

BANK OF ENGLAND

THE FINANCING PATTERNS OF NEW AND OLD ECONOMY FIRMS IN THE UK

By

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Abstract

Using data from a variety of sources, this study shows that, on average, new economy firms in the UK are less dependent on debt finance than on equity finance relative to old economy firms. This reflects differences in access to both debt and equity markets and accords with theoretical considerations suggesting that debt finance is less appropriate than equity finance, at the start-up and early stages, for new economy firms relative to old economy firms. But there is a subset of new economy firms with relatively high levels of indebtedness, reflecting the growing recourse to debt finance at later stages of growth for larger companies in certain parts of the new economy, notably the telecoms sector. There is little direct evidence that new economy firms are any riskier on average than old economy firms, although they do still appear to face a higher cost of debt finance.

*This paper has not yet been discussed within the Bank of England and should therefore be regarded as preliminary.

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A Introduction: what is the New Economy?

1 The “New Economy” is a term that is capable of a variety of interpretations. Sectoral classifications of new economy firms vary from the fairly narrow to the relatively broad. The European Central Bank commented recently that “pronounced changes in information and communications technology (ICT) are seen as a major driving force” in the new economy [European Central Bank (2000)]. The OECD has defined the ICT sectors as those that facilitate, by electronic means, the processing, transmission and display of information, excluding the industries which create the information (the so called “content” industries) [OECD (2000)]. On this, relatively narrow, definition, the new economy would include all companies that manufacture and distribute electronic equipment or are involved in telecommunications or computer and related activities.

2 A somewhat wider definition would encompass the “telecommunications, media and technology” (TMT) sectors. This in turn requires a definition of “technology”. In the UK, a sectoral classification has been developed at the Department of Trade and Industry [see Butchart (1987)], which categorises as “high technology” the information technology, computing, communications, electronics, biotechnology and medical/life sciences industries. More recently, the aerospace sector has also been included. It follows that the TMT definition embraces the ICT sector but ranges more widely to include other industries.

B Characteristics of new economy firms: links to financing requirements

3 A considerable amount of work has been carried out at the Bank of England on the financing requirements of one particular type of new economy firm, ie technology-based small firms (TBSFs), especially in the early stages of their life cycles [Bank of England (2001)]. This has sought to relate the financing of these companies to their particular characteristics. It has looked predominantly at TBSFs at the start-up and early stages, because that is when the innovative nature of these companies is particularly apparent. Certain common characteristics of such companies were identified:

- (i) their value is derived from longer-term growth potential arising from difficult-to-value scientific knowledge and intellectual property;
- (ii.) at least in the early stages, they tend to possess little in the way of tangible assets which may be used as collateral to secure finance;
- (iii.) they initially provide products or services which have little or no track record, are largely untested in markets and are sometimes subject to rapid rates of obsolescence.

4 A key consideration **at the start-up stage** is whether these characteristics lead to different or additional problems for new economy firms in raising initial finance. These may reflect the difficulties potential finance providers face in assessing the technology involved; uncertainties and risks relating to the likely costs of R&D; or problems in estimating prospective demand for the new product or service. The information asymmetries which characterise small business finance in general may apply particularly to new economy firms at the start-up stage. Such asymmetries are associated with capital market imperfections with the potential to affect adversely both the quantity and price of debt and equity finance and the potential risks.

5 Once start-up and early stage finance has been secured, however, TBSFs may develop in very different ways. The Bank's earlier work distinguished between different types of firm according to the size and timing of development costs. These vary across different "new economy" industries, for example:

- (i.) in the **IT and computer software industries**, front-end development costs are relatively low and lead times from product to market launch are relatively short, while products are often subject to rapid obsolescence;
- (ii.) in the **medical/life sciences sector**, market entry and product development occur over a much more extended period of time, involving heavy R&D expenditure and complex consultancy arrangements;
- (iii.) the **biotechnology industry** is subject to much higher front-end development costs and the gestation period until sustained profitability is achieved may well be 10-15 years.

6 These differences remind us that it is overly simplistic to attempt to compare the financing requirements of new and old economy firms. As with the old economy, the new economy embraces a wide range of firms in different industries, of different sizes and at different stages of their life cycles. The financing arrangements of these varied companies will, and indeed should, vary considerably. Indeed, requirements for finance will change as a firm develops through the "innovation cycle": seed, start-up, early growth, further development, sustained expansion, maturity. The Bank's earlier work specifically investigated financing requirements through the cycle and reached the following conclusions:

- (i.) like small and medium-sized enterprises (SMEs) generally, TBSFs are heavily dependent on internal (including the proprietor's own) funds at the seed stage;
- (ii.) seed and start-up costs are likely to be higher for TBSFs than for other SMEs because of the more complex product development process;
- (iii.) given the perceived higher risks and longer development times applicable to TBSFs, together with their lack of collateral, tangible assets and track record, equity risk capital is likely to be more appropriate and available than debt finance at the start-up and early growth stages;
- (iv.) second and third round funding may be required before TBSFs achieve sustained profitability;
- (v.) as TBSFs grow and develop, their financing needs become more akin to old economy firms and bank and capital market debt become more appropriate sources of external finance.

7 It follows that the “innovation cycle” of new economy firms involves a complex process beginning with the initial concept of a product, through prototype development, initial production and, finally, sustained product sales. The financing of the process requires a series of injections of money, often from different finance providers in different proportions at different stages of the cycle, and failure to finance adequately any part of the cycle may cause the firm to fail.

8 This suggests that the access of new economy firms to finance is a crucial component of their likely success at all stages of their life cycles. In what follows, we examine recent UK statistics to compare the financing structures of new and old economy firms. This is done partly to throw light on the extent to which the actual financing arrangements for the new economy firms are what might be expected in the light of the key distinguishing characteristics of such firms, as described above. But we also consider the extent to which these arrangements accord with theoretical considerations relating to the optimal financing structures of companies. Those considerations are, therefore, briefly described in the next section.

C Theoretical Considerations

9 There is, of course, a huge literature on the appropriate capital structure of companies, dating back to Modigliani and Miller (1958) and earlier. Much of this literature considers possible capital market imperfections, such as information asymmetries, moral hazard and adverse selection, that may affect both the quantity and price of both equity and debt finance provided to companies [see, in

particular, Jensen and Meckling (1976), Leland and Pyle (1977), Stiglitz and Weiss (1981) and Myers and Majluf (1984) for the classic references].

10 As noted above, the characteristics of new economy firms may suggest that such capital market imperfections apply with particular force to such firms. The idea that these problems may obstruct the external financing of innovative business activities is certainly not “new”; it goes back to at least Arrow (1962), although his conclusion that this represents a market failure justifying public sector intervention is much more contentious [see, in particular, the critique of Arrow by Demsetz (1969)]. But the particular characteristics of TBSFs listed in paragraph 3 above, may make them more vulnerable than old economy firms to asymmetric information about risk characteristics and default probabilities, in view of the difficulties finance providers face in assessing the new technology and R&D involved and the prospective demand for the end-product [see, inter alia, Moore and Garnsey (1992), Matthews (1994) and Storey and Tether (1996)].

11 Empirical studies reach conflicting conclusions on whether more innovative firms face greater difficulties in accessing finance than firms generally [see the review of the economic literature contained in Bank of England (2001)]. But most studies do agree on at least one point: the unsuitability of debt finance for the early-stage financing of innovative high-tech firms. The information asymmetries and moral hazard present at the start-up stage have a particularly marked impact on banks and other debt providers because of the lack of collateral and market presence which characterise most new economy start-ups. Some studies [for example, Mason and Harrison (1998)] attribute the source of the information asymmetry underlying debt finance of small new economy start-ups to the difficulties banks face in assessing technical projects and hence in distinguishing between good and bad lending propositions. Risk aversion may then lead banks incorrectly to reject projects with good prospects. Others [notably Philpott (1994)] emphasise the inability of innovative businesses seeking early-stage finance to relieve moral hazard by meeting banks’ requirements for collateral.

