



Schumpeter and Steindl on Growth and the Transformation to Maturity in Capitalism¹

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Abstract: Joseph Schumpeter and Josef Steindl provide distinctive contributions to the analysis of growth and development under capitalism. They each analyse the evolution of competition and use this analysis to determine the growth prospects of mature capitalism. Both reach pessimistic conclusions, although for different reasons. This paper critically examines the analysis of each author and makes suggestions for building on their work to provide a richer theory of economic growth and transformation within advanced capitalist economies.

Scientific analysis is not simply a logically consistent process that starts with some primitive notions and then adds to the stock in some straight-line fashion. It is not simply progressive discovery of some objective reality – as is, for example, discovery in the basin of the Congo. Rather it is an incessant struggle with creations of our own and our predecessors' minds and it 'progresses', if at all, in a criss-cross fashion, not as logic, but as the impact of new ideas or observations or needs, and also as the bents and temperaments of new men, dictate. (Schumpeter 1954, p. 4)

1 Introduction

In *Capitalism, Socialism and Democracy*, Joseph Schumpeter (1942 [1975]) examines the history of capitalism and discusses its future prospects. In particular, he notes the evolutionary nature of capitalism, identifying its inherent tendency to transform itself through entrepreneurial action leading to innovation. Competition is in the form of the 'perennial gale of creative destruction', in which the market-power positions of established firms are destroyed by innovators. These innovations provide an impetus for growth. However, Schumpeter worries that growth prospects of capitalism will eventually diminish because of a decline in entrepreneurial activity as capitalism becomes 'civilized'.

In *Maturity and Stagnation in American Capitalism*, Josef Steindl (1956 [1972]) analyses the evolution of the American economy in the twentieth century. He argues that industrialisation and technical progress are associated with cost differentials across firms, leading to a pattern of competition that raises industry concentration. With high concentration an industry reaches 'maturity', which inhibits further competition and reduces investment in the expansion of productive capacity, thereby impeding further growth.

In the present paper, we argue Schumpeter and Steindl each capture important aspects of the analysis of transformation as well as growth under capitalism. By growth we mean the expanded reproduction of a range of economic activities, while by transformation we mean reordering or restructuring of broadly economic phenomena, such as firms and the connections between firms in industries. In Schumpeter's analysis, innovations lead to a reordering of the

competitive positions of firms as well as providing an impetus for expansion of production. An ensuing process of creative destruction then leads to restructuring of production. In Steindl's analysis, the emergence of cost differentials is a reordering of competitive positions and the pattern of competition leads to both expansion of production and industry restructuring.

While Schumpeter and Steindl each provide a framework in which transformation can be analysed, we argue that their analyses suffer because neither the transformation to 'civilized' capitalism in Schumpeter nor the transformation to 'maturity' in Steindl is based on an adequate theory of the firm. In particular neither author deals adequately with the creation of new firms and the internal development of established firms. We identify this weakness with a tendency by both authors to attribute calculation and adjustment to the economy and to economic actions, and entrepreneurship and creativity to non-economic factors and processes. The firm straddles this boundary of economic and non-economic and so the tensions of adjusting and creating are pertinent to the firm. This is not to diminish the contributions of either Schumpeter or Steindl. By identifying and analysing the central role that innovation and competition play in growth and transformation under capitalism, Schumpeter and Steindl have pointed the way to advancing the theory of economic growth for mature capitalist economies.

We review the contributions of Schumpeter in Section 2 and Steindl in Section 3. In Section 4, we discuss their analyses in tandem, focussing in particular on how extending their treatment of the creation and internal development of firms can provide a richer theory of growth and transformation under capitalism. In conclusion there is a brief summary and suggestions for further research.

2 Schumpeter's Theory of Economic Development and the Changing Nature of Entrepreneurial Activity

We begin by contrasting Schumpeter's theory of growth and transformation with the neoclassical theory of growth. This is followed by a discussion of Schumpeter's treatment of innovation, particularly its relation to competition in the 'process of creative destruction'. The section concludes with critical observations on Schumpeter's treatment of transformation to maturity in the form, 'civilized' capitalism.

Schumpeter's view of the then current mainstream theory of growth and transformation is clearly reflected in his comments on the incipient theory of evolution in Alfred Marshall's *Principles of Economics*.

I do not think that the theory at the back of them was satisfactory. No schema can be that does not go beyond the automatic expansion of markets – an expansion not otherwise motivated than by increase of population and by saving – which then induces internal and external economies that in turn are to account for further expansion. But still it was a theory of evolution, an important development of Adam Smith's suggestions, and greatly superior to what Ricardo and Mill had to offer on the subject. (Schumpeter 1941, p. 243, italics in original)

Schumpeter clearly views incorporating population growth and capital accumulation through saving as positive steps towards an evolutionary theory of growth and transformation, but he does not think this type of 'automatic expansion'

provides the full story. He would presumably have had a similar reaction to the formalisation of this 'automatic expansion' in the Solow–Swan model (Solow 1956, 1957, Swan 1956), approving of the embellishment on the classical analysis of the stationary state but finding that it does not go far enough.

The extra element that drives growth under capitalism according to Schumpeter is clearly isolated in *The Theory of Economic Development* (Schumpeter 1934 [1961]). Here he distinguishes economic development from the circular flow of economic activity. The circular flow involves undertaking routine production and distribution activities, up to and including activities that might be considered to be 'automatic expansion'. However, for Schumpeter the main driver of growth is economic development, which from the perspective of the circular flow model involves discontinuous change in the way things are done, such as new products, new production techniques, new markets and new forms of organisation.

Development in our sense is a distinct phenomenon, entirely foreign to what may be observed in the circular flow or in the tendency towards equilibrium. It is spontaneous and discontinuous change in the channels of the flow, disturbance of equilibrium, which forever alters and displaces the equilibrium state previously existing. Our theory of development is nothing but a treatment of this phenomenon and the processes incident to it. (Schumpeter 1934 [1961], p. 64)

Economic development introduces reordering and restructuring as a mechanism operating on economic growth. Population growth and capital accumulation are identified as the prime drivers of economic growth in both classical and neoclassical economics.² Yet, these factors are unable to account for much of the growth experienced in modern capitalist economies. This missing growth, the 'Solow residual', is identified in Schumpeter's theory of economic development as the result of innovation understood as discontinuous change in the channel of the circular flow associated with economic equilibrium. Most importantly, the focus on population growth and capital accumulation limits the conception of maturation under capitalism to the transition to a steady state or to steady-state growth.

