

Ever Bigger Firms?

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When the grandfather of modern economics, Adam Smith, was preparing his *Wealth of Nations* almost a quarter of a millennium ago, the workforce of businesses would typically be counted in single or double figures. Now the world's biggest firms, such as Wal-Mart, have a payroll of well over a million, bigger than the population of some entire nations. This paper reviews some of the reasons for this growth, and considers whether it might continue forever. Powerful evidence exists of *potential* scale economies, in business functions from R&D to finance, and industries from pin production to pharmaceuticals. And these do indeed translate into remarkable performance records for some industrial giants. But surprisingly, *on average*, bigger firms do not enjoy above average profitability and, on the whole, giant firms are not gaining on the world economy. This paper reviews some of the market and managerial constraints on size, and considers innovative efforts – ranging from the New Zealand dairy industry to the McDonald's chain – to reconcile global-level scale economies in some functions with local autonomy in others. In passing, the paper notes a disturbing array of incentives tempting some managers to expand their empire, even when that is not in the shareholders' interest.

When the grandfather of modern economics, Adam Smith, was preparing his *Wealth of Nations* almost a quarter of a millennium ago, the workforce of businesses would typically be counted in single or double figures. Now, the world's biggest private sector employer, Wal-Mart, has a payroll of 1.3 million (www.walmart.com). In terms of output, the growth is even more striking – technical progress means that output generally grows faster than employment (each worker becomes more productive); so, for example, after around a century in business, output of the leading car makers is now approaching 10 million vehicles a year (8.6 million for GM in 2003, 6.8 million for Toyota – www.gm.com, www.toyota.co.jp).

This paper reviews some of the reasons for this growth, and considers whether it is likely to continue inexorably, outstripping that of nations. Already, Wal-Mart

has a payroll bigger than the population of some small nations. In another quarter millennium, will the biggest companies match the *larger* nations in size? Writing halfway between Adam Smith and now, Alfred Marshall, the father of modern economics, would initially have answered decisively no. He adopted the famous analogy of the trees in the forest when analysing the growth and size of firms; and he concluded that there would be clear limits on their size: ‘sooner or later age tells on them all’. Six editions later of his *Principles of Economics*¹ (Marshall, 1910), having observed a period of rapid growth by giant firms, he somewhat moderated his position: ‘vast joint stock companies ... often stagnate, but do not readily die’ (Ref. 1, p. 316). Was even this too pessimistic for the giant firm? Have the likes of Wal-Mart, GM and Toyota now finally put paid to Marshall’s biological analogy?

The benefits of size

At first sight, the array of scale economies available to growing businesses might suggest that ever-increasing size is indeed inevitable. Such economies are evident in every function of the modern business – production, R&D, marketing, finance – as well as in the very construction of business facilities.^{2,3} And there are also ‘network externalities’ which can bring great advantages to the dominant giant player in an industry.

Production economies

One of Adam Smith’s (1776) key contributions was to identify the potential gains from mass production arising from mechanization and the division of labour. His famous example was the pin factory, where already in 1776 sophisticated division of labour in large scale production led to output per man some 200 times greater than it would have been had one worker carried out all the individual operations in pin-making. Output per worker had already reached 4,800 pins per day.⁴ But Adam Smith had only observed the first awakenings of these developments: the strength of the technical and organizational forces he identified is illustrated by the fact that, two centuries later, output per worker in a large scale pin factory had actually reached 800,000 pins per day.⁵

The manufacture of pins now seems a rather quaint example. But it was a prescient one: the economics of mass production identified by Adam Smith are found in much of modern manufacturing. A more topical example is offered by computer chips. The longer the production run of large scale integrated circuits, the more proficient staff become at controlling the production process, and the more thinly are spread the set-up costs. It has been estimated that each time cumulative output doubles, the cost per chip falls by 25 to 30%.⁶

R&D and marketing

In a number of industries, the scale of R&D effort required to introduce a new product may be beyond the capacity of any but the largest firms. For example, in pharmaceuticals, it has been estimated that expenditure of \$250 to \$350 million is necessary to develop a blockbuster drug that involves an entirely new technology.⁷ And in practice dominant firms (in terms of size, market share and profitability) accounted for the great majority of pharmaceutical breakthroughs in the 1990s.⁸

Similarly in the car industry, very large sums are required to develop a new model. Bruner⁹ explains that part of the background to the alliance between the car firms Volvo and Renault was the rising cost of developing new models. Volvo's 850 model had taken SEK 7 billion, and eight years to develop; and it was not clear that a relatively small firm would be able, by itself, to achieve sufficient sales to recoup such expense.

