

# How the deficiencies of the financial system reduce spending on technological innovation and diffusion

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Paper prepared for the conference on Financial Institutions and Economic Security, sponsored by the Innovation, Knowledge, and Development Centre (IKD) of The Open University

## Introduction

This paper is in a sense complementary and parallel to Bill Lazonick's [The New Economy Business Model and the Crisis of US Capitalism]: his is concerned with the way that employment security is undermined by financial pressures at the microeconomic level; mine looks at employment security macroeconomically, as a question of sufficiency or insufficiency of aggregate demand at the level of a national economy, or even of the global economy. It is not difficult to see how financial systems can affect aggregate demand, if they affect the development and diffusion of new technology. The more is spent on this – invested in it – the higher is aggregate demand<sup>1</sup>. So this paper discusses how financial systems, broadly defined, affect such development and diffusion. It does so both for developed and developing economies: even if we are only concerned with employment security in developed economies, the determination of aggregate demand there cannot be looked at in isolation from the economic situation of developing countries. By way of convenient simplification, we shall look at innovation – the development of genuinely new technology – in developed economies, and then at diffusion – the adoption of technology already developed elsewhere – in developing economies. The conclusion for both is large the same: the financial system, broadly defined, tends to reduce aggregate demand and thus employment; and in developing countries it tends to increase capital intensity – and thus reduce employment.

## The tasks of the financial system for innovation in developed economies

Table 1: Dimensions of technological regimes and financial and corporate governance systems.

Dimension	Nature of technological regime	Requirement from finance and corporate governance system	
1	Extent of competence destruction and consequent need for reconfiguration of firm structure.	<i>Finance:</i> Availability of <b>expert</b> finance for new firms in areas affected by radical innovation	<i>CG:</i> Pressure from <b>expert</b> owners for higher value-added in such areas
2	Technological opportunity	Availability and acceptability of <b>expert</b> risk capital	
3	Low visibility/slow pay-off of innovation	Shareholder/ financier <b>engagement</b>	
4	Stakeholder spill-overs in innovation	Stakeholder <b>inclusion</b>	

Table 1 summarises what innovation requires of the financial system (right-hand column) depending on the nature of the *technological regime* in the sector or sub-sector at a given point in time (left-hand column). To summarise the summary:

- Where change tends to destroy competences rather than build on them, and where there are great technological opportunities, there is a high demand for industrial **expertise** in the financial system. There is high opportunity in high-technology sectors (though they vary greatly in competence destruction): IT hardware, software, pharmaceuticals, aerospace.
- Where the processes of innovation have low visibility and/or slow pay-off, high **engagement** by shareholders and/or financiers is required. Where there are great gains to be had through close cooperation with related firms, and strong commitment by employees, stakeholder **inclusion** is required. These characteristics tend to prevail in medium-high-technology sectors: motor vehicles, chemicals, machinery.

How do developed countries' financial systems match up to these requirements? One needs to distinguish between broad types of financial system – the 'outsider' type of the US and the UK, in which shareholders and financiers are in the main 'outsiders', relatively separate from industrial management, and the 'insider' type which prevails (or used to) in most of the rest of the world (developed and developing) in which the connection between finance and industrial management is (has been) relatively close. Both types have much variation within them – thus the US system is markedly different from the UK's. Generally speaking the US financial system is relatively strong in industrial expertise, particularly in the highly-developed sub-system of venture capital, which helps to explain its strength in most areas of high technology. The 'insider' type has even more variation. Germany's system (for example) is highly engaged and inclusive, which helps to explain its strength in the medium high-tech sectors. I have no space here to survey the diversity of financial systems. The main point to make is that it exists, and that it is an advantage for there to be a diversity of financial systems in the world, so that national (even regional) economies can specialise in the fields for which their financial system fits them (and/or develop financial systems suited to the fields in which they have specialised). As we shall see there has recently been something of a convergence on the US model, or what was thought to be the US model.

### **The deficiencies of the financial system for innovation in developed economies**

We start from the assumption that over the last two hundred years there has been a succession of 'technological revolutions', in which approximately every half-century a new 'techno-economic paradigm' has appeared. This follows the cumulation of a number of radical process innovations, leading to certain key factors of production becoming drastically cheaper than before, with clear prospects of further cheapening. A new broad trajectory of technological advance becomes apparent (Perez, 1983, 2002; Tylecote, 1992; Freeman and Louçã, 2001; and see also Schumpeter, 1939). There are great technological opportunities, which alas the existing institutions are poorly adapted to realise – foremost among them, those of finance and corporate governance. So it was when the Fordist techno-economic paradigm (which appeared in the 1910s) was succeeded by the Information and Communication Technology (ICT) techno-economic paradigm, from the late 1970s. One particular problem for financing was the shift from the hardware-based technology of Fordism to the largely-intangible technology of ICT, in which intellectual property and human capital played a much greater part.

