Fostering the ‘New Economy’:  
the role of financial intermediation

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July 2001

1. INTRODUCTION

The extraordinary growth performance of the US economy in the second half of the 1990s, in combination with the revolution in Information and Communication Technology (ICT), has launched the notion of a ‘New Economy’. Although economists are still struggling to define this New Economy, and to establish its manifestations, it is beyond dispute that technological progress in the ICT sector has been substantial and that this has had significant positive effects on productivity and macroeconomic performance. These developments offer new challenges not only for investors, but also for policymakers. Indeed, while policymakers may seek to foster the advent of the New Economy in order to exploit its potential for higher economic welfare, they will also be mindful of the financial stability risks this may entail.

In this paper we consider the financing issues of the New Economy, focusing on the role of financial intermediation. Although these issues have received little attention in the literature to date, their relevance is clear. First, financing is a precondition for New Economy

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activities to emerge. Second, some financing methods may be better suited than others to elicit the necessary entrepreneurial initiatives. In fact, these differences may help explain the more convincing evidence for the emergence of the New Economy in the US than in Europe and Japan. Third, especially in the case of substantial bank involvement, the financing structure of the New Economy may have implications for an economy’s financial stability.

The paper is organised as follows. The next section succinctly discusses the scope of the New Economy and highlights the difficulties of defining the New Economy and identifying it in practice. Section 3 reviews the characteristics of New Economy firms that have a bearing on their preferred financing scheme, especially the considerations favouring equity over debt financing, and maps out the financial growth cycle typical to the New Economy sector. Against this background, Section 4 conducts an empirical investigation into the relationship between a country’s financial structure and the contribution of its ICT sector to productivity and economic growth. Financial stability risks associated with the financing of New Economy investments are discussed in Section 5. Section 6 concludes.

2. THE SCOPE OF THE ‘NEW ECONOMY’

Although there is no commonly accepted definition of the New Economy, there is broad agreement on its main features (see Stiroh, 1999, for a survey). The driving force is technological innovation in the ICT sector, contributing to an increased flexibility and transparency of markets. In terms of macroeconomic performance, the New Economy is characterised by an increase in the economy’s potential growth rate, stemming from a more rapid pace of ICT-related productivity gains. Moreover, cyclical fluctuations (in output growth and unemployment) may become less pronounced on account of more timely inventory management and improvements in information processing. Put differently, the emergence of the New Economy can be seen as a large and long-lasting positive supply shock, causing higher and possibly also more stable economic growth without extra inflation.

The existence of the New Economy is subject to intense debate. One of the main sceptics is Gordon (2000), who attributes most of the recent productivity gains in the US to cyclical
effects. Others find that ICT investments have contributed substantially to economic growth and labour productivity (see Oliner and Sichel, 2000, for the United States; Oulton, 2001, for the United Kingdom; Cette, Mairesse and Kocoglu, 2001, for France; Scheuer, 2001, for Germany; and Schreyer, 2000; Daveri, 2000; Roeger, 2001; and Van Ark, 2001, for broader country samples). In this context, the evidence for European countries and Japan is weaker than for the United States, although there are significant cross-national differences in Europe.

It is difficult to identify a specific part of the economy as the ‘New Economy sector’. In a sense, the New Economy comprises all sectors where new information technology is applied, as the diffusion of ICT is crucial to keep the economy on a higher growth path. We concentrate on the ICT sector, however, as this allows a focus on firms whose financial characteristics are directly related to the advent of the New Economy. In addition, there are indications that most of the differences in economic performance between the United States and Europe can be attributed to the ICT producing, rather than the ICT using sector (Van Ark, 2001). These are generally small, young firms, although established companies, for instance in the telecom sector, also play a role.