12 These and other studies imply an optimal capital structure for new economy small firms through their life cycles that is rather different from that which generally applies to old economy small firms. The majority of the latter finance themselves broadly in line with the “pecking order” hypothesis [see Myers and Majluf (1984)], which postulates that businesses tend to prefer internal finance, while those requiring external finance opt initially for debt rather than equity. This preference is associated with

information asymmetries. The difficulties equity investors face in assessing whether returns on corporate investments adequately compensate for risk, compared with banks that have built up a relationship with the companies, often means that corporate equity has to be issued at a greater discount than debt. This may apply also for larger companies at later stages of finance. Many studies find evidence of significant negative price effects when existing publicly quoted firms announce new stock issues [Myers and Majluf (1984)].

13 For new economy small firms, as we have noted, theoretical considerations suggest some alteration of the pecking order hypothesis. Although internal funds still provide the bulk of the initial finance for new economy start-ups, such funds will be exhausted more quickly than at old economy small firms if new economy small firms are slower to progress to sustained profitability. Theory suggests new economy small firms will seek to access equity finance given that, once the personal assets of the firm's founder (plus family and friends) have been exhausted, the only remaining assets of the early-stage new economy small firms are likely to be intangible and therefore unsuitable as collateral. This will not change until the firm achieves a size and production level which generates more tangible business assets, such as receivables and inventories, which may be pledged as collateral. At these later stages of the life cycle, the firm will be able to access debt finance in addition to both public and private equity.

14 Although this theory suggests new economy small firms will seek to access equity finance at an earlier stage of their life cycles than old economy small firms, it should be emphasised that substantial fixed costs, such as underwriting and advisory fees, make it uneconomic for new economy small firms to raise small amounts of public equity capital at these early stages. The initial lack of size and trading record of new economy small firms may also preclude them from meeting the listing criteria of public exchanges. This suggests that these firms will tend to seek private equity finance, most particularly from the venture capital industry, at an earlier stage than equivalent old economy small firms. Public equity capital will become more important for larger companies at later stages of finance. The supply of venture capital finance to high-technology firms in the UK is explored in depth in Bank of England (2001).

15 The partial reversal of the pecking order hypothesis for new economy small firms may be rationalised if it is assumed that private equity providers such as venture capitalists possess superior

information in certain respects to banks and entrepreneurs [see Garmaise (1997) for a demonstration of this idea]. Conventional wisdom assumes that entrepreneurs have better information on project-specific aspects such as the feasibility of the technology, but venture capitalists may have greater information on the project's marketability and operational implementation. In such cases, venture capitalists may be less risk averse than debt providers, especially if they can mitigate information asymmetries through reliance on particular types of equity finance, such as preferred and/or convertible stock.

16 This latter point is based on the idea of venture capitalists being able to reduce agency problems through the provision of quasi-equity rather than full equity finance. The use of convertible and/or preferred stock is fairly widespread in venture capital contracting [see, *inter alia*, Norton and Tenenbaum (1992) and Kaplan and Stromberg (2000)], because it enables venture capitalists separately to allocate cash flow, voting, board and liquidation rights to exercise appropriate control over entrepreneurs and take precedence over any ordinary shareholders. It is interesting that the use of convertible preferred stock seems to be especially widespread in new economy sectors such as software and biotechnology. Kaplan and Stromberg (2000) considered some 200 venture capital investments in 118 US companies by 14 venture capital firms over the period 1987-99. Some 36% of these firms were located in the IT/software industries and a further 39% in other high-tech sectors, such as biotechnology, telecommunications and life sciences. The evidence suggested that convertible preferred stock was by far the most commonly used financing instrument, appearing in 189 out of the 200 financing rounds.

17 Such instruments generally ensure that the cash flow rights, voting rights and control rights of the venture capitalists and entrepreneurs are contingent on observable measures of financial and non-financial performance. If the company performs poorly, the venture capitalists take full control; as company performance improves, the entrepreneur acquires more cash flow and control rights; if the company performs very well, achieving a median return of over 30% pa over a four year period to IPO, the venture capitalists relinquish most of their control and liquidation rights, while retaining their cash flow rights. These state contingencies are found to be more common in start-up and early-stage financings than in later financing rounds. The result is consistent with the idea that potential conflicts of interest between the entrepreneur and the venture capitalist will depend on the degree of uncertainty about the project's economic viability, which may well be greater in the new economy sectors and at the early stages of the project's life.

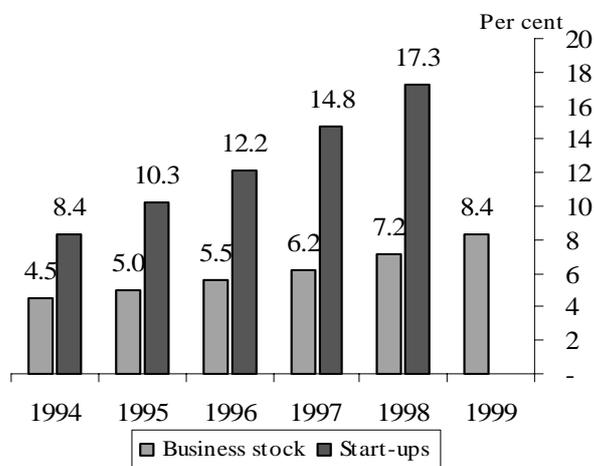
18 At later stages of financing, of course, both the public equity markets and debt finance become viable options for new economy firms as they grow in size and develop, generate higher turnover and assets that can be used as collateral, and reach sustained profitability. At these later stages of development and larger sizes, theoretical considerations offer less clear-cut answers to the issue of whether financing requirements should continue to differ for new and old economy firms. Moreover, there is less evidence on which to base empirical studies, because many new economy firms have yet to reach these stages of development. But enough has been said to emphasise that the new economy/old economy financing comparison has to take into account very carefully the size of the companies and the stage they have reached in their life cycles.

19 In what follows, we look at what the available UK statistics say about the financing of new and old economy firms in the UK, using data on a panel of all quoted non-financial companies over the period 1974-99. These data are supplemented from other external sources, including the Office for National Statistics and the London Stock Exchange. For the purpose of this comparison, we adopt the narrower definition for new economy firms, encompassing all those operating in the ICT sectors of the economy. As the sample relates to quoted companies, it will cover rather larger companies than considered in the Bank's earlier work, which focussed exclusively on TBSFs. It will therefore complement the earlier work, and help to fill the gap caused by most existing studies concentrating on smaller firms.

D Importance of the new economy

20 The new economy has grown fairly rapidly in importance in the UK in recent years. Chart 1 shows that the share (by number) of ICT businesses in the total stock of UK companies has increased from 4.5% to 8.4% over the 1994-99 period, while new economy start-ups have risen from 8.4% of total start-ups in 1994 to 17.3% in 1998. This has been driven largely by a doubling in the number of businesses entering the "computer and related activities" sub-sector. This sub-sector now accounts for 76% of all firms in the ICT sector.

