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SURVEY

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The dynamics of value, price and profit

This article argues that in place of the fundamentally static neoclassical concept of an economy in equilibrium, economic theory is in need of a dynamic vision of growth as a disequilibrating process which is driven by competition and the accumulation of capital. The theory of price and profit should be erected on these foundations. This was the project of classical economics, and it reached its apogee in Marx's Capital.

● Neo-Classical economics has infected every social science discipline, including my own, geography. Breaking with this conceptual universe has proven remarkably difficult, and has forced most of us at one time or another to make forays into the realm of economic theory in order to clarify basic issues.[1]. My target here is no less than the process of economic growth itself. For the geographer it is abundantly clear that what needs to be understood is, above all, industrialization of new places as capitalism expands around the globe and the deindustrialization of older places as industry shifts gears to keep in the race of the global accumulation of capital. This process cannot be understood in the terms of (neo) Classical location theory, which conceives of the distribution of economic activities as a problem of optimal spatial allocation in an exchange framework (eg Isard, 1956). What needs to be grasped is the way that industries generate places at the same time as they produce commodities and develop their productive powers, how industrialization is driven by the forces of strong competition, technical change and accomulation, and how the spatial division of labor is repeatedly uprooted by the disequilibrating forces of economic growth (Storper & Walker, 1988).

In conventional economics, prices and profits are the crucial signals guiding business behaviour, perfect competition the spur to optimal behaviour and equilibrium the state to which all

things tend. Satisfying individual consumer wants is the goal of economic activity, exchange the means to this end and efficient resource allocation the harmonious results of a properly functioning market. Technological change consists of smooth substitution within or between production functions, in response to market signals. This is thoroughly backwards. The goal of capitalism is accumulation, and the production, investment and expansion of surplus value the principal means to this end. Competition arises from the drive to accumulate and spurs capitalism to further exertions to survive and gain advantage over their fellows, and these efforts, in turn, constantly disrupt existing conditions of production. Furthermore, technological change evolves in an uneven and inconstant fashion, always keeping the production system out of joint. Equilibrium is a possibility always just out of reach, uncertainty an ever-present condition of business operation. The 'market' is a set of practical institutions for economic exchange, and prices and profits proximate guides in a rapidly shifting world of production in which there are no absolutes.

In short, what is wanted is not a theory of resource allocation via exchange, but a theory of growth based on the production of surplus value, the accumulation of capital, competition, and technological change. Growth must be understood as a fundamentally expansionary and disequilibrating process, and a theory of prices and profits erected on that foundation. This was the project of Classical economics, which reached its apex in Marx's *Capital*, before the marginalist counter-revolution drove all such disturbing issues out of economics (Pasinetti, 1981: 11-14). This paper is intended to clarify the issues and contribute in small measure to the purpose before price in economic theory.

Production and surplus-value

Neo-Classical economics *begins from the realm of exchange* and works back to production (Nell, 1972; Pasinetti, 1981). Prices are established exogenously in the market by supply and demand, responding to conditions of consumer taste and resource scarcity. Prices are the key signals for business behavior, to which production responds. Capitalists seek to maximize profits, or the difference between revenues and costs, but all 'excess' or 'deficient' profits disappear under the force of perfect competition. Profit is a residual that goes to zero at equilibrium, as firms equalize revenues and costs at the margin by making adjustments freely along their production frontiers. Capital is simply equipment, one of several factors of production, which may be bought or leased. Capital does not make profit, only a 'fair

return' for its contribution to production.

Classical theory is quite the opposite. *It begins from production*, out of which come the commodities to be exchanged. That production constitutes the wealth of nations was the great discovery of the Physiocrats and Adam Smith in the 18th century. Profits and prices are likewise produced, flowing from the technical and social relations of production. Market prices are regarded as strictly secondary variables in production and accumulation, resulting from the erratic play of short-term supply and demand.

In Classical theory, costs of production – whether called natural price (Smith), cost-price (Ricardo), or prices of production (Marx) – are the determinants of price on the average. These provide a centre of gravity around which market prices oscillate.[2] The supply of reproducible goods adjusts to long run changes in levels of demand, and average costs shift in the process if constant returns to scale do not obtain. Short-run demand fluctuations, on the other hand, have little influence on prices, even though market prices cannot be expected to coincide exactly with their centers of gravity (Farjoun & Machover, 1983: 75; Dumenil & Levy, 1987). Non-reproducible goods, which generate rents, are treated as a secondary problem – whereas neo-Classical theory made scarce goods the archetype of 'the economic problem' (Pasinetti, 1981: 16; Kalecki, 1971).