Discontinuous change occurs when 'new combinations are, as a rule, embodied, as it were, in new firms' (Schumpeter 1934 [1961], p. 66). Further, new firms depend on bank credit to be able to divert resources from the established circular flow. Although there is no suggestion that all new firms innovate, new firm formation and the extension of bank credit to these firms is a necessary condition for economic development (Schumpeter 1934 [1961], pp. 68-74). Thus, Schumpeter provides the basis for empirical application of his theory by suggesting that economic development occurs only in the presence of two observable phenomena, the formation of new firms and the extension of bank credit to them.

In a previously unpublished paper Schumpeter (1932 [2005]) expands on the special character of economic development. In particular, he clearly argues that a degree of indeterminacy must be accepted in the analysis of development. Indeterminacy is associated with novelty, where, 'Novelty changes the previously considered matter and substitutes it with another that reacts differently to changes in the data' (Schumpeter 1932 [2005], p. 113). Novelty stands in contrast to the 'norm' of the economy, where the latter is defined in the following terms:

We want to imagine all the concrete relationships of the Walrasian system as similar to a matrix whose elements will

have to be interpreted as the components of a vector. Below we summarily refer to these components as the “norm” of the economy. (Schumpeter 1932 [2005], p. 114, quotes in the original)

Development is then precisely defined as ‘*transition from one norm of the economic system to another norm in such a way that this transition cannot be decomposed into infinitesimal steps*. In other words: Steps between which there is no strictly continuous path’ (Schumpeter 1932 [2005], p. 115, italics in the original). Schumpeter goes on to argue that this absence of a continuous path means that ‘the *triad* “indeterminacy, novelty, leap” remains unconquerable’ and that ‘development is a problem not simply of facts but of our mental apparatus’ (Schumpeter 1932 [2005], p. 117, quotes and italics in the original).

Schumpeter (1947) further explains that there is special behaviour associated with discontinuous change by distinguishing between ‘creative response’ and ‘adaptive response’.

Whenever an economy or a sector of an economy adapts itself to a change in the data in the way the traditional theory describes, ... we may speak of the development as *adaptive response*. And whenever the economy or an industry or some firms in an industry do something else, something outside of the range of existing practice, we may speak of *creative response*. ... Accordingly, a study of creative response in business becomes coterminous with a study of entrepreneurship. (Schumpeter 1947, p. 150, italics in the original)

Thus, a creative response requires that actors do something outside the range of existing practice, and hence such a response can be considered as experimental and also as a means of developing data. It is just this sort of response that, in *The Theory of Economic Development*, Schumpeter (1934 [1961], pp. 74-80) associates with entrepreneurial activity and with the agent of this activity, the entrepreneur. Entrepreneurial activity is distinctive as it creates incomprehension and disruption among economic actors, and also then overcomes the resistance that invariably arises to discontinuous change. Entrepreneurs provide leadership to give direction to this process of reordering and restructuring of economic phenomena.

Schumpeter places discontinuous change and creative response at the centre of his analysis of growth under capitalism in *The Theory of Economic Development*. In *Capitalism, Socialism and Democracy*, he extends the analysis to consider the possibility for transformation to maturity of the growth process. ‘The essential point to grasp is that in dealing with capitalism we are dealing with an evolutionary process. ... Capitalism, then, is by nature a form or method of economic change and not only never is but never can be stationary’ (Schumpeter 1942 [1975], p. 82).

Central to Schumpeter’s discussion of transformation to maturity is recognition of the role played by large-scale business. Rather than associate innovation with new firms financed by bank credit, as in *The Theory of Economic Development*, Schumpeter states: ‘What we have got to accept is that it (the large-scale establishment or unit of control) has come to be the most powerful engine of that (economic) progress’ (Schumpeter 1942 [1975], p. 106, words in parentheses added). It is important to note the terminology: ‘has come to be’, which clearly indicates recognition of transformation in the process of economic development.

While Schumpeter shifts the location of innovation from new firms to large-scale enterprise, he does not change his characterisation of the behaviour associated with innovation (Langlois 1998). Entrepreneurial activity remains just as necessary to the process of introducing 'the new consumers' goods, the new methods of production or transportation, the new markets, the new forms of industrial organization' (Schumpeter 1942 [1975], p. 83). Schumpeter then addresses the question of whether the effectiveness of entrepreneurial activity is reduced by its shift to large-scale enterprise, which would impede the prospects for sustained growth.

Schumpeter argues forcefully that entrepreneurial activity is not directly impaired by the rise of large-scale enterprise. He begins with his famous discussion of the 'the process of creative destruction'. Here, dynamic competition replaces the traditional model of 'competition within a rigid pattern of invariant conditions, methods of production and forms of industrial organization' (Schumpeter 1942 [1975], p. 84). He notes that 'it becomes a matter of comparative indifference whether competition in the ordinary sense functions more or less promptly; the powerful lever that in the long run expands output and brings down prices is in any case made of other stuff' (Schumpeter 1942 [1975], p. 85).

While he does not directly address whether creative destruction strengthens or weakens with the rise of large-scale enterprise, Schumpeter is clear that the process works effectively even when, or because, firms engage in monopolistic practices. Indeed, he notes:

These units not only arise in the process of creative destruction and function in a way entirely different than the static schema, but in many cases of decisive importance they provide the necessary form to its achievement. They largely create what they exploit. Hence the usual conclusion about their influence on long-run output would be invalid even if they were genuine monopolies in the technical sense of the term. (Schumpeter 1942 [1975], p. 101)

Having established that the process of creative destruction and the success of capitalism as an engine of growth are robust to the rise of large-scale enterprise, Schumpeter nevertheless expects entrepreneurship to decline with capitalist maturity, which he discusses as the 'civilization of capitalism'. Schumpeter identifies the problem by turning his attention from economics to the 'socio-psychological *superstructure* ... and to the mentality that is characteristic of capitalist society and in particular of the bourgeois class' (Schumpeter 1942 [1975], p. 121, italics in the original). Essentially, Schumpeter sees the success of capitalism as undermining the social (and so essentially non-economic) institutions and attitudes on which its success depends. Large-scale enterprise plays an important, if indirect, role.