3. THE FINANCIAL STRUCTURE OF NEW ECONOMY FIRMS

The capital structure of a firm depends on a host of factors, including its risk profile, track record, assets and projected receipts, as well as the preferences of the entrepreneur (Berger and Udell, 1998; Bank of England, 2001). In general, the choice of capital structure can be explained in terms of agency costs, as described by principal-agent theory (Jensen and Meckling, 1976). Underlying this theory are problems of information asymmetry, which stem from the complication that entrepreneurs (the ‘agents’) have more information about their firms’ prospects than outside investors (the ‘principal’). On this score, young and small firms are more likely to face tight external financing constraints, as information asymmetries tend to be relatively large. As a result, such firms depend heavily on insider finance and start-up funds provided by family, friends or ‘business angels’. Once a firm’s growth potential becomes reflected in its cash flow performance, more sources of external finance become available, including bank loans and venture capital. At this stage, as firms
do not yet have access to open capital markets, financial intermediation becomes essential to address agency problems through screening and monitoring activities. Finally, when the firm has developed a track record, finance can be attracted directly from public capital markets by issuing corporate bonds or shares.

How does the New Economy sector fit into this framework? From a financing perspective, the dominant characteristics of New Economy firms may be summarised as follows:

- investments are subject to considerable uncertainty and typically have a ‘high risk, high return’ profile in ‘winner takes it all’ markets, characterised by network effects and the goal of setting the dominant standard.2
- fixed costs (e.g. research and development) are large, whereas variable costs are small, as ICT products (e.g. computer software) can generally be easily reproduced; by consequence, cash flow is likely to be significantly negative during the initial phases;
- products are subject to rapid obsolescence and assets are intangible (e.g. patents, networks and goodwill), making them ill-suited to serve as collateral (Bank of England, 2001);
- information asymmetries between entrepreneurs and investors tend to be relatively large;
- production relies heavily on human capital, which has implications for employees’ incentive mechanisms (e.g. the use of own funds or stock options to increase commitment, see Rajan and Zingales, 2000a).

These characteristics have implications for the appropriate financial structure of New Economy firms. In particular, the ‘high risk, high return’ nature of investments, together with the limited amount of collateral, suggests that equity finance is more appropriate than debt finance. After all, in the case of a debt contract the investor’s return is limited to the fixed amount of the loan and related interest payments. Hence, the creditor hardly benefits from the New Economy firm’s upside potential, but is nevertheless fully exposed to its downside risks. The return on equity, by contrast, is positively related to the firm’s
profitability, without an upper limit. The crucial point is that the debt holder’s return is a concave function of the firm’s profitability, whereas the equity holder’s return is convex (see Figure 1 for a stylised illustration, where an amount $D$ is financed with debt). There is only limited scope for a bank to take the risk profile into account by setting a higher interest rate, as this may lead to adverse selection or prohibitively high financing costs. Moreover, a combination of debt and equity finance could lead to a conflict of interests. Especially if the investment is largely debt-financed, equity-holders will tend to press for a more risk prone strategy than debt holders, because a ‘low risk, low return’ approach could lead to a situation in which profits are only sufficient to cover the contractual debt obligations. To a lesser extent, a comparable conflict of interests could arise between holders of different types of debt or equity (e.g. senior versus subordinated debt).

The prevalence of information asymmetries has further implications for the optimal composition of equity finance. As New Economy firms are generally young and small, and thus lack a well-established track record, while market prospects are relatively uncertain, outside equity investors will have little to go by in deciding on their participation. This difficulty is likely to be particularly constraining during the initial phase of a firm. By implication, internal financing may be expected to play a heavy role during this phase. At the same time, substantial financing through partial management ownership will limit an entrepreneur’s incentive to conduct business in a manner that benefits him or her at the expense of outside investors.

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2 In other words, the returns of New Economy projects are likely to have a ‘fat tails’ distribution, i.e. a significant number of large successes, but also many severe losses. See e.g. Cochrane (2001) for an empirical study of ‘high risk, high return’ investments, based on venture capital projects.

3 In practice, this conflict of interests does not arise if debt and equity finance are provided by a single investor (e.g. a venture capitalist). In such a situation, an investor may provide a relatively large share of debt finance in order to increase financing safeguards and to reduce fiscal payments. In this context, it is the relative share of total equity, rather than the absolute amount of equity, that determines the degree in which an investor benefits from a firm’s upside potential.
In a subsequent phase, when a certain track record has been established and monitoring arrangements may be developed (also on the basis of cash flow receipts), venture capitalists may provide complementary equity financing. In practice, venture capitalists tend to contribute not only to New Economy firms’ start-up financing, but also to their management know-how (see e.g. Bank of England, 2001; Kaplan and Strömberg, 2000, 2001). This provides the venture capitalist with a grip on the firm’s strategic orientation as well as with a monitoring device to mitigate any moral hazard governing the activities of the entrepreneur.