Sorescu *et al.*⁸ emphasize the link between R&D activity and marketing: the financial success of a new drug is likely to depend not just on the quality of the drug, but also on the firm's ability to bring it to market. And in marketing again, there are various sources of scale economy – for example, an advertising programme may have to reach a threshold size before it has significant impact in establishing brand recognition.¹⁰ Clearly, such huge initial expenditures on R&D and marketing require very long production runs if the firm is to recoup the outlay out of subsequent revenues; they also require initial financial commitments beyond the capacity of smaller companies.

Finance

Armed with a promising product, but needing to make large outlays on R&D and marketing, the smaller firm faces a double handicap. First, it does not have the large flows of retained profit – internal finance – being earned by big established firms from their existing operations. Secondly, it finds it harder to raise new outside finance. Some forms of outside financing, such as corporate bonds, tend only to be available to established, 'blue chip' firms; whilst, in the market for new shares, it seems that smaller firms have not been able to raise new funds from investors on terms as favourable as those offered to otherwise similar, but larger, businesses.^{11,12}

Construction

Scale economies also extend to the very construction of a firm's facilities. In some industries, such as oil, steel or cement, the construction cost per unit of output can

fall sharply as plant size increases. This is because the output of such plants will rise roughly in proportion to the *volume* of the constituent tanks and pipes. But the construction cost (materials required, etc) will generally be more closely related to the *surface area* of those tanks and pipes. The relation between surface area and volume lies behind the engineers' 'two-thirds rule', used in estimating the cost of such new plants: the area of a cylinder or sphere (a key determinant of cost) rises as the two-thirds power of volume (a key determinant of output and revenue).

Network externalities

For some types of product, benefits arise for a consumer when extra consumers buy the same product. The benefits of using the system increase, the more other users adopt it; a critical mass of buyers can become essential for the product to be viable; and the first firm to achieve dominance may enjoy an enviable position. A classic example is the Microsoft operating system, Windows. With Windows then installed in about 80% of the world's personal computers, Hewlett Packard's operations manager argued there was 'absolutely no choice' but to select it as the operating system for its Pavillion computers.¹³ Another example of such a self-reinforcing process is provided by eBay. Both buyers and sellers benefit, the more people there are trading on eBay. There is an inherent advantage in scale; and in such markets the firm or firms that initially achieve dominance are likely to see a virtuous circle of rising sales and profits.

Do the potential scale economies give big firms a clear competitive advantage?

In the light of this impressive array of benefits that accrue from size, we might expect that, in cross-section comparisons, bigger firms would tend significantly to out-perform their smaller rivals, and that, over time, becoming bigger would typically boost performance. But when we confront this strong a priori expectation with performance data, surprising results emerge. True, there are some spectacularly successful giant firms, which achieve much higher returns than the rest of their industry. But, *on average*, and over a run of years, there does not seem to be a persistent pattern of bigger firms enjoying higher profitability than otherwise similar smaller ones.^{6,14} And this result is corroborated by studies over time, of the effect on performance of major changes in size achieved through takeover (takeover, rather than internal growth, accounting in some periods for the majority of giant companies' growth¹⁴). It seems, on average, that expansion through takeover does not enhance the acquiring firms' financial performance.¹⁴⁻¹⁷

Although the bigger firms do not seem systematically to achieve higher *average*

rates of profit, they do seem to display less variability: their performance is less volatile. And they enjoy higher average survival rates:¹⁸ they remain in business longer than smaller companies. Even so, the survival rates may after all be little better than those of Marshall's trees in the forest. Meeks and Whittington¹⁸ trace the records over the subsequent half-century of the companies listed on the UK Stock Exchange in 1948 – generally the biggest and best-established firms in the economy. By 1998, only 1 in 12 was still alive, independent and listed on the Stock Exchange. Taking a longer period and a world perspective, and focusing on the giants among giants – the strongest of all – Hannah¹⁹ traces the records of the 1912 list of the world's largest industrial businesses: even here, only a fifth of the 1912 top 100 were in the 1995 top 100.