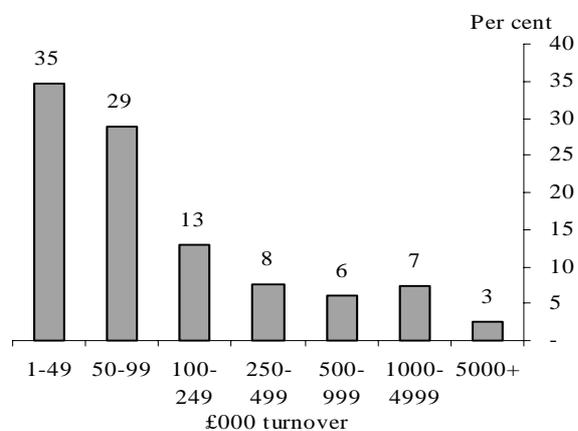
Chart 1: ICT share of stock of businesses and start-ups



Source: ONS, DTI and Bank of England

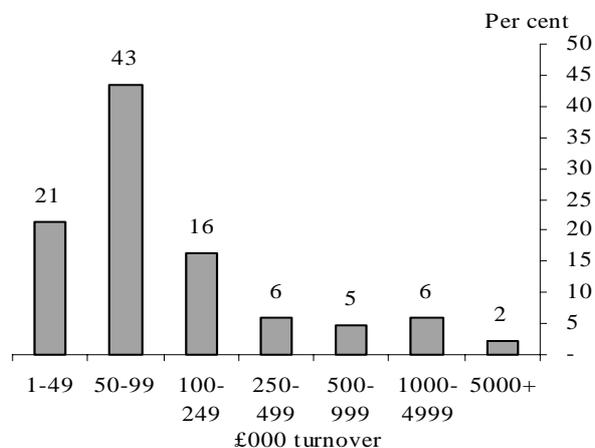
21 Charts 2-5 show the size distribution of new and old economy firms in the UK in 1996 and 2000. In 1996, some 64% of new economy firms had turnover of less than £100,000, compared with 50% of old economy firms. These proportions had not changed substantially overall by 2000, although considerably more new economy firms had moved into the £50-99,000 turnover range. Only 36% of new economy firms reported turnover in excess of £100,000 in 2000, compared with 51% of old economy firms. Overall, therefore, new economy firms are smaller in size than old economy firms.

Chart 2: Histogram of new economy firm sizes 1996



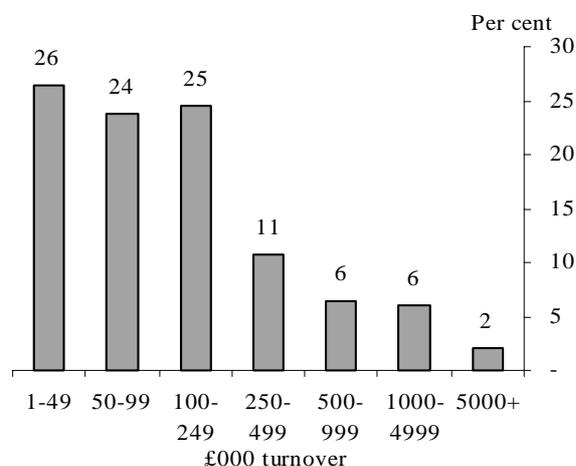
Source: ONS and Bank of England.

Chart 3: Histogram of new economy firm sizes 2000



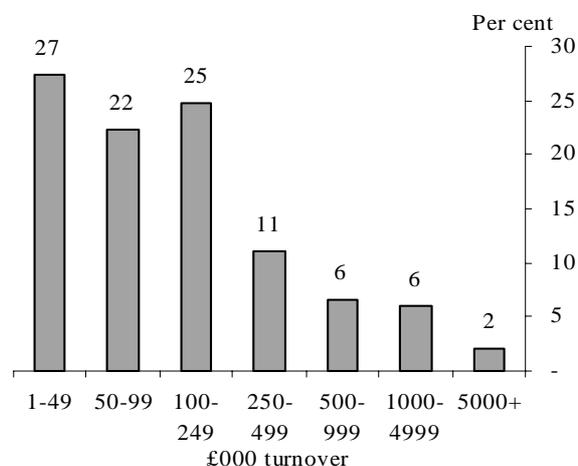
Source: ONS and Bank of England.

Chart 4: Histogram of old economy firm sizes
1996



Source: ONS and Bank of England.

Chart 5: Histogram of old economy firm sizes
2000

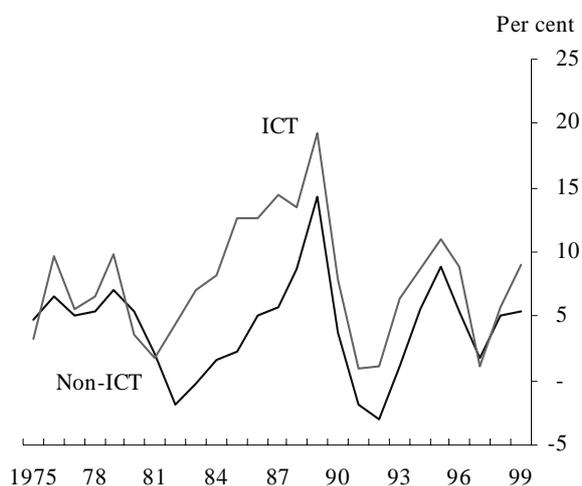


Source: ONS and Bank of England.

22 Charts 6 and 7 present some evidence on the investment behaviour of new and old economy quoted firms*. They suggest that the investment growth rate of the median new economy firm exceeds that of the median old economy firm over the period 1974-99; in 1999, for example, investment by new economy firms rose by 9.0%, compared with 5.4% for old economy firms. The gap is rather wider when investment as a proportion of capital stock (at replacement cost) is compared for new and old economy firms; in 1999, for example, the median new economy firm invested some 17.7% of its existing capital stock, compared with 12.7% for the median old economy firm. This may reflect greater expansion of the net capital stock by new economy firms, or it may be driven by higher obsolescence rates of capital (or both). It certainly suggests that new economy firms may, other things being equal, need to raise more finance than old economy firms.

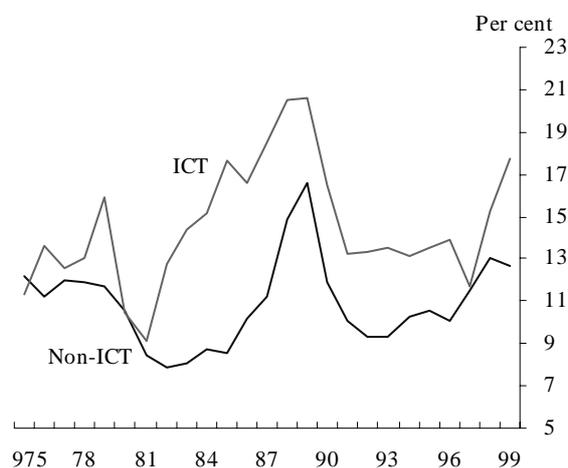
* The data are derived from the company accounts of all quoted UK non-financial firms recorded by the Thomson Datastream database for the period 1974-99. This sample contains some 1,129 old economy firms and 168 new economy firms in 1999.

Chart 6: Investment growth rates for median ICT and Non-ICT firm



Source: Thomson Datastream and Bank of England.

Chart 7: Investment as a proportion of the capital stock (at replacement cost) for ICT and non-ICT firms



Source: Thomson Datastream and Bank of England.

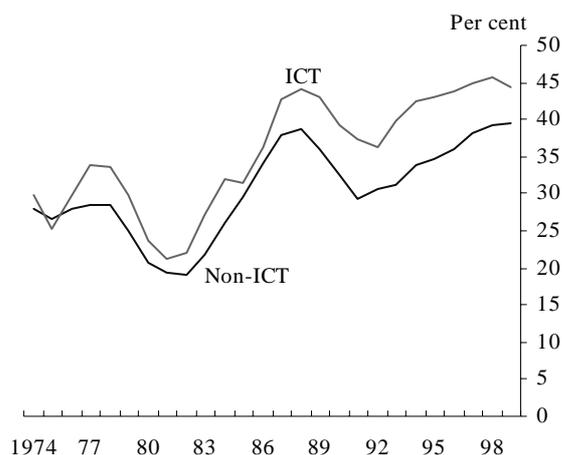
E Financing patterns of new and old economy firms

(i) Internal funds

23 We now examine the data to see what light is thrown on the three sources of finance highlighted in the pecking order hierarchy of finance considered in Section C above. A direct measure of the use of retained earnings as a source of finance is not readily available. Nor can we easily obtain measures of the contribution to internal funds of the resources of the firm's owner, plus family and friends. All the statistics enable us to do is to compare the proportion of income retained after deductions for tax, dividend and interest payments. This provides an ex post measure of retained earnings, but cannot be used to proxy ex ante internal funds because it is itself affected by the extent of external financing (which will affect, inter alia, dividend and interest payments). That said, Chart 8 suggests that new economy firms retain a greater proportion of their income after tax, dividends and interest than old economy firms, with the gap having widened somewhat in the 1990s compared with the 1980s. This may be consistent with the investment figures considered earlier: it suggests that new economy firms retain a greater proportion of earnings to finance investment spending. In particular, over the whole

period, only 68% of new economy firms chose to pay a dividend, compared with 76% of old economy firms.