Once cash flow has turned positive and assets (including claims) have been accumulated that may serve as collateral, banks may be expected to step in. Prior to this, their debt financing role will generally be minimal, given the borrower’s inability to cover debt service obligations with current proceeds. But debt financing by banks may subsequently also remain limited, especially when New Economy firms reach the stage in which they...
have direct access to capital markets. Nonetheless, banks have an important supporting role by providing other bank services (payments, consultancy) and, indirectly, by funding venture capitalists (see Section 5). The client relationships of banks with New Economy firms may also be crucial for services such as IPOs. Indeed, exit prospects through successful IPOs are critical for a vibrant venture capital market (Black and Gilson, 1998). Furthermore, banks fulfil an important role in fostering the New Economy through their monitoring of the activities of Old Economy clients—especially by focusing on whether these clients are sufficiently alert in adjusting their strategies and operations to the challenges posed by the ICT revolution.

FIGURE 2  The financial growth cycle of New Economy Firms

<table>
<thead>
<tr>
<th>SEED</th>
<th>START-UP</th>
<th>EARLY GROWTH</th>
<th>SUSTAINED EXPANSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small, young firms</td>
<td>Small</td>
<td>Small/medium</td>
<td>Medium/large</td>
</tr>
<tr>
<td>No track record</td>
<td>Limited track record</td>
<td>Track record</td>
<td>Good track record</td>
</tr>
<tr>
<td>No collateral</td>
<td>Growth potential</td>
<td>Collateral available</td>
<td>Known risk</td>
</tr>
<tr>
<td>Negative cash flow</td>
<td></td>
<td>Positive cash flow</td>
<td></td>
</tr>
</tbody>
</table>

- Own capital
- Business angels
- Trade credit
- Venture capital/Private equity
- Banks
- Profit retention
- Public equity
- Public debt

Firm size  Firm age  Cash flow  Information availability

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4 Anecdotal evidence based on interviews with banks, New Economy firms and venture capitalists confirms the limited role of banks in debt financing of original New Economy firms (that is, firms without an Old Economy production base).
In all, the appropriate financing structure of a New Economy firm is largely dependent on its phase of development. Four main stages are commonly identified in a firm’s life cycle: seed, start-up, early growth and sustained expansion (Bank of England, 2001). Within this framework, Figure 2 provides a general illustration of the typical financial growth cycle of a New Economy firm.

A general conclusion is that ample private equity financing is vital to spur the emergence of the New Economy and that a well-developed financial system is needed to accommodate its sustained growth. On the whole, the financing role of banks is of minor importance. This tallies with previous papers (OECD, 2000, 2001; and UNICE, 2001) that stress the importance of venture capital and, more generally, of financial markets. In this respect, New Economy firms are not expected to comply with the so-called ‘pecking order’ hypothesis which states that, once a firm decides to attract external funds, debt is preferred over equity finance (see also Bank of England, 2001). In contrast, venture capitalists commonly carry out the function of financial intermediation until the firm is in a position to directly tap public equity and debt markets.

4 NEW ECONOMY FINANCING AND THE STRUCTURE OF CAPITAL MARKETS

The financing of New Economy firms is determined not only by their business scheme and preferred financing pattern, but also by the structure of capital markets. Traditionally, a distinction is made between economies with bank-based capital markets, as in Germany and Japan, and market-oriented systems, as in most Anglo-Saxon countries. In bank-based systems, long-term relationships between banks and their clients are key to overcoming frictions in financial markets. By contrast, in market-based systems more weight is attached to explicit contracts, market transparency and the price mechanism. In practice, of course, the distinction between the two systems is not very strict, but is rather a matter of emphasis. After all, in market-oriented economies like the United States, banks are important for smaller borrowers, whereas in bank-centric economies like Germany, large firms attract considerable funding from the stock market.
A number of studies have sought to determine which of the two systems leads to a better economic performance (for instance, Allen and Gale, 2000; Beck and Levine, 2000; Levine, 2000; Demirgüç-Kunt and Maksimovic, 2000). In general, although a well-developed financial system is found to be important for economic growth (see also Rajan and Zingales, 1998, 2000b), these studies are inconclusive as to which system is optimal. Furthermore, even if one system were identified as inferior, it may be difficult to achieve improvements, as the development of a financial system is largely a path-dependent process. Nonetheless, as discussed above, the specific financing needs of New Economy firms imply that equity finance is generally more appropriate than debt finance, suggesting that a market-based system could be more accommodative for the New Economy than a bank-based system. Rajan and Zingales (2000b) argue that venture capital – which they consider a ‘hybrid’ of relationship-based and market-based financing – is most effective to encourage knowledge-intensive industries. However, Black and Gilson (1998) provide evidence that the development of a venture capital market is impaired in bank-based systems, as divestment possibilities through IPOs are limited. In this context, the OECD (2000) attributes much of the United States’ superior economic performance in the 1990s – compared with Europe and Japan – to its market-oriented financial system and its well-developed venture capital market.

