by Giulio Bottazzi, Giovanni Dosi, Angelo Secchi and colleagues; see Figures 3.1 and 3.2 in Chapter 3 for an example), we see that the average firm does not grow very much at all. We argue that there is little point in trying to find the determinants of growth for the ‘average firm’, because this latter grows so little that its growth could be due to almost anything (hence the highly idiosyncratic component in growth rates that is commonly found). Instead, it is just a handful of extreme-growth firms that are responsible for a disproportionate share of the turbulence and reallocation that drives industry dynamics. Focusing on the ‘average firm’ in the case of firm growth rates would be to misplace our attention. An important theme in Chapters 3 and 6, and also the rest of this book, is that it is a heterogeneous minority of agents that is driving the process of industrial evolution.

Our survey of firm growth is therefore loosely guided by the evolutionary economics perspective, and this is for several reasons. First, this perspective explicitly recognizes the heterogeneity of firms. At any time, we can expect there to be considerable diversity in the characteristics of firms. Whilst the least viable firms can be expected to be eliminated due to selection pressures, there will remain at any time a marked heterogeneity between the surviving firms, even among dimensions such as productivity and production methods. The importance of such an evolutionary vision of the economy has been further underlined by recent observations that selection pressures are rather weak. Second, evolutionary economics is based on what Sid Winter has called a ‘dynamics first!’ approach. A dynamic view of firms and industries is obviously an essential ‘point de départ’ for our study of the growth of firms. Third, evolutionary economics embraces the phenomenon of innovation in a way that other perspectives are not able to do. The importance of firm-level innovative activity has grown tremendously over the last decades, and we need a theoretical framework
that will take this into account. This is especially true given that Chapter 6 focuses specifically on firm-level innovation. Fourth, the low rationality assumptions that form the basis of the evolutionary framework strike us as simply being far more judicious than the ‘Olympian’ rationality frequently assumed in the neoclassical paradigm. Uncertainty is unquestionably one of the most fundamental features of the modern economy, and it seems to us to be also one of the defining characteristics of firm growth. Firm growth is essentially a venture into unfamiliar territory. Indeed, in Chapter 5 (section 5.1) we criticize the mainstream literature that takes the assumption of infinitely rational profit-maximizing firms as a foundation for its empirical work into firm-level investment patterns. Instead, we delve into evolutionary theory to obtain a guiding theory. In section 8.4 we investigate the evolutionary principle of ‘growth of the fitter’ and it is astonishing to observe that even this general principle, when taken literally, does not appear to hold. It seems that even evolutionary economics, which has genuinely mild rationality assumptions, may be overstating the capacity of the forces of economic development.

A final motivation for basing our analysis in the evolutionary perspective is that it appears to be more or less in accordance with the empirical facts. One of the few regularities that has emerged from research into the growth of firms is that Gibrat’s ‘law of proportionate effect’ appears to provide a better description of industrial development than any other alternative theory. Although Gibrat’s law is frequently criticized as having no theoretical content (due to the emphasis on purely stochastic shocks), on the contrary it is our (controversial) view that Gibrat’s law does have a theoretical basis, and that it is not too far-fetched to consider that this basis is of an ‘evolutionary’ flavour. We have three reasons for making this association. First, Gibrat’s law emphasizes heterogeneity between firms that stems from the variance of the growth shocks. Second, the stochastic nature of Gibrat’s law can be seen to emphasize the inherent uncertainty that permeates modern capitalism. Third, Gibrat’s law accommodates the evolutionary principle of path dependency by the fact that a firm’s current size is viewed as the mere amalgamation of all previous growth shocks.

The evolutionary setting of this book does not go far in predicting how much a particular firm will grow, however – instead it provides a theoretical setting in which empirical work can be grounded. The prevalence of uncertainty and also pervasive heterogeneity of firms in the context of a turbulent and restless economy suggests to us that the state of the economy cannot be worked out from the armchair. Instead, our understanding of the growth of firms must progress through solid empirical analysis. This necessarily involves ‘getting one’s hands dirty’ and working with data. We feel obliged to reiterate an exhortation that is dated but nonetheless
The growth of firms still very relevant: ‘The subject of organizational growth has progressed beyond abysmal darkness. It is ready for – and badly needs – solid, systematic empirical research directed toward explicit hypotheses and utilizing sophisticated statistical methods’ (Starbuck, 1971, p. 126).

This book can be split up, quite roughly, into empirical and theoretical chapters, and it appears that, when the chapters are tallied by sheer headcount, the first six chapters appear to be oriented towards empirical work while the remaining three are theoretical. This should not be taken as an indication that theoretical work is to be marginalized in comparison with empirical work. In contrast, we emphasize that empirical work should be shaped and guided by theoretical hypotheses. The nature of empirical investigation into firm growth is not a random exploratory process, but is most effective when it refers to theoretical concepts and the interpretation requires that theories be constructed.