And although giant companies have achieved unprecedented absolute size, it is not clear that, on average, they are any longer gaining on the national or world economies. For example, if we plot the share of the largest 100 manufacturing firms in manufacturing net output, we find that, consistent with powerful scale economies, the US witnessed a significant rise from 1918 to 1970, from 22% to 33%; in Germany the increase was from 17% to 30%. In the UK, the top 100 tightened their grip faster still: the increase was from 17% to 40%. But in the subsequent 20 years the process seems to have run out of steam in the US, where the share is unchanged at 33% in 1990; and in the European countries it had actually fallen back – to 23% and 36% respectively.²⁰

Ghemawat and Ghadar²¹ adopt a global perspective on the same issue, and conclude that in many industries, concentration is actually falling. Even in industries that at first glance seem to be increasingly dominated by a handful of global giants, appearances are belied by the data. For example, the world oil industry is 'far less concentrated today than it was 50 years ago'; and in automobiles the 'long-run trend has been towards dispersing market share ... across a greater number of players'. And they observe that, for the archetypal giant we mentioned in our introduction, General Motors, 'worldwide market share has fallen to its lowest level in more than 50 years'.

Why, then, do the potential scale economies not more readily translate into superior performance, and ever more dominant companies? We focus on three influences which constrain the growth of giant firms – the growth of their own market, the difficulties of managing an ever increasing labour force, and the problem of diversifying outside their 'core competence'.

Market constraints on size

If a firm stays within its core specialization, then, of course, eventually it will be constrained by the size of the market it serves. In the limit, it would become a monopolist – the single supplier serving the whole market – and its own growth

would be determined by the growth of that market. In practice, consumer preferences for choice, or government competition policy, are likely to limit the firm to less than 100% of the market.

The dominant firm's position may then be threatened on at least two fronts. First, new entrants from less developed economies, which enjoy lower labour costs, may be able to undercut the incumbent. For example, the steel industry has developed in a succession of industrializing economies, with the result that US Steel, the biggest industrial enterprise in the world before World War 1,²² is now only a modest fraction of the size of the biggest industrial companies. An early challenge came from Japan; but now China produces more steel than the US and Japan combined. Over extended periods, changes in the 'league tables' of the biggest firms are strongly influenced by such new competition. By 1995, Japan contributed no fewer than 21 of the global top 100, from a base of zero in 1912; whereas, collectively, the US, the UK, Germany and France saw their representation in the top 100 fall in those eight decades from 86 to 64.¹⁹

Although competitors who enjoy lower labour costs may exercise an important brake on the expansionist plans of major incumbent firms, the bigger challenge may come from changes in technology, or in tastes (especially as incomes grow). Both may divert spending from the incumbent giants. Thus, when Hannah¹⁹ reported that only a fifth of the world's top 100 industrial businesses in 1912 were still in the 1995 top 100, he noted that these include firms such as Eastman Kodak, Unilever (Lever Brothers), Procter and Gamble, Bayer (Elberfelder Farbenfabriken), GE, Exxon (Jersey Standard), and BP (Burmah/Anglo-Persian). And he concludes that 'the surviving giants were exclusively in 'new' growth industries: petroleum, electricals, chemicals, ...and branded products' (Ref. 19, p. 63).

Management constraints on size

One strand of the literature has placed less emphasis on the market constraint on size – sometimes suggesting that it can be relieved by diversification into new markets (see below) – and instead focused on the limits dictated by management (e.g. Ref. 23). Her argument is that the key characteristic of the firm is an individual who has the final say in crucial decisions – someone to whom every employee ultimately reports, either directly or indirectly. As this input – senior management or coordination – is fixed, increasing the size of the firm, and hence the number of decisions, increases the probability that those decisions will be less effective, both because the chief executive has less time to devote to each one of them, and because the chief executive becomes ever more remote from the 'front line', and hence less well-informed. Fewer sound decisions translate into lower revenues or higher costs.

At the same time as the chief executive's time is spread more and more thinly

over the activities for which she/he is responsible, problems are likely to develop lower down the chain of command, in coordinating the activities of different branches of the organization.

The standard response to these problems is to create intermediary managers – to link the chief executive to the front line, and to mediate horizontally between different activities, which need to be harmonized. And, the argument goes, the bigger the company, the larger the share of revenues that has to be devoted to controlling and coordinating its diverse operations. As Scherer and Ross (Ref. 6, p. 105) describe the theory: ‘Hordes of middle managers, coordinators, and expeditors proliferate’, adding, ‘For readers untutored in the ways of bureaucracy, an expeditor is a person whose desk is between the desks of two coordinators’!

Diversification

Many companies have sought escape from the constraints of their original market via diversification into new lines of business. As much as half of US and UK merger activity in some periods after the Second World War has involved acquirers buying targets from a different industry.^{15,24} An example from the US is W. R. Grace Company – originally an ocean shipping business, which diversified into chemicals, then into clothing manufacturing, toy retailing, restaurants,... It bought no fewer than 186 businesses between 1950 and 1978,¹⁵ but even then was surpassed by Beatrice Foods Co, which took over 290 companies in the same period.