Financial structure and the New Economy in practice

Empirical investigation of the importance of financial structure for the development of the New Economy is hampered by data limitations. These limitations reflect the abstract character of the New Economy’s underlying concepts and the short timeframe of its existence. Recent studies of the impact of the New Economy on economic performance in the major OECD countries have sought to overcome these difficulties by focusing on the contribution of the ICT sector to macroeconomic performance (see Daveri, 2000; Schreyer,

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5 To some extent, this is a chicken-and-egg problem because, in turn, IPOs are important for a well-functioning stock market.

6 In this light, the European Union has launched a Risk Capital Action Plan (RCAP) to integrate its fragmented venture capital markets (European Commission, 2000). The RCAP consists of elements to be harmonised within the Union, including the patent system, bankruptcy laws and aspects of tax policy. It also seeks to ease restrictions on private equity investments by institutional investors such as pension funds and insurance companies.
A summary of the results of these studies is presented in columns 2-6 of Table 1. Daveri and Roeger calculate the impact of ICT on economic growth on the basis of a growth accounting framework using ICT investment as a separate input. Van Ark follows a different approach and focuses on productivity contributions in individual industries, making an explicit distinction between the ICT using sector and the ICT producing sector; only the latter is included in Table 1. In addition, Roeger and Van Ark analyse the relationship between ICT and productivity growth. Each of these studies establishes marked differences between countries in the contribution of the ICT sector to productivity and economic growth.

### Table 1: Financial structure and contribution of ICT to economic performance: overview of previous studies

<table>
<thead>
<tr>
<th>Source</th>
<th>Contribution of ICT to economic growth (percentage points)</th>
<th>Contribution of ICT to productivity* (percentage points)</th>
<th>Financial system**</th>
<th>Venture capital**</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td>0.41 0.50 0.24</td>
<td>0.19 0.21</td>
<td>0.02</td>
<td>0.079 0.068</td>
</tr>
<tr>
<td>France</td>
<td>0.34 0.50 0.45</td>
<td>0.25 0.27</td>
<td>-0.45</td>
<td>0.116 0.092</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>0.59 0.50 0.58</td>
<td>0.33 0.44</td>
<td>1.38</td>
<td>0.502 0.187</td>
</tr>
<tr>
<td>Italy</td>
<td>0.23 0.50 0.20</td>
<td>0.19 0.20</td>
<td>-0.34</td>
<td>0.079 0.030</td>
</tr>
<tr>
<td>Spain</td>
<td>0.30 0.50</td>
<td>0.14</td>
<td>-0.30</td>
<td>0.066 0.030</td>
</tr>
<tr>
<td>Netherlands</td>
<td>0.59 0.80 0.53</td>
<td>0.27 0.22</td>
<td>0.54</td>
<td>0.263 0.164</td>
</tr>
<tr>
<td>Belgium</td>
<td>0.34 0.70</td>
<td>0.22</td>
<td>0.63</td>
<td>0.116 0.175</td>
</tr>
<tr>
<td>Denmark</td>
<td>0.40 0.50 0.23</td>
<td>0.06 0.23</td>
<td>0.07</td>
<td>0.031 0.017</td>
</tr>
<tr>
<td>Sweden</td>
<td>0.46 0.80</td>
<td>0.27</td>
<td>0.83</td>
<td>0.216 0.197</td>
</tr>
<tr>
<td>Finland</td>
<td>0.41 0.80 1.31</td>
<td>0.38 0.88</td>
<td>-0.30</td>
<td>0.110 0.091</td>
</tr>
<tr>
<td>Norway</td>
<td>0.41 -</td>
<td>-</td>
<td>-0.11</td>
<td>0.121 0.146</td>
</tr>
<tr>
<td>Japan</td>
<td>0.45 -</td>
<td>-</td>
<td>1.07</td>
<td>0.024 -</td>
</tr>
<tr>
<td>Australia</td>
<td>0.61 -</td>
<td>-</td>
<td>1.18</td>
<td>0.093 -</td>
</tr>
<tr>
<td>New Zealand</td>
<td>0.55 -</td>
<td>-</td>
<td>1.46</td>
<td>0.038 -</td>
</tr>
<tr>
<td>Canada</td>
<td>0.64 -</td>
<td>-</td>
<td>1.06</td>
<td>0.181 0.219</td>
</tr>
<tr>
<td>United States</td>
<td>0.64 1.00 0.82</td>
<td>0.50 0.41</td>
<td>1.10</td>
<td>0.278 0.569</td>
</tr>
</tbody>
</table>