Chart 8: Proportion of income after retained deductions for tax, dividends and interest



Source: Thomson Datastream and Bank of England.

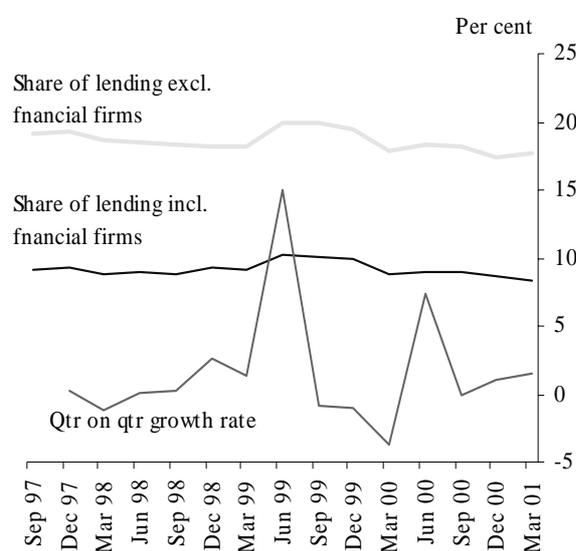
(ii) Debt finance

24 Limited information is available in the UK on the provision of debt finance to ICT firms. Statistics for bank lending to the UK private sector, in both sterling and foreign currency, are currently reported on a disaggregated sectoral basis to the Bank of England. However, disaggregated figures applicable to the ICT sector are available on a consistent quarterly basis since September 1997 only.

25 Chart 9 shows quarterly growth rates of bank lending to ICT companies (both incorporated and unincorporated) since September 1997, and also plots the share of UK-owned bank lending outstanding to the ICT sector as a proportion of total bank lending to UK industrial and commercial companies (excluding financial companies). Chart 10 gives the total stocks of lending to the ICT and non-ICT sectors. These charts show fairly modest growth in bank lending to ICT firms over the past 3 years, although the quarterly growth rate is fairly erratic. The share of total bank lending attributable to the ICT sector has fluctuated between 17.6% and 20.0% since September 1997, declining a little over the whole period (and especially since the peak in mid-1999). These shares look surprisingly high, given that ICT businesses currently represent only 8.4% of the total business stock and given theoretical

considerations suggesting the unsuitability of debt finance for high-tech small firms, especially at the start-up stage. But the figures for total lending in Charts 9-10 exclude financial companies, whereas these are included in the business stock figures in Chart 1. If financial companies are included in the total bank lending figures, the share of bank lending to ICT companies fell from 9.2% in September 1997 to 8.7% in December 2000, broadly in line with the proportion of ICT companies in the total business stock. And it should be noted that these figures include larger companies, whereas the theoretical arguments on the unsuitability of debt finance for new economy companies refer more appropriately to small companies.

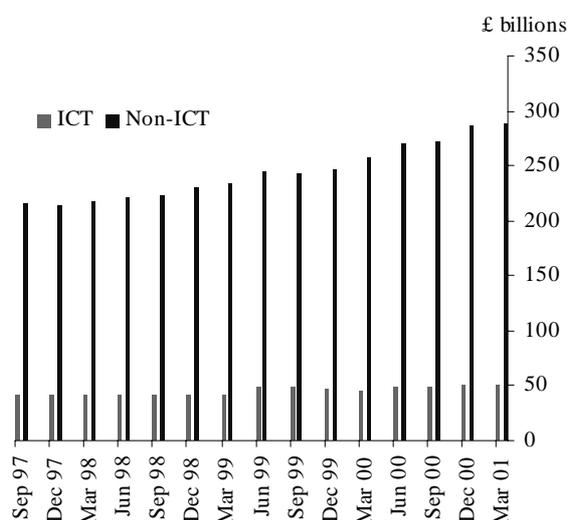
Chart 9: ICT share / growth of bank lending ^(a)



Source: Thomson Datastream and Bank of England

(a) Amounts of outstanding in sterling and other currencies, including loans and advances under repos, sterling and commercial paper, and acceptances. This excludes PNFC lending from foreign residents.

Chart 10: Lending outstanding to ICT / Non-ICT sectors

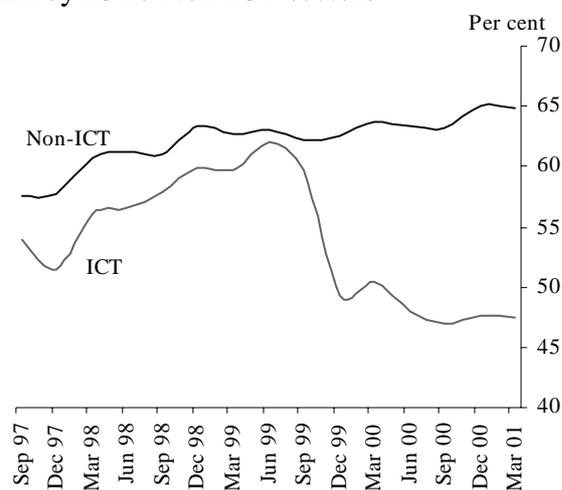


Source: Bank of England

26 Further information on ICT companies' usage of bank debt is provided by figures on the proportion of total bank facilities offered to ICT companies that are actually drawn down. Chart 11 compares these figures with corresponding estimates for the non-ICT sectors. These show that new economy firms have in recent years used rather less of their bank facilities than old economy firms. Indeed, since mid-1999, the proportion of bank facilities drawn down by ICT firms has declined from over 60% to less than 50%, while for old economy firms, the proportion has drifted up slightly, to reach 65% by end-2000. This may suggest that new economy firms were able to access wider sources of non-bank debt financing over this period, in particular through bond issues. Interestingly, there is no

evidence of any major rise in the usage of bank facilities since March 2000, when the public equity markets for high-tech stocks peaked. The subsequent marked correction in high-tech stock prices might be expected to have led to a substantial rise in the usage of bank facilities (especially back-up facilities), but the figures do not provide much evidence for this. That said, the growth rate of bank lending to ICT companies has risen substantially since March 2000, having earlier fallen precipitously between mid-1999 and March 2000, the period during which the high-tech equity markets were rising most rapidly. And bond issuance by new economy companies in the telecoms sector has accelerated significantly in 2000.

Chart 11: Share of facilities offered that are drawn down by ICT / Non-ICT sectors

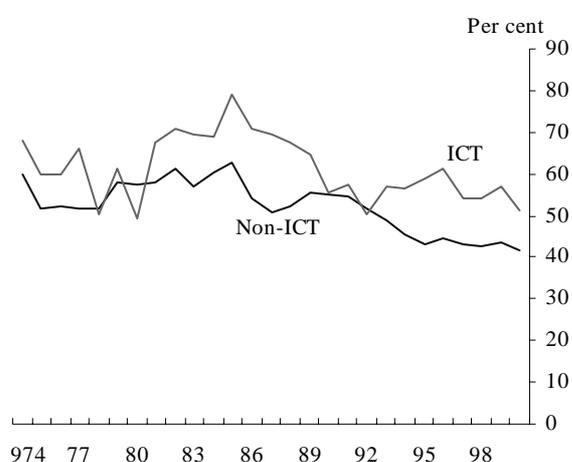


Source: Bank of England.