Since capitalist enterprise, by its very achievements, tends to automatize progress, we conclude that it tends to make itself superfluous – to break to pieces under the pressure of its own success. The perfectly bureaucratized giant industrial unit not only ousts the small or medium-sized firm and "expropriates" its owners, but in the end it also ousts the entrepreneur. (Schumpeter 1942 [1975], p. 134)

Schumpeter's explanation of the process of civilising capitalism suggests that maturity emerges, to a large extent, from the outside of economic reasoning.

A sociological perspective could be read into Schumpeter that people prefer doing bureaucratic jobs and that these roles or positions in society are held in esteem among others. Further, entrepreneurship, or simply working directly in production, manufacturing and services provision, is somehow stigmatised. The general point being that as the economy approaches maturity, economic reasoning is weakened and the economy merges into society and civilisation.³ Just as with the neoclassical growth models, there is a residual from the perspective of economic reasoning. Changes are discontinuous from the perspective of economic reasoning, such as in creative destruction. But when viewed from a sociological perspective, these changes are bound together in a continuous sense, for instance by the strictly non-economic and personal character of the entrepreneur or by the large corporation's research and development department considered as a continuing social organisation.

While Schumpeter discusses the civilisation of capitalism in the context of its socio-psychological superstructure, the transformation clearly rests on two conditions ascribed to the economy *per se*. The first condition relates to the internal development of giant industrial units, namely a tendency toward bureaucratisation. The second condition relates to the development of industry structure and its impact on entrepreneurs, namely the domination of giant firms over small- to medium-sized firms that diminishes the role of the entrepreneur.

It is reasonable to ask whether the civilisation of capitalism is underway more than sixty years after the publication of *Capitalism, Socialism and Democracy*. Here Schumpeter's conjectures fare poorly.⁴ Entrepreneurial activity remains strong in small business (see, for example, Acs and Audretsch 1990) and the examples of Bill Gates, Richard Branson and Jack Welch suggest that entrepreneurs continue to play an important role in the management of large-scale business. Indeed, William Baumol (2001) argues that the innovative performance of modern big business is miraculous.

A more fundamental criticism of the conditions that Schumpeter ascribes to civilised capitalism is that they are based on his macro-level analysis of socio-psychological superstructure of capitalism but in fact relate to the micro-level creation of new firms and the internal development of established firms and, as well, to the meso-level development of industry structure. Schumpeter's micro-level theory of the firm is not well developed, as it is largely limited to the analysis of entrepreneurial firms or their modern counterpart of large business units with bureaucratised research and development departments. Further, Schumpeter's theoretical analysis is silent on the meso level of analysis of industry development.⁵ Micro-level and meso-level analyses are necessary to examine fully the implications of macro-level phenomena, such as a change in the social position of entrepreneurs, for the functioning of the component elements of the capitalist system.⁶

Because capitalism has not necessarily yet reached maturity in the Schumpeterian sense of civilised capitalism, the evidence of continued entrepreneurial activity may not be fatal to assessing the validity of the conditions he ascribes to mature capitalism. As capitalism becomes civilised in its maturity, the rate of formation of innovative new businesses may well decline and large businesses may well become so bureaucratised that they cease entrepreneurial activity. However, without a theoretical structure that identifies the micro and meso developments associated with the transformation to maturity, Schumpeter's theory remains incomplete.⁷

3 Steindl's Theory of Maturity and Stagnation

We begin with a brief summary of Steindl's theory of maturity and stagnation from his treatise, *Maturity and Stagnation in American Capitalism* (Steindl 1952 [1976]).⁸ Following this summary is an examination of the structure of his analysis in terms of its micro-level (firms), meso-level (industries or other localised economic environments) and macro-level (aggregate economy) components. We conclude the section with some critical observations on Steindl's theory, particularly of the role of firms in his explanation.

Steindl starts with observations about competition, suggesting that competition is characterised by a tendency towards price rigidity (Steindl 1952 [1976], pp. 14-17). He also suggests that there are substantial cost differences across firms (Steindl 1952 [1976], pp. 18-37). When prices are rigid, the reordering of competitive position associated with cost-reducing innovations leads in the first instance to an increase in the gross profit margins of the innovating firms. If the level of excess capacity for the firms with lowest unit production cost is within acceptable limits, these 'progressive' firms have no incentive to cut prices. This allows high-cost firms to survive, even when these 'marginal' firms do not gain access to the cost-reducing technology (Steindl 1952 [1976], pp. 37-40).

Steindl (1952 [1976], pp. 46-8) argues that firms expand by internal accumulation; investment in new equipment for expanding production of existing product depends on the level of profit earned from prior production. Higher profits earned by progressive firms then lead to the expansion of their productive capacity relative to marginal firms, with implications for the structure of the industry. First, the progressive firms eventually become the largest firms in the industry. Second, if the number of marginal producers is constant, the industry is subject to relative concentration in the sense of a faster rate of growth and growing market share for the limited number of largest firms (Steindl, 1952 [1976], pp. 40-2). However, a sufficiently high rate of growth of industry demand can attract new entrants, who are small and relatively high-cost firms, thereby postponing the onset of relative concentration.

Most importantly, the expansion of progressive firms is a cumulative process, with investment in new capacity driving down unit costs, at least in part through technical progress embodied in new equipment. This raises the subsequent level of internal accumulation, at least as long as there is no reason for progressive firms to compete aggressively. However, as the rate of growth of industry capacity increases with rising profit rates and internal accumulation, capacity growth at some point exceeds the exogenously given rate of expansion of industry demand and unplanned capacity emerges.

Progressive firms initially react to unplanned excess capacity by engaging in aggressive price or selling competition. Marginal firms cannot match the aggressive competition owing to their smaller gross profit margins, so that they are forced to cede market share to the progressive firms. In some cases, they are bankrupted and exit the industry. The reduced gross profit margin also dissuades entry of new firms. Concentration of the industry becomes absolute in the sense that, with the decline in the number of the marginal firms, there is a decline in the total sales of small firms and a rise in the total sales of large firms (Steindl 1952 [1976], pp. 42-3).

Steindl (1952 [1976], pp. 53-5) then argues that industry maturity follows the process of absolute concentration and competition is impaired. Firms in mature

industries refrain from further aggressive competition aimed at marginal firms and limit their investment to match the rate of growth of market demand. This has implications for the aggregate economy. In particular, while further cost reductions with continued price rigidity lead to high gross profit margins, the higher net profits are not realised. The higher profits do not lead to a corresponding increase in investment and aggregate demand, so sales are depressed across the economy and in mature industries capacity utilisation drops to offset the higher gross profit margins. Thus, a bias towards the stagnation of the aggregate economy below its productive potential is a characteristic of mature capitalism, which is dominated by oligopolistic industries (Steindl 1952 [1976], pp. 127-37).