A key question is to what extent these cross-country differences are related to differences in capital market structure. In this context we look at correlations with three indicators (see Table 1, last three columns). First, we consider a financial system indicator, taken from Beck and Levine (2000), that measures the extent to which an economy’s financial structure

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7 Other studies (e.g. Oliner and Sighel, 2000) focus on just one country and thus do not allow cross-country comparisons on the basis of capital market structure.

8 For the ICT using sector, differences across countries (as presented in Tables 1 and 2) are in line with those of the ICT producing sector. In both cases, nearly all correlations with financial structure (as presented in Table 2) are positive. However, for the contribution of ICT to labour productivity growth, the effects are more pronounced (i.e. correlations are higher) for the ICT producing sector than for the ICT using sector.
can be regarded as bank-based (low value) or market oriented (high value).\textsuperscript{9} As expected, Anglo-Saxon countries tend to be market oriented, while most economies on the European continent are at the bank-based end of the spectrum. Our second financial structure indicator is the size of the venture capital market. As noted before, the availability of venture capital may be considered vital for many New Economy investments. Again, differences across countries over the 1995-1999 period are substantial: venture capital markets are largest in the United Kingdom, the United States, the Netherlands and Sweden, and relatively small in Japan, Denmark, Spain and Italy. Differences are even more pronounced in the third financial structure indicator, comprising only the high-tech segment of the venture capital market (for 1999). While the largest market is to be found in the United States, the smallest markets are in Denmark, Italy, Spain and Germany.\textsuperscript{10}

Table 2 presents straightforward correlations between, on the one hand, the contribution of ICT to economic performance and, on the other hand, the three capital market structure indicators.\textsuperscript{11} These are based on the data in Table 1. Figures A1 and A2 in the appendix give a graphical representation of these correlations. Of course, the results in Table 2 need to be interpreted with caution, as the correlations are based on a limited number of observations (at most 16 countries), while the sample periods do not always exactly match. However, robustness is increased by taking data from a variety of studies, resulting in 15 correlations. In fact, it is striking that virtually all the correlations are positive and statistically significant. This lends further support to the view that a market-oriented system and a well-developed venture capital market are important factors stimulating the emergence of the New Economy. An outlier in Van Ark’s sample is Finland, where the impact of ICT is much

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\textsuperscript{9} This indicator is constructed as follows (see Beck and Levine, 2000, for further details). First, the activity of stock markets relative to banks is calculated, defined as the log of the ratio of value traded and total outstanding bank lending to the private sector as a percentage of GDP. Second, the size of stock markets relative to the banking sector is calculated, defined as the log of the ratio of market capitalisation and total bank lending as a percentage of GDP. The indicator is the first principal component of these two measures.

\textsuperscript{10} These figures refer to venture capital investments, based on the country of management. Alternatively, one could look at differences on the basis of the country of destination of these investments, which would take into account cross-border investments from other countries. For most countries, differences between both approaches are small (see Baghyan and Freudenberg, 2000).
larger than in the other countries, while it is also one of the most bank-based economies
with a relatively underdeveloped venture capital market. Obviously, this is due to the telecommunication industry being dominated by one large firm (Nokia) that has ready access to open capital markets and is not dependent on funding from banks or venture capitalists. Once Finland is excluded, correlations are all much higher, positive and still statistically significant.