In our survey of broad theoretical predictions of firm growth in Chapter 8, it appears that no single theoretical perspective is able to provide an overview of firm growth. It seems that general, overarching theories are not that helpful, but instead theories need to be tailored somewhat to their specific context.

Some theoretical building blocks are clear. In contrast to the neoclassical assumptions of perfect rationality over an infinite horizon, we take the opposite view – that firms are not rational, many fail, and that many miss opportunities. Furthermore, many firms may shape their own destinies, as it were, and make opportunities for themselves that did not seem to exist before. Smaller firms, in particular, appear to be rather irrational, although the behaviour of larger firms appears to be more predictable, perhaps because they are more inert and lack the flexibility that small firms have.

1.3 MEASURING SIZE AND GROWTH

A number of the chapters in this book (Chapters 2 to 7 in particular) refer to quantitative empirical investigations into firm growth, and the basic unit of analysis is a firm’s growth rate. In this section, we explain what is meant by a growth rate for a firm in a given year.

In some of the later chapters, however (for example Chapters 9 and 10), we deliberately emphasize the more subtle, qualitative aspects of firm growth, and the processes of structural change within growing organizations. These later chapters play an important role in the book, because they remind the reader that what we call an ‘observation’ in the ensuing econometric investigations (that is a growth rate for a firm in a given year)
is not just a ‘statistic’ but actually has a much deeper significance. This is indeed one of the dangers of empirical work – one can get so accustomed to dealing with numbers that one may forget what the numbers actually represent. (Indeed, this has led some individuals to be unnecessarily apprehensive about empirical work in general.)

But without further ado, we now discuss how firm size and growth can be measured.

**Measuring Size**

The number of different indicators of firm size is rather vast, and is limited only by the imagination of the researcher. Employment and total sales, however, are the most commonly used indicators (Delmar, 1997). This is in part because data on employment and sales is among the easiest to obtain. In the majority of cases, it will make little difference which firm size indicator is taken, as they tend to give similar results. (This should not be taken for granted, however.)

Among the candidate indicators of firm size and growth, a major advantage of employment is that, unlike financial quantities, it does not need to be deflated. This is useful for multi-sector analyses, where sector-specific deflators need not be sought out. It is also useful for the cross-country analyses, or investigations involving multinational corporations, because exchange rate complications are avoided. A drawback of employment, however, is that indivisibilities are substantial for small firms that have only a few employees. Sales is also frequently taken as a measure of firm size. One disadvantage of sales, though, is that it need not necessarily correspond to the actual value-added of a company. Consider the case of a firm that buys an almost finished product (for example computers) that is modified or repackaged in some minor way before being sold on to others. Such a firm will have a high sales figure, because of the high cost of the final product, even though its contribution to the overall economy in terms of value-added will be low. If this firm then goes on to acquire its upstream components suppliers, its total sales will not change but its share of value-added will of course have increased. Value-added may thus be a better indicator of firm size than sales, because it takes into account the cost of materials used in the production process. In practice, however, data on value-added is not always available, and the peculiar scenario described above does not occur very often.

There are also many other measures of firm size in use. Another popular measure is total assets – although this indicator encounters difficulties if the firms in the sample have different capital intensities. Some authors (for example Little, 1962; Baumol et al., 1970) speak of firm growth as referring
to growth of profits. Among the least conventional indicators, one finds ‘acres of land’ or ‘head of cattle’ (Weiss, 1998). In this survey we consider growth in terms of a range of indicators, although we devote relatively little attention to the growth of profits. This is because total profits is more of a financial than an economic variable, and it often takes on negative values (although the concept of a negative firm size has little meaning for the empirical researcher).¹

Measuring Growth

The most common way of measuring growth is by taking log-differences of size.

\[
G_{it} = \frac{S_{it} - S_{i,t-1}}{S_{i,t-1}}
\]

(1.1)

\[
= \frac{S_t - S_{t-1}}{S_{t-1}} - 1
\]

(1.2)

where \(S_{it}\) is the size of firm \(i\) at time \(t\). Taking logs, and remembering that \(\log(1) = 0\), we obtain:

\[
\log(G_{it}) = \log((S_{it}/S_{i,t-1}) - 1) = \log(S_{it}/S_{i,t-1}) = \log(S_{it}) - \log(S_{i,t-1})
\]

There are also a few other ways of measuring growth rates.

Some investigations into the growth of young firms simply take size as an indicator of growth (see for example Eisenhardt and Schoonhoven, 1990; Storey, 1994; Colombo and Grilli, 2005). The justification for this is that the initial size \(S_{i,t-1}\) is zero since these young firms had zero size in the initial period (that is shortly before they came into existence). A drawback of this methodology is that it confounds the effects of start-up size and subsequent growth.