The content of Steindl's analysis clearly diverges from that of the neoclassical analysis by emphasising heterogeneity of firms and the implications of this heterogeneity for transformation of capitalism. However, his analytical categories of firms, industries and the aggregate economy correspond to those of neoclassical economics. He analyses firm behaviour at the micro level, competition among firms at the industry level and then aggregates to reach conclusions about growth for the economy as a whole at the macro level. However, his analysis is distinctive in that the industry is not only represented at a sub-aggregation level as in neoclassical analysis, but also as a meso level in which transformation occurs as well as growth. We further explore Steindl's analysis by providing a critical examination of the component elements at the micro, meso and macro levels.

We start with the micro level, where Steindl's analysis of firm pricing and investment is based on simple behavioural rules. The pricing rule is that prices are held constant as long as capacity utilisation remains equal to or above a desired level. Deviations from this rule only occur with the emergence of undesired excess capacity, after which price reductions or increases in sales effort are just sufficient to increase sales to the level of planned capacity. For investment, Steindl argues that until the industry reaches maturity firms expand capacity in their existing products at the maximum rate permitted by retained earnings with a constant gearing ratio and excluding the possibility of issuing new equity (that is, firms grow at the rate of internal accumulation). At maturity, investment is scaled back to match the growth of market demand so that undesired excess capacity is eliminated and further price reductions are unnecessary.

The meso level is the most developed component of Steindl's analysis. His 'ideal pattern of competition' comes close to the analysis of a meso trajectory as described by Kurt Dopfer *et al.* (2004). The meso trajectory involves changes at the industry or market level that interact, at the micro level, with the investment and pricing behaviour of firms and, at the macro level, with behaviour of aggregate demand.

In the ideal pattern of competition the rate of expansion of progressive firms is initially below the rate of growth of market demand, and industry concentration falls without any aggressive competition. During this stage additional small producers enter the industry in sufficient numbers to keep the profit rate of marginal producers at the norm for small business in the economy.

The second stage of the ideal pattern of competition involves increasing relative concentration without aggressive competition. The growth rate of progressive firms exceeds that of industry demand, but the lower level of internal accumulation by marginal firms means total capacity expansion for the industry is below the rate of demand growth. However, eventually, the growth rate of progressive firms exceeds the growth of industry demand to such an extent that

aggressive competition in the form of price reduction and increased sales effort is undertaken by the progressive firms to make room for their extra output. This third stage is the stage of absolute concentration.

In the analysis of the ideal pattern of competition, the intensity of competition is endogenous to the development of the industry. The intensity of competition is just sufficient to make room for the expansion of capacity by progressive firms. The driving force behind the movement through stages of competition is the acceleration of internal accumulation by progressive firms as their production cost falls owing to the combination of economies of scale and technical progress.⁹ It is only when the industry-output share of marginal firms has shrunk to insignificance that the process of concentration comes to an end and firms alter their strategy, abandoning aggressive competition and matching investment in productive capacity to the exogenously determined growth of industry demand. Thus, competition in Steindl's analysis is self-limiting.

The restructuring of the industry in Steindl's ideal pattern of competition follows directly from the reordering of firms associated with the creation of cost differentials through technical change. Thus, his analysis of dynamic competition is used to understand the process of transformation of industry structure from containing a large number of heterogeneous firms to containing a small number of relatively homogeneous firms. Cost differentials disappear in the same process that leads to concentration. In this sense, the same process that recreates order alters structure leading to a condition of industry maturity.

Steindl's macro-level analysis builds from his meso-level analysis of the ideal pattern of competition and the transformation of industries to maturity. In particular, he focusses on the implications of changes in the intensity of competition for the relation between aggregate investment and aggregate saving at various stages through the ideal pattern of competition and on to maturity. Ignoring the details of this analysis, Steindl's conclusion regarding investment behaviour is as follows.

The difference in the level of investment activity in the different stages of the secular development can thus be explained in terms of an endogenous theory, taking account of the well-known structural changes such as the development of monopoly. From the above discussion it appears likely that utilisation appears as an adverse influence on investment in the period of maturity in contrast to the earlier periods, when it did not do so, and quite probably was high enough even to contribute a positive influence on the level of investment. (Steindl 1952 [1976], p. 137)

Steindl's theory of maturity and stagnation depends critically on the shift in investment and pricing behaviour of progressive firms as the industry moves to maturity. Prior to maturity, progressive firms expand through internal accumulation, investing in their existing industry an amount proportional to their profit. If undesired excess capacity emerges, aggressive competition by the progressive firms reduces profits and makes room for their capacity by driving some marginal firms from the industry. After maturity, firms refrain from further expansion and aggressive competition when their internal accumulation would otherwise result in undesired capacity.¹⁰

Levine (1981) and Shapiro (1988) have questioned the restrictive nature of the investment strategy that Steindl posits for progressive firms. They argue that

firms, especially the progressive firms that earn differential rents in Steindl's analysis, have broader horizons than a particular product market and that new product development provides an alternative direction of expansion for a firm impeded by a limited market for established products in its original line of business. The opportunities for new product development are not limited by concentration at any level of aggregation. Indeed, these opportunities are not limited by aggregate demand of the Keynesian type. The development of new products can generate new wants that alter the propensity to consume in the economy. Also, the development of new products can lead to the premature obsolescence of existing capital stock, removing the shackles of a limited replacement demand for capital.

Harry Bloch (2000 and 2005) considers what happens to Steindl's theory if one accepts the broader horizon for the firm and considers the implications of new product development. He argues that new product development provides the potential for a reversion from mature oligopoly to competition. For example, the development of personal computers led to a reordering of the competitive position of firms and to a reversion of the computer industry worldwide from mature oligopoly to an industry experiencing bouts of aggressive competition such as would be expected for an immature industry in Steindl's ideal pattern of competition.

This implies that industry maturity and the accompanying limits on investment can be viewed as a moment in a progression that neither starts nor ends with maturity. While the notion of a cycle is probably too regular to fit the likely evolution of the pattern of competition, the stochastic nature of the outcome of efforts on new product development are such as always to leave open the possibility of reordering of competitive positions and further restructuring in any mature industry. Indeed, the shift to maturity and associated increased focus on new product development increases the probability of significant innovations that would provide the basis for a reordering and reversion to competition.