27 There is very little information in the quarterly sectoral data on the maturity of bank lending or on the provision of non-bank debt to ICT firms. Information on these points can be gleaned from company accounts, using our sample of quoted non-financial companies and annual data over the 1974-99 period. But the company accounts data do not permit separation of bank and non-bank debt easily; they do, however, enable us to calculate debt-equity and gearing ratios based on an aggregation of bank and non-bank debt. These ratios are reported in section (iv) below. Data on gross bond issues are also available from Bondware. They show a marked acceleration in bond issuance by new economy companies over the past three years, from £2.5bn in 1997 to £5.4bn in 1998, £12.0bn in 1999 and £23.1bn in 2000. This was entirely attributable to telecommunications companies.

28 On the maturity point, the company accounts data can be used to separate short-term and long term debt, where short-term debt is defined as debt due to be repaid within one year. Chart 12 shows the share of short-term debt in total debt for the median ICT and non-ICT companies in our panel of quoted companies, over the period 1974-99. Over most of this period, the share of short-term debt was rather higher for ICT than non-ICT companies; in 2000, for example, 52% of the median ICT firm's debt was short-term compared with 41% for the median non-ICT firm.

Chart 12: Share of short term debt for the median ICT and non-ICT firm^(a)



Source: Bank of England.

(a) Short term debt is debt due to be repaid within one year.

(iii) Equity finance

29 In this section, we consider evidence on the provision of private and public equity to ICT firms. Rather more comprehensive data are available for public equity, although, as noted in the theoretical section, private equity (especially venture capital) is more suitable for smaller new economy firms at relatively early stages of finance.

30 The London Stock Exchange (LSE) provides information on the number of new listings disaggregated on a sectoral basis^{**}. Table 1 shows that over the whole period from 1990-2000, nearly 16% of firms listing on the UK stock exchange (including both the main exchange and the AIM market) were companies in the ICT sector. The proportion has risen substantially over this period, from around 3% in 1990 to 26% by 2000.

Table 1: Number and share of firms listing on the UK stock exchange in ICT sectors

Year of listing	Total number of new firms listing	Number listing in non-ICT sectors	Number listing in ICT sectors	Share of all new listings in ICT sectors
1990	69	67	2	2.9 %
1991	62	59	3	4.8 %
1992	49	47	2	4.1 %
1993	88	80	8	9.1 %
1994	154	136	18	11.7 %
1995	182	162	20	11.0 %
1996	260	227	33	12.7 %
1997	197	175	22	11.2 %
1998	186	154	32	17.2 %
1999	196	155	41	20.9 %
2000	453	335	118	26.0 %
Total	1,896	1,597	299	15.8 %

Source: London Stock Exchange and Bank of England.

31 An additional indicator of the importance of the equity market for new economy firms is their share of total money raised on the public equity markets. Unfortunately, these data have been reported on a consistent sectoral basis by the LSE only since 1999. Table 2 summarises the information that is

^{**} The sectoral classifications do not correspond to those used in the business stock and bank lending data. In the LSE data, the new economy sectors are defined as electronic and electrical equipment, engineering and machinery, media and photography, telecommunications services, IT hardware and software, and computer services.

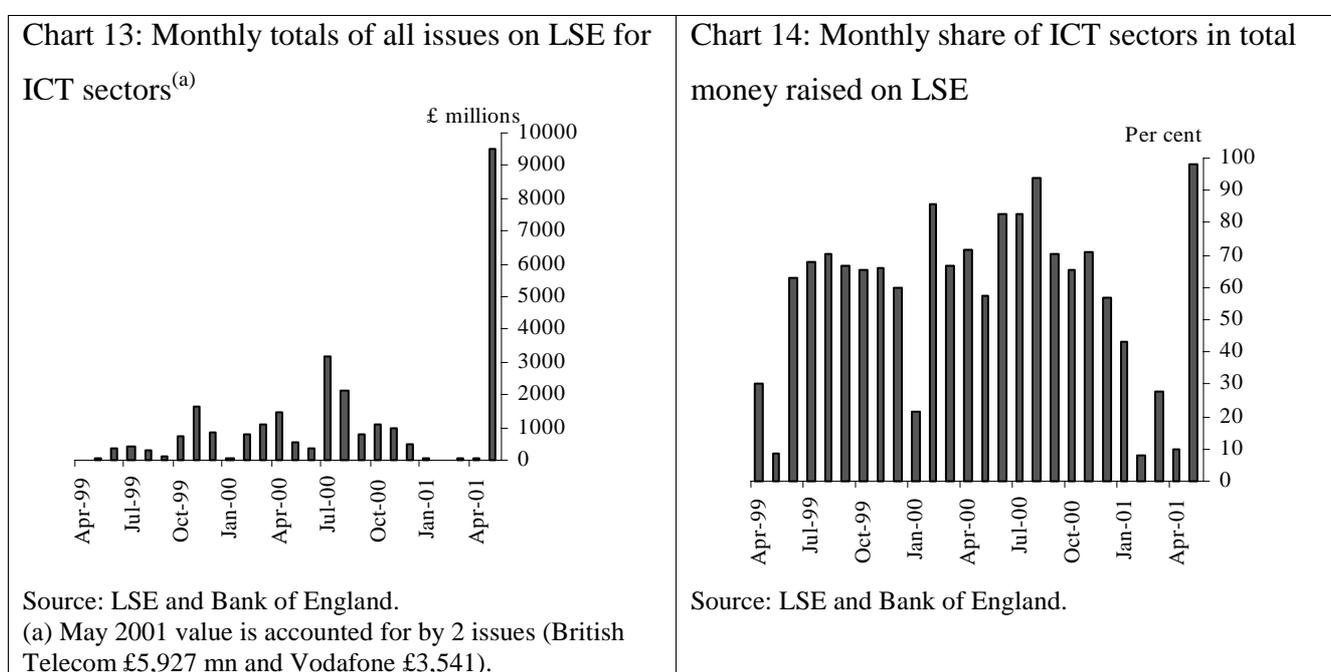
available, separating out new (or primary) issues from total issues (including secondary rights and other equity issues by existing firms). The total value of new issues rose by over 150% in 2000 compared with 1999, with new issues by ICT firms (in value terms) rising by slightly less – some 138%. But, notwithstanding the marked correction in high-tech stock prices after March 2000, some 74% of the total value of new equity issues in 2000 was attributable to ICT firms, only 4.5% points down on 1999 and way above the proportion of the business stock accounted for by ICT firms. Nearly 60% of the firms making new issues in 2000 were located in the ICT sector, up from around 45% in 1999. Furthermore, some 75% of the total equity value raised by the non-financial business sector in 2000 was accounted for by ICT firms, compared with 60% in 1999. These estimates support the theory suggesting that equity finance should be relatively more important than debt finance for new economy firms in their early stages of development.

Table 2: New issues and All issues by new and old economy firms.

Money raised by business sector through:	1999	2000	Change in share of ICT
<i>New Issues:</i>			
Total number of firms	75	224	
Number of firms in ICT sectors	34	131	
Share of ICT sectors	45.3%	58.5%	13.2
Total Value £ mn	3286.2	8,299.1	
Value in ICT sectors	2584.3	6,148.5	
Share of Value in ICT sectors	78.6%	74.1%	-4.5
<i>All issues (new, rights and other)</i>			
Total number of firms	1,031	1,306	
Number of firms in ICT sectors	403	601	
Share of ICT sectors	39.1%	46.0%	6.9
Total Value £ mn	9583.6	17,290.0	
Value in ICT sectors	5719.5	13,008.2	
Share of Value in ICT sectors	59.7%	75.2%	15.5

Source: London Stock Exchange and Bank of England.

32 Charts 13 and 14 decompose the statistics for all public equity issues by ICT firms into monthly numbers. Both the levels of ICT issues, and their share in the total, held up surprisingly well for several months following the high-tech equity market peak in March 2000, although both dropped off markedly in late 2000 and early 2001. Indeed, by February 2001, the share of total equity (by value) raised by ICT firms had fallen to 8.2%, the lowest figure over the entire period for which data are available. Following a modest recovery in March, and a further poor month in April, there was a huge rise in ICT equity issuance in May, reflecting a £5.9bn rights issue by BT and a £3.5bn equity issue by Vodafone.