Clearly such strategies sidestep the barriers to growth set by the size of the market and the limits set by the competition authorities on the firm’s share of any single market. But this liberation comes at a price. First, such growth is likely to benefit from few of the scale economies we outlined above, most of which derive from expanding the size of the production unit, or researching and marketing a particular product line. Second, such growth is likely to compound the management problem: some of the chief executives’ fund of experience and expertise is likely to be product- or technology-specific – in new businesses they are likely to be even less well-informed about the ‘front line’ than in a single product business, and coordination between the operating divisions will also suffer from information problems. As the executive of a taken-over company explained to Ravenscraft and Scherer,¹⁵ ‘What is wrong with our company is MBAs who think they can manage anything without knowing anything about the company’.

Nevertheless, some companies made it work. Shares in the US diversified acquirer Teledyne bought for \$1,000 in 1965 were worth \$65,463 by 1983.¹⁵ But many did not. Between a third and a half of US diversifying acquisitions were subsequently divested.^{15,25} And the statistical and case study analysis of those

sell-offs by Ravenscraft and Scherer¹⁵ suggests that scale economies were indeed few and managerial control problems were many.

Mitigating control loss as size increases

How then can firms handle this tension between the technological or marketing pressures for size, and the diseconomies of managing large bureaucracies? One approach is for independent firms to share an activity in which there are significant scale economies. For example, independent firms may share a common brand. The largest dairy ingredients supplier in the world, Fonterra Cooperative Group Limited, is actually a cooperative of 13,000 independent New Zealand dairy farmers – run to process and market the milk from their independent farms (www.fonterra.com).

McDonald's Corporation offers an alternative model for combining the scale benefits of a global brand with the managerial benefits of small scale, owner-managed operations. Around 70% of McDonald's 30,000 restaurants in 119 countries are franchisees – they are owned and operated by independent individuals (www.franchiseopportunities.com/Zor_52/McDonalds.htm).

But perhaps more significant quantitatively are the moves by companies to try to create 'firms within firms'. Thus, in pharmaceuticals, having created a giant company by amalgamation – on the grounds that scale was essential to the R&D process – GlaxoSmithKline has broken up part of its research efforts into semi-autonomous sub-firms, 'Centres of Excellence for Drug Discovery'; these have responsibility 'for taking lead compounds forward to the point where... large scale clinical trials [are justified]. Agility is the watchword' (www.gsk.com/process).

Devolution of powers to smaller sub-firms has also characterized the recent development of Britain's biggest firm, the oil giant, BP.²⁶ At the same time as the company grew via massive mergers, its board delegated authority to individual operating units, monitoring their performance through the same financial measures as outside investors use to analyse whole companies, and allowing the respective managers to compete for investment funds from head office.

Just as, in politics, the transfer of powers up to supra-national organizations such as the EU, or down to regions within countries, cause us to reappraise the notion of the state, so these developments at the firm level raise questions about what we mean by the term 'firm'. This subject is associated in economics with the Nobel Laureate, R.H. Coase.²⁷ He explored what it is that characterizes the firm as an institution, and he emphasized the suppression of the price mechanism. Rather than economic activity being mediated by markets where freelance individuals negotiated with one another to buy and sell goods and services, the firm replaced the market with direct commands – because the transaction costs

were lower than if the whole process were coordinated by the market. In some ways, in terms of the choice between the command model and the market model, the devolution process at GSK or BP might be seen as a return to the market and its price mechanisms – but an internal market, within firms. This process is to be seen in many aspects of modern management.

Injejiklan²⁸ describes the pay systems being introduced for managers of operating units within firms: pay is increasingly being related to the performance of the unit for which the manager is responsible – the arrangements mimic the incentive structure facing the owner-manager operating in an external market. And Williamson²⁹ introduced the notion of the M-form (multi-divisional) corporation where (as in our BP example above) semi-autonomous operating units compete with one another for funds from head office with which to expand – the arrangements mimic the external capital market where owner-managers go to banks or the stock market for new money. Moreover, when it comes to trading between branches of the same firm, very often procurement policy confers no favours on operating units within the same company – constituent units trade with one another at arm's length, on the same terms as, and in competition with, entirely independent firms.