Technical change and development of the firm's product range are external to Steindl's analysis, which means that the analysis requires extension before the possibilities for reversion to competition can be properly explored. Steindl shows an awareness of the limitation of his analysis, at least in regard to technical change, when he writes in the Preface to the 1976 edition of *Maturity and Stagnation in American Capitalism*:

This kind of technological development would preferably be integrated into our economic concepts. But economists have no concepts and no measurements for technological development. We are helpless before it. It was thus a kind of instinctive movement with which I swept the whole thing under the carpet. (Steindl 1952 [1976], p. xvi)

Whatever the difficulties involved, the incorporation of technological development into Steindl's analysis would contribute to understanding the process of growth and transformation under capitalism.

4 Discussion

Schumpeter and Steindl offer distinctive theories that allow for the transformation of capitalism alongside economic growth. They both treat innovation as an integral part of the growth process, even if innovation occupies an ambiguous role with respect to their formal economic arguments. Innovation means reordering among

firms so the theories of Schumpeter and Steindl are richer than the corresponding modern classical and neoclassical theories, which treat economic growth as occurring without any change in the prevailing order of capitalism, understood as a set of social institutions, structures, routines and practices. However, the connections between innovation, economic growth and the transformation of capitalism are arguably obscure, and obscure for different reasons, in the accounts of Schumpeter and Steindl.

Schumpeter and Steindl differ from modern classical and neoclassical theories of growth by including the transformation of capitalism, both as an integral consequence of growth and as shaping future episodes of growth. Our comparison allows for further reflection along two dimensions. The first is to re-examine the explanations of the transformation of capitalism offered by Schumpeter and Steindl. Specifically, the discussion of transformation draws attention to how both authors draw boundaries around their economic and their non-economic analyses and so prompts readers to assess the status of these boundaries. The second is to revisit micro-meso-macro analysis as a basis of exploring the gaps left by both Schumpeter and Steindl, especially regarding firms.

4.1 Explanations of Economic and Social Transformation in Schumpeter and in Steindl

For classical and neoclassical growth theories, structures, institutions and agents' behavioural dispositions are unaffected by economic growth, even if growth itself leads to an evening out and then dissipation of opportunities for securing economic rents. Consequently, there is no feedback into the growth episodes that follow from changes in economic structures and institutions or changes in the habits of economic agents. The explanation of economic growth is contained within the economy, subject also to 'environmental disturbances'. The economy is indistinguishable from capitalism through the framing of the economy because the non-economic factors are necessarily orthogonal to the economy.

As argued in Section Two above, Schumpeter is consistent in his distinction between adaptive and creative responses, or between continuous and discontinuous changes. Creative responses cause discontinuities through entrepreneurship in small or in large enterprises. In abstract terms, Schumpeter presents a theoretical structure that bears similarities to the neoclassical growth theorists. Economics is represented either by a decentralised Walrasian understanding of the economy or a bureaucracy. The economy's agents can undertake rational and objective calculation or adaptation, which may be automated. Entrepreneurship or creativity is necessarily non-economic or extra-economic and so a residual factor from the perspective of the economy and adaptation. The non-economic entrepreneurship, or creative response, can gradually be reintegrated into the economy through imitation by other agents who learn to calculate that economic rents can be earned, but there needs to be a first mover. In a further manifestation of the tension between the economy and creativity or entrepreneurship, capitalism ceases to provide for the economy's growth, due to the social process of civilisation in which creativity and entrepreneurship are no longer supported, encouraged or held in esteem.

Schumpeter's discontinuities within the economy, and the attendant duality of economic and non-economic, are also fundamental to linking the economic and non-economic. However, they are difficult to apply empirically. Where are the strictly non-economic explanations of creativity and of civilisation? In abstract

terms, Schumpeter's discontinuities are from the perspective of the economic, in which adaptation implies objective calculation. As Schumpeter (1934 [1961]) argues, any actor can emerge from a functional role in an economy by adopting a creative and entrepreneurial role and so causing an economic discontinuity. But this is at the same time a non-economic continuity in which major organisational changes are made within a firm, or in which a new firm spins out from an established one. The familiar question is raised as to how a creative agent persuades other agents to switch allegiances and resources, from adaptation and calculation to creativity.

Our discussion in Section Three above implies that, for Steindl, innovation finds its instigation among an industry's firms exhibiting different costs. Also, the absence of any development of new products as maturity progresses is notable. In other words, innovation is significant and hidden among (focal) firms' inputs and production processes, and significant in being absent or even suppressed among these firms' products. Rather than entrepreneurship and creative responses being subject to the civilisation of capitalism as with Schumpeter, Steindl's potential entrepreneurs are subject to imperfect markets, in which imperfection is manifest in the emergence of different kinds of capital. Entrepreneurship may instil a sense of progressiveness among firms *per se*, but larger firms can borrow outsider funds at preferential rates. Larger firms, if progressive, can install capital machinery at greater scale, overcoming any indivisibilities. And, given outsider pressure to maintain gearing ratios, insider capital accumulates in progressive firms, tying its subsequent deployment to what managers already know, implying chronic path-dependence in further investments in capacity.

While Schumpeter claims economic discontinuities and so preserves a distance between economic and non-economic realms, Steindl introduces ambiguities and implies that there are spaces for creativity, explicitly through imperfections in capital markets.

4.2 *Recovering the Dimensions of Micro, Meso and Macro in Schumpeter and in Steindl*

Our second question of this discussion section investigates the discontinuities and gaps by referring to the emergent reasoning of micro-meso-macro analysis (Dopfer *et al.* 2004). First and foremost, micro-meso-macro introduces the question of (dis)aggregation into economic analysis. Strictly, the Walrasian model economy has no levels, only individual actors who potentially can contract with any other individual at very low cost. This provides a clue that firms, considered sociologically as continuing means of social organisation rather than economically as individual actors, are imbued with creativity, entrepreneurship and innovation. The involvement is either in the absolute sense of Schumpeter, in which the distinction of economic and non-economic is explicit, or in the hybrid, adaptive sense of Steindl, in which the distinction is implicit.