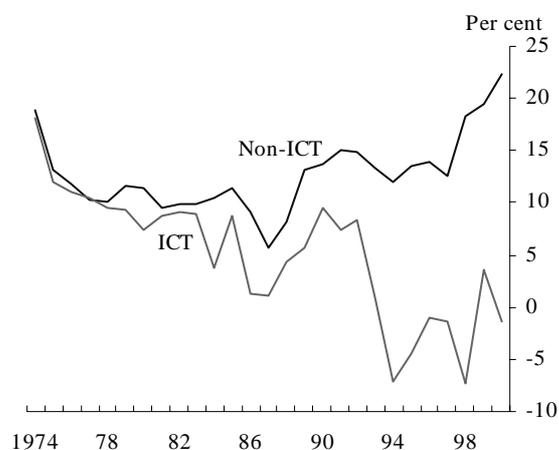
33 Turning now to private equity, the role of the venture capital industry in the provision of finance to new economy firms can be gauged from figures supplied by the British Venture Capital Association [BVCA (2001)]. These show a more than quadrupling of venture capital investments in new economy companies, from £319mn in 184 companies (11.4% of total funds invested in the UK) in 1996 to £1,615mn in 772 companies (25.3% of total funds invested in the UK, a greater allocation than for any other industry grouping) in 2000. Some £493mn of this latter figure went to early-stage investments, in 359 companies (nearly 65% of which were in computer software / hardware). This proportion of 30.5% of venture capital investments in the new economy sectors in 2000 going into early-stage finance compares with 11.0% of venture capital investments overall.

34 There is only limited information on investments by business angels in the UK, based on figures collected by the BVCA. These figures relate only to investments through business angel networks in the UK, which totalled nearly £30mn in 1999/2000. This is only the tip of the iceberg, since the vast majority of business angels are not members of business angel networks [separate estimates suggest that total business angel investments amount to around £500mn per annum]. For what they are worth, however, the BVCA figures suggest that business angel investments in new economy firms rose from £5.7mn (21% of the total number of investments and 26% of the total value of investments) in 1995/96 to £13.8mn in 1999/2000 (45% of the total number and 49% of the total value of investments).

(iv.) Debt-equity and gearing ratios

35 Some evidence on the relative use of debt and equity for new economy firms can be gleaned from the company accounts data. Chart 15 shows capital gearing at replacement cost, as calculated by net debt (from both bank and non-bank sources) divided by the capital stock measured at replacement cost. It is immediately apparent that the median new economy firm had lower capital gearing than the median old economy firm throughout the 1974-99 period, with the gap having widened significantly since 1990. By 2000, capital gearing of the median old economy firm had risen to 22%, close to a 25-year high, whereas capital gearing of the median new economy firm was -1.4%. This accords with the theory that new economy small firms may be expected to make more use of equity relative to debt, other things being equal, than old economy small firms.

Chart 15: Capital gearing at replacement cost for the median ICT and non-ICT firm^(a)

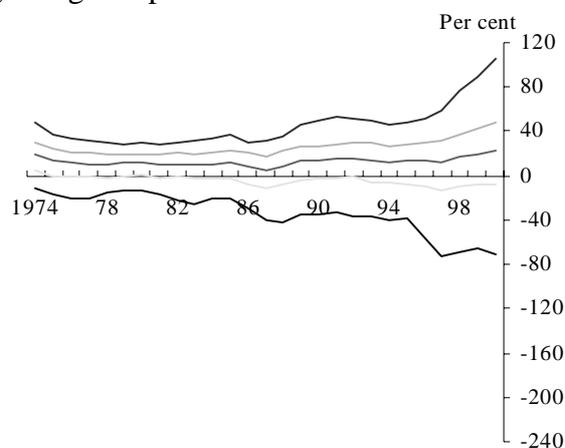


Source: Thomson Datastream and Bank of England.

(a) Capital gearing is calculated as the ratio of net debt to the sum of net debt plus the market value of equity. Replacement cost is calculated by the perpetual inventory method. Net debt is calculated as gross debt minus cash deposits. ICT firms have negative capital gearing when their cash deposits exceed gross debt.

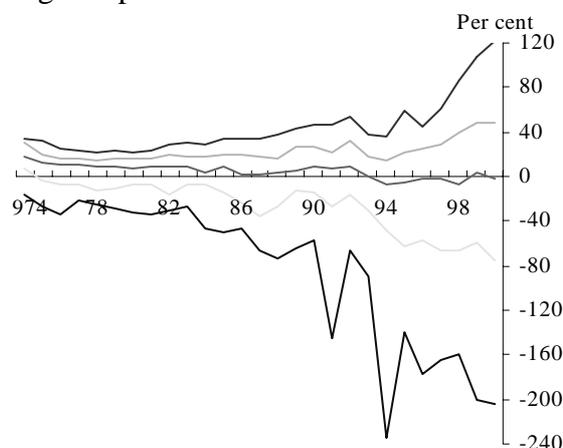
36 An interesting feature of these data is that the median new economy firm had negative net capital gearing for parts of the second half of the 1990s, ie its deposits of cash exceeded its gross debt levels. But concentration on the median firm masks major differences in the gearing of companies through the distribution. A comparison of the distribution of capital gearing for both old and new economy firms shows that the propensity of new economy firms to have negative gearing is much greater than for old economy firms (see Charts 16 and 17) at the bottom of the distribution. But it is notable that the dispersion of capital gearing in the recent past has been much greater for new economy firms than old economy firms. There is also a subset of quite highly geared new economy firms; indeed, the gearing of these firms exceeds that of old economy firms at corresponding points of the distribution. This reflects rising indebtedness of more mature and large companies in certain parts of the ICT sector, notably the build-up of debt in the telecommunications sector following the acquisition of 3G mobile licences and also substantial M & A activity in that sector.

Chart 16: Distribution of Non-ICT firms' capital gearing at replacement cost^(a)



Source: Thomson Datastream and Bank of England.
(a) Percentiles are 90th, 75th, 50th, 25th and 10th respectively.

Chart 17: Distribution of ICT firms' capital gearing at replacement cost^(a)



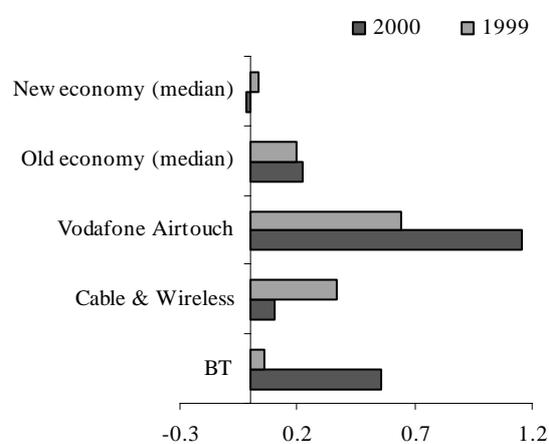
Source: Thomson Datastream and Bank of England.
(a) Percentiles are 90th, 75th, 50th, 25th and 10th respectively.

37 More light on these points can be obtained by considering in more detail recent financing trends at selected UK telecoms companies. Charts 18 and 19 show two measures of capital gearing for 3 UK telecoms companies - BT, Vodafone and Cable and Wireless – and compares these with gearing at the median new and old economy firms. In the cases of both BT and Vodafone, the huge bill for 3G mobile phone licences, together with the need to finance substantial M&A activity, induced a large rise in debt financing, and hence capital gearing (at both replacement cost and market value), in 2000 compared with 1999. Vodafone's stronger share price performance made it possible for it to access equity finance in addition, a route less open to BT following the decline in high-tech equity markets through much of 2000. So the rises in capital gearing at BT were rather larger than at Vodafone, albeit occurring from lower starting levels.