**TABLE 2 Correlations**

(t-values in parentheses)

<table>
<thead>
<tr>
<th>Contribution of ICT to growth</th>
<th>Financial system</th>
<th>Venture capital</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>High-tech</td>
</tr>
<tr>
<td>Daveri (2000)</td>
<td>0.80 (5.3)</td>
<td>0.52 (2.4)</td>
</tr>
<tr>
<td>Roeger (2001)</td>
<td>0.75 (3.8)</td>
<td>0.69 (3.2)</td>
</tr>
<tr>
<td>Van Ark (2001)</td>
<td>-0.01 (-0.0)</td>
<td>0.27 (0.9)</td>
</tr>
<tr>
<td>idem, excl. Finland</td>
<td>0.55 (2.0)</td>
<td>0.68 (2.8)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Contribution of ICT to productivity</th>
<th>Financial system</th>
<th>Venture capital</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>High-tech</td>
</tr>
<tr>
<td>Roeger (2001)</td>
<td>0.50 (1.9)</td>
<td>0.60 (2.5)</td>
</tr>
<tr>
<td>Van Ark (2001)</td>
<td>-0.08 (-0.3)</td>
<td>0.15 (0.5)</td>
</tr>
<tr>
<td>idem, excl. Finland</td>
<td>0.64 (2.5)</td>
<td>0.67 (2.7)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Venture capital</th>
<th>Financial system</th>
<th>Venture capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>0.40 (1.6)</td>
<td>0.54 (2.3)</td>
</tr>
<tr>
<td>High-tech</td>
<td>0.69 (3.4)</td>
<td></td>
</tr>
</tbody>
</table>

Source: Table 1

Overall, our findings provide preliminary evidence that the New Economy and capital market structure are related. If there is a causal relationship between both factors, this is more likely to run from financial structure to New Economy than in the opposite direction, if only because the New Economy is the more recent phenomenon. However, there may also be a ‘third factor’ explaining both financial structure and the New Economy. An obvious

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11 Presented are standard correlation coefficients: 

\[ \rho \frac{\sqrt{n}}{\sigma_X \sigma_Y} \] 

for two series \( X \) and \( Y \). The corresponding t-values equal to 

\[ t = \frac{\rho \sqrt{n}}{\sqrt{1 - \rho^2}} \], \n
where \( n \) is the number of observations.

12 Finland is not an outlier in the other studies (Daveri, Roeger), as these are based on a broader definition of the ICT sector. By contrast, Van Ark’s figures focus on the ICT producing sector, which is dominated by
candidate is the degree of liberalisation and deregulation of non-financial markets, which is one of the driving forces of the New Economy. Indeed, countries with market-oriented financial systems may also have relatively flexible labour and product markets, in which case the financial structure should be seen within the more general context of a flexible market environment. Besides this, cross-national variation in economic performance may be partly related to differences in legal systems (La Porta et al., 1998).

5. NEW ECONOMY FINANCING AND RISKS TO FINANCIAL STABILITY

Next to their role in channeling funds to New Economy investments, financial markets also have a task in absorbing the inherent risks. These risks can be specified in terms of credit risk and market risk (and indirectly also reputation risk) and are reflected in interest rate spreads, stock prices and credit ratings. Table 3 confirms that in the United States, Europe and Japan, the stock price volatility of various New Economy indices (IT, TMT, Telecom) has been substantially larger than that of other sectors over the period 1995-2001, which illustrates the higher risk profile of investments in this former sector. In general, however, New Economy investments will not threaten financial stability – in terms of the stability of the financial system and thus of macroeconomic developments – as long as the scope for contagion is limited. This primarily depends on the extent to which banks are involved, since problems within individual banks spread easily to the macroeconomy through credit conditions and also risk taking on systemic dimensions.

Nokia. Although not presented in this paper, analyses based on Van Ark’s data on the ICT using sector do not find Finland to be an outlier.

13 McGuckin and Van Ark (2001) find that part of the productivity gains related to the New Economy in the United States can be attributed to the reform and liberalisation of product markets in the past decades.