Some authors, such as Delmar et al. (2003) and Shepherd and Wiklund (2009), make the distinction between relative growth (that is the growth rate in percentage terms) and absolute growth (usually measured in the absolute increase in numbers of employees). Absolute growth is used relatively frequently in the literature on the growth of small entrepreneurial firms, where the firms being analysed can be very small. Absolute growth may be preferred by policy makers, for example, who tend to be more
concerned with the number of jobs in a region than the performance of individual firms.

Measuring growth in relative or absolute terms can indeed give different results (Almus, 2002). In this vein, we can mention the ‘Birch index’ (Birch, 1987) which is a weighted average of both relative and absolute growth rates (this latter being taken into account to emphasize that large firms, due to their large size, have the potential to create many jobs).

The Birch index can be presented like this:

\[
\text{Birch Index}_{it} = (E_{it} - E_{i,t-1}) \cdot \frac{E_{i,t}}{E_{i,t-1}}
\]  

(1.3)

where \( E \) represents the total employment of firm \( i \) at time \( t \).

The usual method of measuring growth (as presented in equations 1.1 and 1.2), is that the growth increment is measured relative to the initial size. The initial size may be a poor indicator of a firm’s actual size, however. If the firm’s initial size is low because of an unusual temporary shock, then the growth achieved over the period will be abnormally high when it is scaled down by initial size. The sorting of growing entities according to their size is not an easy statistical task, and, as a result, other measures of scaling down growth, instead of using initial size, have been put forward. For example, Friedman (1992) recommends that growth rates are scaled down by average size, or perhaps by final size.

The growth rate index popularized by Davis et al. (1996) measures growth relative to average size rather than initial size. This index can be written as follows:

\[
\text{DHS Index}_{it} = \frac{E_{it} - E_{i,t-1}}{\frac{1}{2}(E_{i,t-1} + E_{it})}
\]

(1.4)

The growth increment, \( E_{it} - E_{i,t-1} \), is thus scaled down by the average size over the period of analysis.

It is trivial to verify that the growth rates obtained from this procedure range from a growth rate of +2 (in the case of a firm starting from zero size at \( t - 1 \)), to a growth rate of −2 (in the case of an exiting firm that has zero size at time \( t \)).

This survey focuses predominantly on relative growth rates. It is primarily a discussion of firm growth and does not discuss the processes of entry and exit in any great detail. Furthermore, in our description of the processes of expansion (for example Chapters 9 and 10) we emphasize positive growth rather than negative growth. This is a reflection of the fact that organizational decline has received relatively little attention in the literature. (For an introduction to organizational decline, the reader is referred to Whetten, 1987).
1.4 STRUCTURE OF THE BOOK

In the Simonian spirit of scientific investigation (see for example Simon, 1968) we begin by gathering together some stylized facts and empirical insights (Chapters 2–7) before looking for theoretical explanations of these results. In the empirically-oriented chapters, we begin by considering first the distributions of firm size and growth rates, before moving on in search of the determinants of growth rates. We then present some broad theories of firm growth and evaluate their performance in explaining the stylized facts that emerge from empirical work. We then move on from these general theoretical perspectives to discuss some more descriptive theories of firm growth processes in the later chapters.

To begin with, we take a non-parametric look at the distributions of firm size and growth rates, before moving on to results from regressions that investigate the determinants of growth rates. Chapter 2 discusses research into the firm size distribution, which can be considered to be one of the oldest stylized facts in the industrial economics literature.

Our survey of the determinants of firm growth begins in Chapter 4, where Gibrat’s law of proportionate effect is presented. This law predicts that firm growth is a purely random phenomenon and that firm growth is independent of firm size. Chapter 5 examines the relationship between relative performance (that is profits or relative productivity) and firm growth, and an inquiry into the relationship between innovation and firm growth can be found in Chapter 6. Chapter 7 considers the role of other variables in explaining the variation in firm growth rates.

One of the main results that emerges from the literature review into the determinants of firm growth is that, in line with Gibrat’s law, the random element of growth rates is predominant. Efforts to identify the determinants of firm growth have had a limited success, and the combined explanatory power of the explanatory variables (summarized by the $R^2$ statistic) is typically low, usually below 10 per cent (see Table 7.1).

Bearing the newly-discovered empirical regularities in mind, we turn to Chapter 8 in search of some theoretical explanations. The broad theories of firm growth outlined in this chapter have only a limited success in explaining growth, perhaps because growth is idiosyncratic, firms are heterogeneous, and as a result of this it is difficult to make wide-reaching generalizations. Moving on, therefore, Chapters 9 and 10 contain qualitative, theoretical accounts of firm growth processes that are more tailored to the
data and more descriptive in nature. Chapter 9 describes firms’ attitudes to growth, as well as the modes of growth available to a firm that seeks growth. Chapter 10 focuses on the transformations and organizational stresses that accompany firm growth.

Chapter 11 concludes the book. One of our main conclusions is that, while researching into firm growth, one should seek to discover new empirical regularities and offer descriptive, ‘appreciative’ theoretical explanations, rather than trying to derive the state of the economy from unfounded mathematical axioms.