38 These differential financing trends within the telecoms sector can also be reconciled with the pecking order theory. At the time of the UK 3G auction, Vodafone was more heavily geared than BT and had a lower credit rating. It also arguably had fewer tangible assets than BT and therefore less collateral with which to secure debt finance. This meant that the cost of debt relative to equity finance was probably less favourable for Vodafone than for BT at that time. And BT may also have been influenced by a need for flexible funding for 3G licences at uncertain cost. This would support initial borrowing via commercial paper with back-up bank facilities, and then subsequent refinancing longer-term later – either through bond or equity issues. Although BT's original plan was to refinance via the

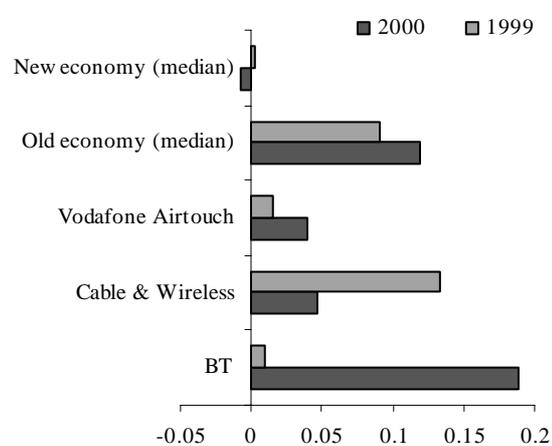
flotation of its mobile phone subsidiaries, the large falls in high-tech equity prices meant it opted in May 2001 for a deeply discounted rights issue instead. With Vodafone also refinancing through an equity placing in May 2001, the capital gearing of both companies will have fallen back in the recent past. In some respects, the recent actions of the two companies indicates that, ultimately, equity finance is perhaps a more appropriate way to finance the purchase of 3G licences, given that the revenues are uncertain.

Chart 18: Capital gearing at replacement cost for telecoms companies



Source: Thomson Datastream and Bank of England.

Chart 19: Capital gearing at market value for telecoms companies



Source: Thomson Datastream and Bank of England.

39 The earlier comparisons of capital gearing for the median new and old economy firms were based on gearing at replacement cost. But gearing at market valuations is arguably more relevant to new economy firms, given the importance to them of intangible assets. A comparison of capital gearing at market value for both old and new economy firms shows that gearing for new economy firms is less than for old economy firms at most percentiles (Table 3).

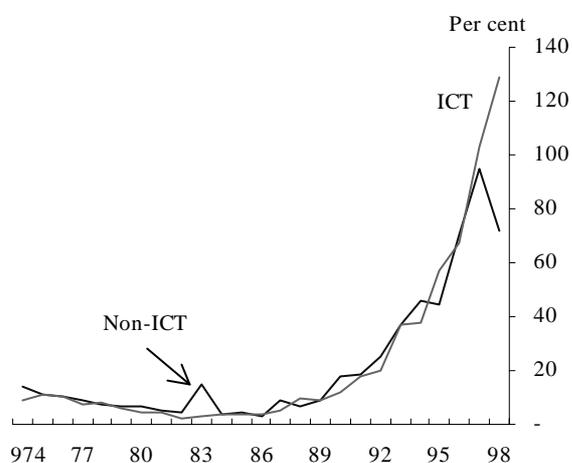
Table 3: Comparison of capital gearing measures for new and old economy firms in 2000

Capital gearing at:	Old Economy firms		New Economy Firms	
	<i>Replacement cost</i>	<i>Market Value</i>	<i>Replacement cost</i>	<i>Market Value</i>
10 th	-70.8	-27.8	-205.0	-23.5
25 th	-08.5	-04.8	-75.0	-09.1
50 th	22.3	11.9	-01.4	-00.8
75 th	48.2	33.4	48.0	11.7
90 th	105.0	52.5	121.0	25.8

Source: Thomson Financial Datastream and Bank of England.

40 Theoretical considerations suggest that the lower overall gearing ratios of new economy firms may reflect the difficulties of accessing debt finance caused by a lack of collateral (at least for smaller firms at early stages of finance). Chart 20 seeks to throw some light on this by comparing the ratio of intangible to tangible assets of new and old economy firms. The ratio has risen from very low levels between 1974-86 to nearly 100% by 1996 for both old and new economy firms. Since then, however, this ratio has fallen back for old economy firms, to 77% by 1998 (the last year for which data are available), while continuing to rise, to 129% by 1998, for new economy firms. This may indicate that, in recent years, new economy firms had proportionately fewer tangible assets that might be used as collateral for further bank borrowing.

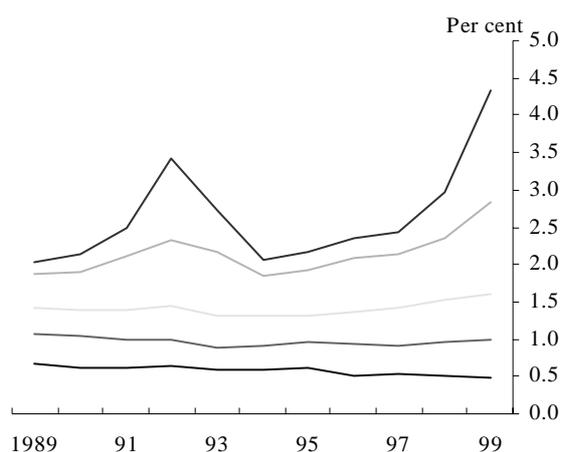
Chart 20: Mean ratio of intangible to tangible assets



Source: Thomson Datastream and Bank of England.

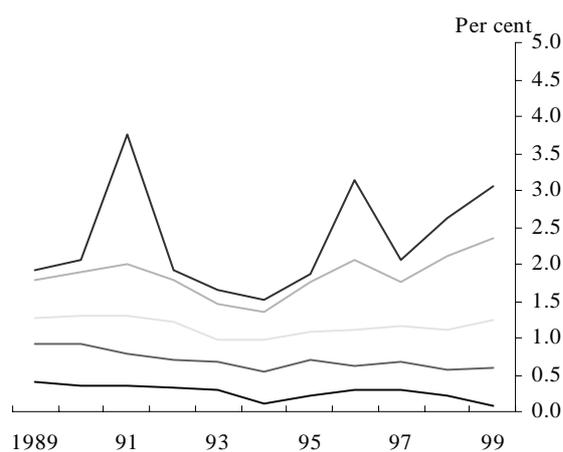
41 Another factor likely to influence the provision of debt finance, relative to equity finance, to different types of firms will be the probability of failure of those firms. A firm-level measure of the expected probability of failure of firms in our sample of quoted companies has been constructed using the methodology of Geroski and Gregg (1997). This links the expected probability of failure to financial characteristics such as profitability, capital gearing and liquidity, plus scale variables such as sales and employment. Charts 21 and 22 show the distribution of the expected probabilities of failure for old and new economy firms respectively. Over the period 1990-1999, the expected probability of failure of the median new economy firm was somewhat lower than that of the median old economy firm – in 1999, for example, the probabilities were 1.3% and 1.6% respectively. Perhaps even more interesting, this lower probability of failure for new economy firms is also evident at the higher percentiles of the distribution; the 1999 figures at the 80th percentile of the distribution were 3.1% for new economy firms and 4.3% for old economy firms. The differences at the median reflect lower starting levels of capital gearing among those firms. At the upper end of the distribution, however, capital gearing at replacement cost (although this measure is arguably less relevant for new economy firms, it is the measure used in the Geroski and Gregg analysis) is actually higher for new economy firms, but the adverse effect of this on the probability of failure is offset by the beneficial effect of higher profitability levels among more indebted new economy firms.

Chart 21: Distribution of probabilities of default for old economy firms



Source: Thomson Datastream and Bank of England.
(a) Percentiles are 80th, 75th, 50th, 25th and 10th respectively.