14 Leahy et al. (2000) show that innovation and investment in new enterprises is more broadly linked to the transparency and enforcement of the legal and regulatory frameworks governing financial markets (in particular through investor protection, accounting and auditing requirements).

15 A direct comparison between New Economy stocks and a broad index is ill-suited to indicate the relative riskiness of New Economy investments, as any sectoral index tends to be more volatile than the aggregate, given the more limited scope for risk diversification. This also explains why most of the sectoral indices in Table 3 are more volatile than the ‘total’ index.
The direct exposure of banks to New Economy firms is generally small on account of the inappropriateness of debt finance. By implication, the financial stability risks of the New Economy are limited. As an exception to this rule, banks provided huge loans to the European telecom sector in the second half of 2000 to finance UMTS licenses. These loans were based on the sector’s favourable cash flow and collateral from traditional activities, and on the assumption of a timely replacement of bank loans through equity or bond placements in the open market. In the event, however, market sentiment turned against these firms in the course of 2000, reflecting serious doubts about the profitability of UMTS investments. In terms of Figure 2, telecom companies proved to be firms at the right-hand end of the spectrum, that are heavily engaged in activities at the left-hand end. This effectively confronted banks with an asymmetric downside risk: the loans and credit lines were only extended when the firms’ performance disappointed other investors.\textsuperscript{16} Moreover, the risk was in part self-fulfilling, since the firms’ tighter financing constraints led to real investments being delayed. Overall, with the benefit of hindsight, a different financing

\textsuperscript{16} Total telecom bank debt redemptions in 2001 are estimated at USD 250 billion (Bank of England, 2000).

\begin{table}
\centering
\caption{Stock market volatility per sector}\label{table:stock_volatility}
\begin{tabular}{|l|c|c|c|}
\hline
 & United States & Europe & Japan \\
\hline
Information technology & 14.0 & 16.0 & 14.3 \\
Telecom, media, technology & 11.2 & 12.5 & 12.3 \\
Telecom & 8.8 & 12.6 & 12.0 \\
Financials & 8.6 & 6.1 & 9.4 \\
General industries & 8.0 & 6.2 & 8.2 \\
Cyclical consumer goods & 7.5 & 7.0 & 7.7 \\
Cyclical services & 7.2 & 7.0 & 7.0 \\
Non-cyclical consumer goods & 7.2 & 6.0 & 6.1 \\
Non-cyclical services & 8.0 & 11.5 & 11.5 \\
Utilities & 5.3 & 6.7 & 5.1 \\
Basic industries & 7.0 & 5.5 & 8.3 \\
Resources & 6.2 & 6.1 & 10.3 \\
\textbf{Total} & \textbf{7.0} & \textbf{6.3} & \textbf{7.9} \\
\hline
\end{tabular}
\begin{flushleft}
* Based on weekly data over the period January 1994-June 2001 (from Datastream). For each observation from 1995 onwards, the ratio between the standard deviation and the average index over the preceding year (52 weeks) is calculated. The presented ratios are averages of this statistic over the entire 1995-2001 period (multiplied by 100).
\end{flushleft}
\end{table}
structure would have been more consistent with the interest of financial stability, even if the capitalisation of banks and the diversification of their portfolios suggests the risks are well-manageable.

Besides their direct exposure, banks are often indirectly involved in the financing of the New Economy. This is especially the case in bank-oriented economies, for instance through bank funding of venture capital. In this context, Table 4 confirms that banks are indeed the most important funding source of venture capital funds in Europe. By contrast, pension funds are most important in the United States. Japan takes an intermediate position. Within Europe, differences are large, with banks playing a major role in Germany, the Netherlands, Spain, Italy and Denmark and pension funds being relatively important in the United Kingdom, Finland and Sweden. Although the high risk inherent to venture capital investments makes these generically ill-suited as bank assets – given the liquid nature of bank liabilities – three considerations may put this into perspective. First, while European banks are more active on the venture capital market than American banks, their exposures are limited in terms of their total balance sheet (venture capital participations generally comprise less than 1% of total assets). Second, New Economy venture capitalists commonly limit risks through strict diversification strategies (such as capping the size of any single participation and investing in firms in different regions and stages of development). Third, in most countries, bank supervisors have imposed restrictions on banks’ financial participation in firms. Moreover, in the new Basle Accord (see Basel Committee on Banking Supervision, 2001), which is planned to become effective in 2005, risk capital is treated as a special category with higher solvency requirements (venture capital is subject to a 150% weighting).
6. CONCLUDING REMARKS