In Schumpeter (1934 [1961]) firms are both the means by which creative responses can be spun out of the economy and the temporary means of organising for developing ideas prior to the recapture of those ideas by a Walrasian economy. Entrepreneurship is arguably constant, but firms are temporal. But in Schumpeter (1942 [1975]) firms are large and continuing mega-corps in which administrators devise and operate procedures by which novel ideas can be captured quickly from research and development activities and ordered and compared as potential products. The economic and non-economic (for instance experimental) are brought

into closer proximity. The economic discontinuity in creative destruction affects other firms along with the focal firm's contemporary practices, but administrative procedures, which are ambiguously both economic and non-economic, provide connections across economic activities over time. Firms are integral in both economic growth, as administrative procedures can be developed within them to cope with comparing and ordering innovative proposals, and in the strictly non-economic civilisation of capitalism.

Steindl's firms are, as organisations, data or orthogonal factors to the competitive processes that distinguish economic growth and also economic maturity in capitalism. The industry and the market set bounds for firms, which change size within these bounds, subject to their cost differentials. However, the behaviour of firms is far from automatic.

First, Steindl distinguishes between progressive and marginal firms. The cost differentials come from somewhere and have a history, which is likely to include entrepreneurship. The firms, after all, are continuing entities. Second, Steindl provides firms with the capacity to absorb, apparently non-problematically, innovations in fixed capital, which are presumably developed by firms in other industries. In contemporary terms, firms have absorptive capacity. Third, firms of different sizes require coordinating.

Steindl emphasises external limits to the size of firms, from demand and from other firms' capacities to produce perhaps at lower cost, as well as external limits to the growth of firms through their access to external capital. The only hint of a role for managers and administration is in assumed behavioural rules, especially of maintaining a constant gearing ratio and reinvesting insider capital in the same industry. The gearing ratio is a function of imperfect capital markets and the reinvestment rule can be understood as a manifestation of chronic path-dependency as a limit on the direction of a firm's growth. There is no attempt by Steindl's firms to develop strategic marketing activities in order to fragment industry with firms seeking less intense competition through shaping niches.

Schumpeter and Steindl are both explicit in explaining the bases and consequences of competitive processes between firms in meso terms, and of economic growth subject to maturity in capitalism in macro terms. Imitation is the critical competitive process in Schumpeter, as, following creative destruction of an established order, lagging firms or entrepreneurs are able to assimilate a first-mover's ideas and subject these to calculation within the economic realm. Steindl relies on cumulative causation with progressive firms able to build on initial competitive advantage.¹¹

Maturity in capitalism in the analyses of both Schumpeter and Steindl involves a change in competition. For Schumpeter, maturity, which he refers to as the 'civilization of capitalism', involves the cessation of the process of creative destruction. For Steindl, maturity comes at the end of the ideal pattern of competition, after absolute concentration has destroyed the rationale for competition, as there are no longer any marginal producers to be squeezed out of the industry.

The civilisation of capitalism in Schumpeter is based on a macro-level analysis of socio-psychological superstructure of capitalism. This leaves the cessation of creative destruction as an exogenous influence on the micro-level internal development of firms and meso-level development of industry structure. The end of the ideal pattern of competition in Steindl's analysis results from the increasing concentration of industry implied by the ideal pattern. Thus, Steindl's analysis can be viewed as complementary to Schumpeter by providing an account

of the end to competition, which is endogenous to the economic analysis.¹² However, as noted above, Steindl's analysis is limited by treating initial cost differences as due to technical change and product development, which are exogenous to the analysis.

Combining Steindl's meso-level analysis of the ideal pattern of competition with Schumpeter's macro-level analysis would improve the theory of growth and transformation under capitalism. However, a superior approach is to develop further the micro-level analysis beyond that utilised by either Steindl or Schumpeter. An essential element is to incorporate Schumpeter's treatment of the special character of entrepreneurship, novelty or creative response into analysing the behaviour of the agents of change in either start-up firms or within large-scale established firms. Also important is extending Steindl's analysis of the internal development of firms through internal accumulation from simply focussing on the expansion of physical capacity to incorporate marketing, introduction of new products and diversification.

A micro-level analysis of the type outlined above could be combined with a macro-level analysis of the transformation of the socio-psychological superstructure of innovation and competition, as in Schumpeter, and with a meso-level analysis of the ideal pattern of competition, as in Steindl. This would provide a powerful micro-meso-macro analysis that could provide a rich theory of economic growth and transformation. Such a theory would build on the seminal contributions of Schumpeter and Steindl, while hopefully avoiding the weaknesses that are identified above.

5 Conclusion

Classical and neoclassical theories of growth suggest that as capital accumulates from a low base there is a long-run transition to a stationary state or steady-state growth. Schumpeter and Steindl provide more complex theories, in which the transformation of capitalism involves more than the transition to a stationary or steady state. In particular, each argues that capitalism transforms itself through reordering and restructuring of economic phenomena as an intrinsic element in the growth process. We argue that, with both Schumpeter and Steindl, this reordering and restructuring is bound up in the analysis of the dynamic process of competition, albeit with substantial differences in approach and emphasis.

We argue that Schumpeter's analysis is incomplete because it is carried out at the macro level of the whole economy without a corresponding micro-level analysis of firm behaviour or a meso-level analysis of industry development. We then suggest that Steindl's analysis can be complementary, at least at the meso level of analysing industry development in terms of an ideal pattern of competition.¹³ However, Steindl's micro-level analysis is limited because technical change and product development are exogenous.

We suggest dealing with the shortcomings of the analyses of Schumpeter and Steindl through improving the micro-level analysis of the firm.¹⁴ Such an analysis should contain elements identified by both Schumpeter and Steindl. In particular, Steindl has the growth and success of firms depending on their investments in plant and equipment, whereas for Schumpeter growth and success come from innovation. These are two important components for building a micro-level analysis suitable for inclusion in a theory of a capitalist system in motion and therefore capable of transformation as well as quantitative growth.

Perspectives on the firm, developed over the past ten years, offer some guidance, but also a good deal of variation, on how to connect firms with innovative development within and between industries and with capitalist development. The framework of dynamic capabilities is now well established, and refers to higher-order processes by which firms may undertake adaptations (Tece et al. 1997; Eisenhart and Martin 2000; Zollo and Winter 2002; Winter 2003). Similarly, Martha Feldman (2003) and Brian Pentland (2003) have assessed the variability and adaptability of routines and procedures within organisations. Dynamic capabilities and analyses of adaptable routines are, however, cast in the tradition of strategic management in which firms have boundaries via which they seek to exercise some degree of control and responsiveness with respect to their environments. Hence, little is learned about the (often) competitive interactions among companies in industrial settings, which is a distinguishing feature of the analyses of Schumpeter and Steindl.