Chart 22: Distribution of probabilities of default for new economy firms



Source: Thomson Datastream and Bank of England.
(a) Percentiles are 80th, 75th, 50th, 25th and 10th respectively.

42 This analysis can be extended to estimate the distribution of debt across firms with different probabilities of failure. By multiplying the probability of failure of each firm by its level of debt

outstanding, and summing across a sub-group of companies, we can obtain a measure of “debt at risk” for that sub-group. This procedure takes no account of correlations of failure probabilities across companies, nor does it adjust for reductions in “loss given default” through debt recoveries. But it provides some quantification of the extent to which debt is concentrated among firms with relatively high probabilities of failure. Table 4 suggests that new economy firms may actually have proportionately less debt at risk than old economy firms. In particular, the proportion of total new economy debt held by firms with a probability of failure in excess of 5% was 12.9% in 1999, compared with a figure of 19.6% for old economy firms. This suggests that there is little reason to suppose that the quantity or price of debt provided to new economy firms has been adversely affected by fears that debt is concentrated at new economy firms with high probabilities of failure.

Table 4: Table of Debt at Risk for new and old economy firms in 1999

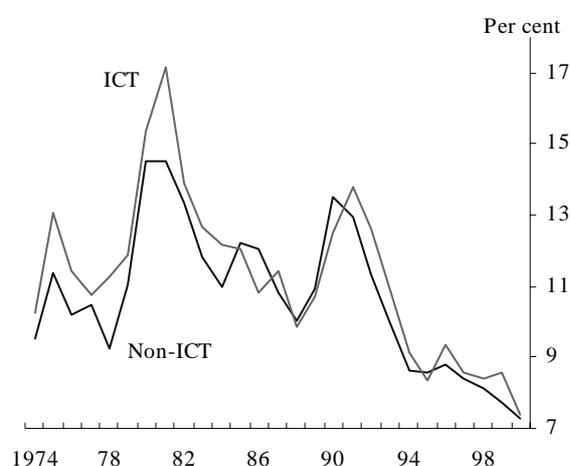
Probability of Receivership	Old Economy firms <i>Share of total old economy debt</i>	New Economy Firms <i>Share of total new economy debt</i>
≥0.0 % and <1.0 %	3.4	1.1
≥1.0 % and <2.5 %	57.5	60.4
≥2.5 % and <5.0 %	19.5	25.6
≥5.0 %	19.6	12.9
All firms	100%	100 %

Source: Thomson Financial Datastream and Bank of England.

43 Notwithstanding this consideration, however, there is still evidence that new economy firms on average face a higher cost of debt than old economy firms. Chart 23 calculates the cost of debt as the ratio of interest payments to gross debt. It shows that, over most of the 1974-99 period, the median new economy firm paid a premium for debt finance over the median old economy firm. This premium averaged around 75 basis points in 1999 but provisional estimates show this narrowing in 2000. This suggests that debt providers may believe that new economy firms are riskier than old economy firms, even though the data on probabilities of default do not seem to bear this out. Direct analysis of the

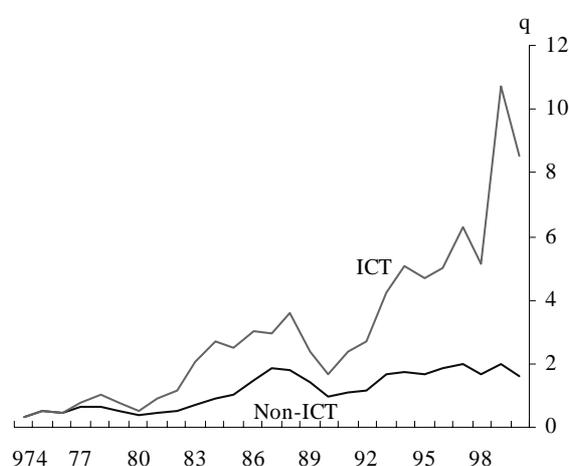
relative failure rates of firms in the new economy compared with businesses generally also do not provide much support for the hypothesis that new economy firms are riskier [see Westhead and Storey (1994) and Garnsey (1995) for the UK evidence and Storey and Tether (1996) for evidence from studies of French, Italian and German firms]. It may be, therefore, that the cost of finance premium for new economy firms has more to do with greater uncertainty among debt providers in quantifying the risk-reward relationship.

Chart 23: Cost of debt for the median ICT and non-ICT firm^(a)



Source: Thomson Datastream and Bank of England.
(a) Cost of debt is calculated as interest paid divided by gross debt.

Chart 24: Tobins q for the median ICT and non-ICT firm



Source: Thomson Datastream and Bank of England.
(a) Tobin's q is calculated as the market value divided by the nominal replacement cost of capital stock.

44 As noted above, the lower debt-equity ratios for new economy firms also reflect their greater access to both public and private equity finance in recent years. New economy firms may find it easier to attract equity finance than old economy firms if they provide more attractive investment opportunities. One measure of the attractiveness of investing in a firm is Tobin's Q, which measures the market valuation of a firm's equity in relation to the replacement cost value of its capital stock. Chart 24 shows a widening gap in the value of Tobin's Q between new and old economy firms over the 1990s, with a particularly sharp rise in Tobin's Q for new economy firms in 1999. Although the marked corrections in new economy stocks relative to old economy stocks post-March 2000 have reduced this gap, it remains large by historical standards.

45 Several studies have argued that the supply of finance may depend more significantly on the size and profitability of the firm rather than whether it is located in a particular sector [see, in particular Moore (1994)]. In that event, differences in the financing patterns of new and old economy firms may be more associated with the fact that new economy firms are smaller and younger, on average, than old economy firms, rather than with differences in the technological orientation of the firms. Other studies dispute these findings: for example, Jordan, Lowe and Taylor (1998), in an empirical analysis of 605 SMEs in South East England, found that debt-equity ratios were inversely correlated with the degree of innovation in the firm. In an attempt to distinguish between these two hypotheses, we regressed gross capital gearing ratios on variables proxying the size and profitability of the firm, the user cost of capital, the ratio of intangible to tangible assets and the new economy/old economy status of the firm. Preliminary results suggest that, even after taking into account size and profitability, whether a firm was located in the new economy or old economy did have a significant effect on its gross capital gearing. The financing of new economy firms, controlling for differences between new and old economy firms in size and profitability, does seem to be significantly different from old economy firms, with new economy firms on average accessing relatively less debt and relatively more equity than old economy firms. These differences do accord with theoretical considerations relating to the provision of different types of finance to different types of firms in the early stages of their life cycles.

Conclusions and suggestions for further work

46 The main conclusions to emerge from this comparison of financing trends in the UK among new and old economy firms are as follows:

- (1) on average, new economy firms have lower capital gearing and debt-equity ratios than old economy firms;
- (2) this reflects differences in access to both debt and equity finance, and accords with theoretical considerations suggesting that debt finance is less appropriate than equity finance, at the start-up and early stages, for new economy firms relative to old economy firms;

- (3) consideration of the distribution of capital gearing and debt-equity ratios reveals a subset of new economy firms with relatively high levels of indebtedness, perhaps reflecting the growing recourse to debt finance at later stages of finance for larger companies in certain parts of the new economy, notably the telecommunications sector;
- (4) there is little direct evidence that new economy firms are any riskier on average than old economy firms, although they do still appear to face a higher cost of debt finance.

47 This analysis has related mainly to comparisons of financing trends at quoted firms. In further research, it would be interesting to consider in more detail the financing patterns of smaller privately owned companies. Another key issue, for publicly quoted companies in this case, is whether the marked correction in ICT stocks over the past year will lead to any reversal in the trends identified in this paper. One aspect of this is the extent to which this may induce new economy firms to rely more heavily on back-up bank lines of credit, because of much greater difficulties in accessing further equity finance in current market conditions. This issue, and the implications for finance providers, will need to be closely monitored in the months ahead. Finally, we will be carrying out further empirical estimation on the differences between financing trends at new and old economy firms.

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