In the response to the challenges of ICT one needs to distinguish between 'insider' and 'outsider' financial systems. The insider type, with its close connection between finance and industry, tended to reinvest the profits of established firms in their established areas. The outsider type had the advantage of being less committed to any industrial status quo: 'footloose' finance could be mobilised to take new forms (e.g. venture capital) and go into new industries. The US accordingly led in the development of venture capital (with the UK a poor second) and partly for that reason led in the development of new high-technology industries.

However the ‘footloose money’ of the outsider economies was not *obliged* to go into the sectors of the new paradigm – software, microelectronics, biotechnology – the ‘new economy’. Instead of moving vertically – up to the high-technology peaks of the economy – it could move laterally, into other economies. Thus in the second wave of French privatisation, in the 1990s, in which shares were sold on the open stock market, it was (for lack of footloose French money) the ‘usual suspects’ from the US and UK which ended up with most of them (Morin, 2000). More adventurously, it could go into developing economies, either as portfolio investment in their stocks or (more likely) as part of foreign direct investment: i.e. by buying shares in multinational firms, investors financed their overseas expansion. So new economies were an alternative to the new economy. There was something of an alternation of illusion and disillusion in each of these in turn: the LDC debt crisis in the early 80s caused disillusion over the new economies for a decade; recession and low interest rates in the early 90s drove investors back to them, rechristened ‘emerging markets’. The East Asian crisis of 1996-7 and the Russian collapse of 1998 caused fresh wariness; this partly explains the strength of the enthusiasm for the ‘new economy’ in 1998-2000. However, by this time (as Perez 2002 points out) there were all the ingredients of a new-paradigm bubble on the lines of the British railway boom of the 1840s: the new paradigm had been ‘around’ for long enough for a considerable number of new firms and some old ones to make large profits out of it, and it did need a major programme of infrastructure investment, this time in telecommunications. The insider economies were not untouched by the frenzy – for example a lot of enthusiastic new German investors invested, and lost, money in the Neuer Markt, the equivalent of the NASDAQ; but there was not so much money available.

The ‘new economy’ bubble caused deep disillusion with new technology as a route to wealth for all but the most industrially-expert investors. But it certainly did not lead to any sort of reversion (or conversion) to close engagement with industry, among the institutional investors of London and New York. For as one of them said in 2000 to Tylecote and Ramirez (2008):

Why should the analyst want to spend a lot of time trying to find out what is going on down there? [inside the firm] Why should the fund manager who has access to global markets and who has a remit to maximise the returns on his assets, bother about the company down the road? [Senior manager, Association of British Insurers, 2000, quoted in Tylecote and Ramirez 2008.]

*Global markets*: the era of globalised finance had arrived, or so, until 2008, they thought. And the quotation shows how with regard to finance, globalisation may, rightly or wrongly, be seen as an alternative to engagement. Consider the options for institutional investors, typically asset managers, managing pension fund and mutual fund money in London or New York. The engagement of a venture capitalist (or a Warren Buffett) – committing money for at least five years, and putting their own non-executive director on the firm’s board to monitor and guide management – was not something they traditionally did. At best they would put a modest fraction of their portfolio into private equity houses which behaved like this. Their traditional skill was as traders, understanding firms and stock markets just well enough to be able to buy before shares rose and sell before they fell – not always, of course, but often enough to beat the market significantly and thus justify their handsome fees. Unfortunately the London and New York markets have long been dominated by professionals like these: diamond cut diamond – such competitive trading strategies were tending towards a zero sum game for the investing community. The globalisation of finance was – or seemed – manna from heaven: if they could not make super-normal returns on the London or New York stock market, because they could only do so at the expense of others with similar expertise, they might do so by the skill with which they moved into and out of asset classes and countries. On global markets they were now competing with new rivals who lacked their advanced knowledge of innovative financial techniques.

The globalisation of the real economy offers an analogous choice of strategy for the managers of large firms. They may aim to grow through long-term new product development, spending heavily on R&D and other innovative activities. Alternatively they may play the global card - closing a factory in England, say, and opening one in China, or outsourcing to a Chinese firm; holding down wages in the factories they keep in England by threatening to switch to China. The two strategies are not mutually exclusive, but nonetheless the elaboration and implementation of each makes demands on top management's time; and so does their justification to shareholders. The latter strategy will be far more easily understood by disengaged shareholders, than the former. Indeed this shows a way in which institutional shareholders may thus augment their strategy of making money simply through skilled trading: with very little engagement they can still understand a firm's situation well enough to see that it can increase its profits by exploiting global labour markets, and may press it to do so more. They will gain from this, and so will the firms' top managers - from profit-related bonuses and stock options. The other employees, who may lose by globalisation, are unlikely to be treated as significant stakeholders in British or American firms - except where they hold shares in some way, which provides them with automatic compensation. This is 'shareholder capitalism' of the purest kind.