Stan Metcalfe (1998, p. 27) offers more appropriate guidance to focus analysis on a unit of selection, such as 'an organizational cum technological complex: a set of instructions for translating input into output for a purpose'. In contrast, Metcalfe argues that the modern firm is foremost a unit of ownership. In a Marshallian sense, the firm's external as well as internal connections are significant, and these connections are with someone or something (Håkansson and Snehota 1989; Casson 1997; Potts 2001; Loasby 2001; White 2002).

We close by noting several developments that point toward a suitable micro-level analysis. Along these lines, Bloch and Finch (2005) suggest a meta-concept of capacity expansion that encompasses investment in plant and equipment and expenditure on innovative activity as two of several activities that firms can undertake in order to grow and succeed. Both activities are embedded in networks of other firms, such as equipment suppliers and potential investors and may require rich communication and persuasion across ownership boundaries in order to be undertaken successfully. David Levine (1981) and Nina Shapiro (1988) suggest starting from the innate purpose of the firm as expansion of wealth. Richard Nelson and Sidney Winter (1982) model innovation as arising from research and development activities with stochastic outcomes. What is essential is that the micro-level analysis focus is on growth and innovation rather than on equilibrium. Only then can the analysis be used to build on the seminal contributions of Schumpeter and Steindl to understanding capitalism as an evolving system that may or may not mature in a direction that impedes prospects for further growth.

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Notes

1 Financial support from the Australian Research Council is gratefully acknowledged. An earlier version of this paper was presented at the 19th HETSA conference held at the University of Ballarat in July 2006. The authors appreciate

helpful comments from the audience as well as from Stan Metcalfe and two anonymous referees, but take full responsibility for any remaining errors or omissions.

2 We can trace such an argument to Ricardo (1821 [1961]). It is incorporated into the more recent reflections on classical growth in Walsh and Graham (1980) and Levine (2005).

3 Such a perspective is developed among economic sociologists who have been influenced by Schumpeter (Parsons and Smelser 1956; Bottomore 1992; Shionoya 1997).

4 Indeed, the underlying conjecture, that large-scale business is superior to small business in generating innovations, which has come to be called the 'Schumpeterian hypothesis', has been largely refuted. Reflecting on research concerning the Schumpeterian hypothesis some fifty years later, Scherer (1992, p. 1430) concludes that 'Most of that research supports a conclusion that Schumpeter overstated the advantages of large, monopolistic corporations as engines of technological change'.

5 As a referee correctly notes, Schumpeter (1939) is clearly aware of the historical relevance of industry development. However, this awareness is not incorporated into his theoretical analysis.

6 This view is not shared in some contemporary strands of neo-Schumpeterian theory that completely ignore questions of firm, industry and society. Endogenous growth theories locate innovation in the outcome of optimal research and development activities (Romer 1986, 1990) and in accumulating human capital (Lucas 1988). Research and development is a set of inputs into a production process and so part of the production function. These links between research and development activity and production or market success can also be stochastic as in Nelson and Winter (1982) or Aghion and Howitt (1998).

7 We thank a referee for pointing out that the limitation of Schumpeter's analysis can be linked to his preference for a Walrasian circular-flow analysis over a Marxian reproduction schema. Analyses based on the Marxian schema, such as those of Kalecki (1971) and Kaldor (1966), can incorporate sectoral shifts associated with economic development without relying exclusively on innovation and new firms.

8 According to Steindl (1984, pp. 6-8), the inspiration for this work came to Steindl from his 'guru', Michal Kalecki, when Steindl was working with Kalecki at the Oxford Institute of Statistics during the Second World War. Kalecki speculated that the stagnation of the 1930s could have something to do with monopoly and suggested that Steindl should work on this problem. Kalecki's own analysis of modern capitalism utilises a dichotomy in competitive conditions between primary production, which he argues is competitive, and manufacturing, which he argues is characterised by imperfect competition.

9 Steindl assumes that technical advances are only available to progressive firms. Bloch (2006) considers whether each of the various types of technical change is consistent with this assumption.

10 Shapiro (1988) argues that the shift in investment behaviour occurs as an industry switches from being competitive to being oligopolistic. The role of the increase in concentration in a shift from competitive to oligopolistic behaviour is consistent with neoclassical views on the role of market structure as a determinant of firm behaviour. However, the conventional view generally only links pricing behaviour, rather than both pricing and investment behaviour, to different levels of concentration. Also in the conventional view there is no reordering and restructuring of the industry through the process of dynamic competition.

11 For an analysis of dynamic competition that mixes imitation and cumulative causation, see Downie (1958). However, Downie does not extend his analysis to discuss the transformation of capitalism.

12 As pointed out by a referee, Schumpeter refrains from attributing the decline in capitalism to a stagnationist tendency associated with the administrative processes of mega-corps. His distaste for stagnationist explanations of the decline in growth under capitalism is clearly expressed in his remarks on Keynes as the father of modern stagnationism in Schumpeter (1954, pp. 1172-3).

13 Steindl's macro-level analysis would presumably not be acceptable to Schumpeter, given the latter's strong aversion to stagnationist views of capitalist development (see Schumpeter 1942 [1975], pp. 392-8).

14 There are alternative approaches to building on the seminal contributions of Schumpeter and Steindl. For example, Baran and Sweezy (1966) emphasise the development of the private and public institutions of capitalism, while Nell (1998) builds on Schumpeterian themes using a holistic method similar to that of Schumpeter in moving among micro-, meso- and macro-level analyses.