The New Economy harbours the promise of higher and more stable economic growth, without a cost in terms of inflationary risk. Alongside technological innovation, the emergence of the New Economy importantly depends on its financial aspects, since these determine the resources and incentives governing the underlying entrepreneurial initiatives. In general, while a firm’s optimal financial structure varies through its growth cycle, the ‘high risk, high return’ profile of New Economy investments (reflecting network effects, greater income uncertainty, larger upfront costs, less tangible collateral and products with a shorter life span) makes equity finance more appropriate than debt finance. By implication, the prospect of the New Economy increases the relative importance of a well-developed market for risk bearing capital, especially venture capital.

Indeed, although the New Economy is hard to define and even more difficult to capture in statistics, there is tentative empirical evidence at the macro level that the emergence of a New Economy is strongly influenced by capital market structure. In particular, countries with more market-oriented (rather than bank-based) financial systems, and with larger venture capital markets, have generally experienced a greater contribution of the ICT sector.

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### TABLE 4  Funding sources of venture capital

<table>
<thead>
<tr>
<th>Source: EVCA Yearbook, Bagyan and Freudenberg (2000)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>United States</strong> 1995-99, percentage of total</td>
</tr>
<tr>
<td>Pension funds</td>
</tr>
<tr>
<td>Corporations</td>
</tr>
<tr>
<td>Individuals and families</td>
</tr>
<tr>
<td>Endowments and foundations</td>
</tr>
<tr>
<td>Financial and insurance</td>
</tr>
<tr>
<td>Foreign investors</td>
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</tr>
</tbody>
</table>

* As of 1998.
to productivity and economic growth. From a financial stability perspective, the appropriate financial structure of New Economy investments further depends on the extent to which the associated risks may be subject to contagion. This primarily depends on the involvement of banks, again suggesting a preference for market-oriented rather than bank-based financing.

What policy conclusions can be drawn? Of course, changes in financial structure can only take place gradually, a process on which policymakers have only a limited impact. Furthermore, the fact that the development of a financial system is largely a path dependent process implies that adjustment costs may be substantial. Nonetheless, recent initiatives in the European Union to stimulate financial market integration (the Financial Services Action Plan and the Risk Capital Action Plan) should be considered important. With fewer barriers for cross-border investment, all EU member states should be able to benefit from other countries’ financial sectors. In addition, governments could do more to stimulate venture capital, for instance by reviewing the tax treatment of related investments. In the case of knowledge intensive investments, which have a public good character, there may even be a case for direct government participation. Taken together, these initiatives may be expected to help bridge the considerable New Economy gap between the United States and Europe.

Finally, as regards the agenda for future research, several extensions can be envisaged, particularly once more data on the New Economy become available. For instance, the analysis could be broadened by covering a longer sample period and a larger number of countries. Beyond this, it would also be of interest to investigate further the mechanisms underlying the correlations set out in this paper, in particular the general influence of a flexible market environment.
REFERENCES


Levine, R. (2000), ‘Bank-based or market-based financial systems: which is better?’, *mimeo*, University of Minnesota.


FIGURE A1  Relationship between contribution of ICT to growth (vertical axis) and financial structure (horizontal axis)

Financial system
Daveri (2000)

Venture capital
Daveri (2000)

High-tech venture capital
Daveri (2000)

Roeger (2001)

Correlation: 0.52
t-value: 2.4

Roeger (2001)

Correlation: 0.69
t-value: 2.8

(excl. Finland)

Van Ark (2001)

Fin

Correlation: 0.68
t-value: 2.8
(excl. Finland)

Van Ark (2001)

Fin

Correlation: 0.55
t-value: 2.0
(excl. Finland)

Van Ark (2001)

Fin

Correlation: 0.85
t-value: 4.8
(excl. Finland)
FIGURE A2  Relationship between contribution of ICT to productivity (vertical axis) and financial structure (horizontal axis)

Financial system
Roeger (2001)
Van Ark (2001)

Venture capital
Roeger (2001)
Van Ark (2001)

High-tech venture capital
Roeger (2001)
Van Ark (2001)