There is perhaps an element of paradox in this. The firm is designed to provide centralized control over economic activity, because centralization is more cost effective. But as it pursues centralization further, expanding the span of control through increasing size, it finds that, to avoid bureaucratic inertia and inefficiency, it needs in part to deconstruct the centrally planned, command structure, ceding power from the top, to revert to smaller scale, competitive models – market mechanisms within the firm, and firms within firms.

Exacerbating control loss – the empire building executive

So far, we have been assuming that the firm's executives are single-mindedly devoted to the performance of their firms, and expand their (or, legally, their shareholders') companies simply in order to achieve scale economies. But one strand of the economic literature has emphasized instead the powerful incentives for some executives to pursue size even if that produces no improvement in performance – even, in extreme cases, if it causes performance to decline.

This approach emphasizes the 'divorce of ownership from control':³⁰ the shift, since Adam Smith's time, from owner-managers to joint stock companies run on behalf of shareholders by salaried managers with little or no ownership stake in the firm. And it has been emphasized that, the bigger firms become, the more dispersed shareholding is likely to be (rarely would an individual's or a family's wealth be sufficient to maintain a controlling stake in the largest modern companies); and this reduces any individual shareholder's incentive to undertake

costly monitoring of firms or take disciplinary action (the costs of the action all fall on that shareholder, yet the benefits are divided with all other shareholders). Moreover, the bigger the firm, the more difficult it is to monitor its executives' activities anyway – information problems mount as the firm becomes bigger and more complex, as we have seen recently in the cases of Enron and of Shell. In consequence, there is a power shift from the owners of the firm to the managers.

And it cannot be assumed that managers will always choose to exercise that power in the interests of the shareholders. In particular, when it comes to choosing the size of the firm, there are reasons why the manager may wish to settle on a larger size than the shareholders would choose. Size brings the managers power. It also brings them prestige: the widely publicized rankings of the top firms in the business press often emphasise size rather than performance – 'number one' is the biggest, not the one with the highest rate of profit. It brings more security – particularly in the takeover market, where a bigger firm is much less exposed to a hostile takeover than a smaller one with a similar performance record.³¹ And it often brings more pay – there is a strong association between size and pay for top executives, while the literature has lamented the weakness of the link between executive pay and shareholder income.³²

The consequences hardly need elaborating: empire-building by top executives in which returns to shareholders may be sacrificed to growth for its own sake (Marris³³ develops a theory of growth-maximizing managers). And these considerations are used by some to help explain why the typical merger brings the acquirers' shareholders no gains, and bigger firms so often achieve rates of profit no higher than those of smaller rivals.³⁴

Just as the response to problems of bureaucracy has been partly to try to mimic within the firm smaller businesses operating in a market, so the response to these incentive problems has been partly to try to mimic the incentive structure of a traditional owner-managed firm. Senior executives have been given shares, or stock options, or been given high-powered profit-related bonuses, to induce them to behave more as if they were owners.

Conclusion

In many industries, technology and the functioning of markets confer formidable benefits on large-scale operation. And it is not clear that, with firms employing over a million people, or producing towards ten million vehicles a year, and still growing, we have yet reached a maximum size for a firm.

Nevertheless, there are important forces limiting the growth of firms. Some of these are external to the firm: firms may exhaust the market in which they hold a competitive advantage; competitors with cheaper labour or new techniques of production erode their market; new products or changing tastes diminish their

market. And some of the forces are internal: managerial efficiency may well suffer as the size of the organization and the range of its responsibilities increase.

These forces help explain the surprising results – given the evidence on potential scale economies – that bigger firms do not on average seem to out-perform otherwise similar smaller ones on the standard financial measures; and that the large expansions associated with mergers do not typically enhance financial performance. Bigger firms do exhibit more stable performance. But even they suffer a very high attrition rate. In addition, although some firms have grown at spectacular rates, it is not clear that on average the biggest firms are outpacing their respective economies: their share of activity is probably not now systematically increasing. And this is despite the fact that senior executives face strong personal incentives to expand their businesses, irrespective of the gains to shareholders.

Moreover, some of the growth in firms that we are observing is being achieved by firms relinquishing some of the central powers that previously characterized them. Many are mitigating the problems of managing scale by delegating powers to ‘firms within firms’, mediated by internal markets. Local managers are being made to resemble more closely autonomous owner-managers. The problem of running a giant firm is often being addressed by deconstructing the centrally planned command structure that traditionally characterized the firm: the legal and financial entity may get ever bigger, but to the customer, supplier or employee, the local operating unit may seem much less like the component of a monolith and much more like a traditional independent local firm.

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