References

- Acs, Zoltan J. and Audretsch, David B. 1990. *Innovation and Small Firms*. Cambridge, MA: MIT Press.
- Aghion, Peter and Howitt, Peter. 1998. *Endogenous Growth Theory*. Cambridge, MA: MIT Press.
- Baran, Paul and Sweezy, Paul. 1966. *Monopoly Capital*. New York: Monthly Review Press.
- Baumol, William. 2001. *The Free-market Innovation Machine*. Princeton, NJ: Princeton University Press.
- Bloch, Harry. 2000. 'Schumpeter and Steindl on the dynamics of competition', *Journal of Evolutionary Economics*, 10, pp. 343-53.
- Bloch, Harry. 2005. 'Steindl's analysis of firm growth and the tendency toward industry concentration', in Tracy Mott and Nina Shapiro (eds), *Rethinking Capitalist Development: Essays on the Economics of Josef Steindl*. London: Routledge, pp. 23-36.
- Bloch, Harry. 2006. 'Steindl on imperfect competition: the role of technical change', *Metroeconomica*, 57, pp. 286-302.
- Bloch, Harry and Finch, John. 2005. *The Growth of Firms, Competition and the Maturity of Industries*. School of Economics and Finance Working Paper 05-08, Curtin University of Technology, Perth, Australia.
- Bottomore, T. 1992. *Between Marginalism and Marxism: The Economic Sociology of Joseph A. Schumpeter*. Brighton: Harvester Wheatsheaf.
- Casson, M. 1997. *Information and Organization: A New Perspective on the Theory of the Firm*. Oxford and New York: Oxford University Press.
- Domar, Evsey. 1957. *Essays in the Theory of Economic Growth*. New York: Oxford University Press.
- Dopfer, Kurt, Foster, John and Potts, Jason. 2004. 'Micro, meso, macro', *Journal of Evolutionary Economics*, 14, pp. 263-79.
- Downie, Jack. 1958. *The Competitive Process*. London: Duckworth.
- Eisenhardt, Kathleen M. and Martin, Jeffrey A. 2000. 'Dynamic capabilities: what are they?', *Strategic Management Journal*, 21, pp. 1105-21.
- Feldman, Martha S. 2003. 'A performative perspective on stability and change in organizational routines', *Industrial and Corporate Change*, 12, pp. 727-52.

- Håkansson, Håkan and Snehota, Ivan. 1989. 'No business is an island: the network concept of business strategy', *Scandinavian Journal of Management*, 5, pp. 187-200.
- Harrod, Roy. 1948. *Toward a Dynamic Economics*. London: Macmillan.
- Kaldor, Nicholas. 1966. *Causes of the Slow Rate of Economic Growth in the United Kingdom*. Cambridge: Cambridge University Press.
- Kalecki, Michal. 1971. *Selected Essays on the Dynamics of the Capitalist Economy*. Cambridge: Cambridge University Press.
- Langlois, Richard N. 1998. 'Personal capitalism as charismatic authority: the organizational economics of a Weberian concept', *Industrial and Corporate Change*, 7, pp. 195-213.
- Levine, David P. 1981. *Economic Theory*, volume II. London: Routledge and Kegan Paul.
- Levine, David P. 2005. 'Reproduction and transformation in the theory of the market', in Tracy Mott and Nina Shapiro (eds), *Rethinking Capitalist Development: Essays on the Economics of Josef Steindl*. London: Routledge, pp. 11-22.
- Loasby, Brian J. 2001. 'Time, knowledge and evolutionary dynamics: why connections matter', *Journal of Evolutionary Economics*, 11, pp. 393-412.
- Lucas, Robert E. 1966. 'On the mechanics of economic development', *Journal of Monetary Economics*, 22, pp. 3-42.
- Marx, Karl. 1894 [1981]. *Capital, Volume 3*. Harmondsworth: Penguin.
- Metcalf, J. Stanley. 1998. *Evolutionary Economics and Creative Destruction*. London and New York: Routledge.
- Nell, Edward. 1998. *The General Theory of Transformational Growth*. Cambridge: Cambridge University Press.
- Nelson, Richard and Winter, Sidney. 1982. *An Evolutionary Theory of Economic Change*. Cambridge, MA: Harvard University Press.
- Parsons, Talcott and Smelser, Neil J. 1956. *Economy and Society. A Study in the Integration of Economic and Social Theory*. London: Routledge and Kegan Paul.
- Pentland, Brian T. 2003. 'Sequential variety in work processes', *Organization Science*, 14, pp. 528-40.
- Potts, Jason. 2001. 'Knowledge and markets', *Journal of Evolutionary Economics*, 11, pp. 413-31.
- Ricardo, David. 1821 [1961]. *The Principles of Political Economy*. London: Dent.
- Romer, Paul M. 1986. 'Increasing returns and long-run growth', *Journal of Political Economy*, 94, pp. 1002-37.
- Romer, Paul M. 1990. 'Endogenous technical change', *Journal of Political Economy*, 98, pp. S71-S102.
- Scherer, Frederic M. 1992. 'Schumpeter and plausible capitalism', *Journal of Economic Literature*, 30, pp. 1416-33.
- Schumpeter, Joseph A. 1932 [2005]. 'Development', *Journal of Economic Literature*, 43, pp. 108-20.
- Schumpeter, Joseph A. 1934 [1961]. *The Theory of Economic Development*. London: Oxford University Press.
- Schumpeter, Joseph A. 1939. *Business Cycles: A Theoretical, Historical and Statistical Analysis of the Capitalist Process*. New York: McGraw-Hill.

- Schumpeter, Joseph A. 1941. 'Alfred Marshall's Principles: a semi-centennial appraisal', *American Economic Review*, 31, pp. 236-48.
- Schumpeter, Joseph A. 1942 [1975]. *Capitalism, Socialism and Democracy*. New York: Harper and Row.
- Schumpeter, Joseph A. 1947. 'The creative response in economic history', *Journal of Economic History*, 7, pp. 149-59.
- Schumpeter, Joseph A. 1954. *History of Economic Analysis*. London: Allen and Unwin.
- Shionoya, Yuichi. 1997. *Schumpeter and the Idea of Social Science*. Cambridge: Cambridge University Press.
- Solow, Robert M. 1956. 'A contribution of the theory of economic growth', *Quarterly Journal of Economics*, 70, pp. 65-94.
- Solow, Robert M. 1957. 'Technical change and the aggregate production function', *Review of Economics and Statistics*, 39, pp. 312-20.
- Steindl, Josef. 1952 [1976]. *Maturity and Stagnation in American Capitalism*. New York: Monthly Review Press.
- Steindl, Josef. 1984. *Economic Papers: 1941-88*. London: Macmillan.
- Teece, David J., Pisano, Gary and Shuen, Amy. 1997. 'Dynamic capabilities and strategic management', *Strategic Management Journal*, 18, pp. 509-33.
- Walsh, Vivian and Gramm, Harvey. 1980. *Classical and Neoclassical Theories of General Equilibrium*. New York: Oxford University Press.
- White, Harrison C. 2002. *Markets from Networks: Socioeconomic Models of Production*. Princeton NJ and Oxford: Princeton University Press.
- Winter, Sidney G. 2003. 'Understanding dynamic capabilities', *Strategic Management Journal*, 24, pp. 991-5.
- Zollo, Maurizio and Winter, Sidney G. 2002. 'Deliberate learning and the evolution of dynamic capabilities', *Organization Science*, 13, pp. 339-51.