In many of the 'insider' economies, on the other hand, employees are key stakeholders, as are other firms with established market relationships. Germany, Japan and the Nordic countries are or have been 'stakeholder-capitalist' economies in this sense (Tylecote and Visintin, 2008). Globalisation places stakeholder-capitalist firms under stress, since profits can be increased by sacrificing domestic stakeholders for cheaper foreign employees and suppliers. As stakeholder firms have changed in the direction of shareholder capitalism, so have their shareholders. Indeed much of the change has taken the form of firms selling their stakes in other firms, and banks selling share stakes, with the shares released being taken up by American and British investors, or others with similar strategies. The most pronounced change in this direction in the 'insider' financial systems has been in France, and it is noticeable that France has also seen some decline in business-financed R&D intensity (against a rising trend in developed countries generally, reflecting the shift to intangible technology investment) (Tylecote and Visintin, 2008).

We can conclude that the financial system of developed economies has been inhibiting investment in innovation. This conclusion is consistent with the trend of spending on investment generally in developed economies, which has been strikingly low if we consider the opportunities presented by technological revolution, for innovation and subsequent diffusion. We now go on to consider the effects of the financial system - world-wide and domestic - on diffusion in developing economies.

### **The tasks and deficiencies of the financial system for diffusion in developing economies**

Switching from discussion of innovation in developed, to diffusion in developing economies, involves two over-sharp distinctions. In practice innovation shades into diffusion along a continuum, and developed economies shade into developing ones. But it is certainly true that in developing economies technological change involves much diffusion and little innovation. (Instead of 'developing' and 'developed' economies I shall refer for convenience to 'North' and 'South'). For diffusion, particularly in the South, the requirements from the financial system involve the same list of three characteristics given above - industrial expertise, engagement, stakeholder inclusion. However they should be in reverse order:

- industrial expertise is useful, but since the technologies to be diffused are well-known, it does not have to be of a high order;
- engagement with firms is most important;
- stakeholder inclusion is vital.

Engagement and inclusion need to be looked at together. What Southern firms need in the early stages of their technological development is a well-worked out *imitative* technology strategy – copying technology already used by other, likely ‘Northern’ firms, with little or no assistance from them and probably without their permission. The obvious alternative is a *dependent* technology strategy, in which technology is transferred with the full permission and assistance of a foreign firm and remains under its control. By contrast with this, success with an imitative strategy requires informed and/or patient support from shareholders (thus, engagement) and the strong inclusion of stakeholders (Liu and Tylecote, 2009). My research on the largest developing economy, China, has shown that the financial system there is generally poor in engagement and inclusion, leading to dependent strategies (Cai and Tylecote, 2008). This is most apparent in state-owned enterprises, and these defects can be assumed in SOEs in other developing countries. The subsidiaries of multinational companies will also (almost by definition) follow dependent strategies.

### **Globalised intellectual property protection and developing countries**

Stakeholder inclusion involves the sharing of the returns to technological change (and its costs) by others besides the shareholders of the firm making the change. But what of the original innovating or inventing firm? Where intellectual property protection is strong, it should get a large share of the returns, and indeed the innovation cannot be adopted without its permission, through some kind of licensing agreement. This may well block any kind of imitative strategy, or at least make it more expensive. This takes us to another consequence of late 20<sup>th</sup> century globalisation - the globalisation of intellectual property protection. This has taken place following the TRIPS agreement of 1994, and entry of a succession of developing countries to the World Trade Organisation (China, 2001-2005). The proclaimed intention is to maintain and increase the incentive to innovate, and the incentive for multinational firms to transfer their technology to developing economies through their supply chains and their subsidiaries in particular. What results is a reinforcement of the preference for dependent strategies, since imitative strategies are blocked. Dependent strategies tend to involve taking Northern technology without adaptation, while imitation gives some opportunity to adapt it to Southern ‘factor endowment’ – that is, economise on capital and use more low-skilled labour. Thus China now has an exceptionally high capital intensity, and it has been forced to maintain an artificially low rate of exchange in order to increase its exports in labour-intensive industries, and make up for the ‘jobless growth’ in the rest of the economy. And fewer firms are emerging in China and other developing countries able to contribute to real innovation as Japanese, Korean and Taiwanese firms have done.

### **Conclusion**

My main conclusion from the above arguments is that globalisation – of finance and trade – has encouraged the development of behaviour in financial systems which has

- inhibited innovation in developed countries – thus reducing the generation of employment through expenditure on innovation and the subsequent diffusion
- inhibited the adaptive, imitative, diffusion of technology in developing countries, and the subsequent development of real innovative capacity; and encouraged instead the dependent transfer of technology, a less dynamic process which increases capital intensity – again the generation of employment is reduced.

The traditional rationale for the globalisation of finance is to facilitate the flow of capital from ‘North’ to ‘South’ – and thus help to create employment where it is most needed. Ironically, the main direction of flow over the last ten years has been from South to North.

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<sup>i</sup> Of course, investment in labour-saving technology can in principle reduce the demand for labour. This is much less likely to happen in the economy as a whole (which includes the machine-making as well as the machine-using firms, and the R&D spend in both of them) than in a single machine-using firm. However it is of interest to discuss the general direction of innovation – more or less labour-saving – and I do so below.