Profit in Classical economics is neither a cost nor a disappearing residual. It is *surplus* above cost, and a distributive claim on social wealth made by the owners of capital (Ricardo, 1821; Marx, 1863). The proportion of surplus retained as profits depends, in the first instance, on the relative power of workers and capitalists. Further claims are made on gross profit in the form of interest payments to financiers, dividends to shareholders, executive remunerations, rent to property owners, and taxes to governments (for an empirical treatment, see Hill, 1979). The remaining quantity is 'profit on enterprise', or net profit. Gross profit does not mean 'excess profit' and net profit does not tend towards zero (Shaikh, 1982).

Classical theory in modern form divides into two approaches, the Marxian and the Ricardian. They differ, most of all, on the centrality of labor. For Marx, the application of labor to transform nature to human ends is the fundamental human activity and starting point for human history. The latter can be understood in terms of modes of production, such as capitalism, that rest on particular combinations of forces of production and social relations under which surplus labor is extracted by a ruling class. Under capitalism, labor takes the peculiar form of wage-labour and abstract labor becomes the

measure of commodity values in a system of generalized exchange (Gleicher, 1983). The centres of gravity for market prices are provided by labor values, defined as socially necessary labor time, both direct and indirect, i.e. variable plus constant capital.[3] The origin of profit in the scheme is *surplus value*, or the difference between the value produced by labor and the cost of that labour (value of labor-power). Marxist models thus establish the cost of labor-power (the 'conventional wage') before proceeding to discuss profits and accumulation (Marglin, 1984: 118). The rate of surplus value is thought by Marxists to be substantial, both over time and across industries and countries.[4]

Ricardian theory has been revived by Piero Sraffa and his followers (Sraffa, 1960; Pasinetti, 1977). Sraffa returned to the Classical foundations of price formation, the generation of a social surplus and the priority of class distribution over prices. In such models, production appears as a technical process, or production of commodities by means of commodities, in which labor is just one among many inputs. Labor time cannot, therefore, serve as the universal measure of value; it is replaced as the 'numeraire' by a composite commodity made up of all goods that enter onto the production of every other commodity ('basic goods'). Given this numeraire and the ratio of profits to wages, one can uniquely determine all prices in the system. Concommitantly, profits are seen as deriving from surplus *output* rather than surplus *value*. As a result, labor values, and Marxian economics, are considered redundant by certain disciples, such as Ian Steedman (1977). Orthodox Marxists have countered by calling the technical equations of Sraffa a form of 'commodity fetishism' (Roosevelt, 1975) and pointing anew to the living process of labor as the central fact of human production and capitalist exploitation (Laibman, 1973-74; Walker, 1988a).

In fact, the differences have often been overdrawn. Both Marx and Ricardo considered labor values to be a good first approximation to market prices (Marx, 1863: v 3, 177-178), and in modern estimates labor costs have been shown to explain about 80% of the variance of commodity prices, across sectors and over time (Shaikh, 1984; Petrovic, 1987; Farjoun & Machover, 1983: ch 5). Further, both schools stress the determination of wage and profit rates independently of factor productivity, in contrast to neo-Classical theory. Indeed, contrary to Steedman, Sraffa was always close to Marxism.[5] Both he and Pasinetti have earnestly pursued the 'chimera' of reducing prices to dated labor. Although Sraffa abandoned the effort in the case of 'joint outputs', it appears that this technicality can be got round (Pasinetti, 1981). In any case, it is fair to say that Ricardo, as an advocate of the industrial bourgeoisie, was not concerned with

origins of profit so much as the fate of the *rate* of profit (Kregel, 1980).

The Classical economists also shared an overriding concern with economic growth. Classical value theory, it is sometimes said, is no more than Walrasian general equilibrium by another name; but this is in error. It is more accurate to call it 'general disequilibrium theory' (Dumenil and Lavy, 1987: 136). Nonetheless, much of the debate over value and price has proceeded as if the issue were primarily one of the solution to an equilibrium set of equations – demonstrating, perhaps, the grip that Walras holds over even radical economists in our time. The Ricardians have been the most remiss in failing to put 'history over equilibrium' (Bhaduri & Robinson, 1980; Harcourt, 1985). Fortunately, recent contributions from both sides have focused attention on the revival of Classical political economy as a whole, and to the centrality of production, competition, distribution and growth in economic theory (eg Pasinetti, 1981; Semmler, 1984; Semmler, 1986).

First digression: Price stability in a classical system[6]

With the revival of Classical price theory, a side-issue has arisen that threatens to become the focus of attention. Vigorous debate has broken out recently about the stability of properties of Classical models, if one drops an assumption of Walrasian equilibrium (Semmler, 1986). The issue is whether prices converge around long-run centres of gravity and profit rates equalize, if either is disrupted by market shifts, competition, etc. The difficulty of assuring such stability was first posed by Nikaido (1983). It revolves around the adjustment capacity of the economy. Again this, Dumenil and Levy (1986, 1987) argue, using computer simulations, that within reasonable parameters prices do converge on long-run norms, given three kinds of adjustment: price, quantity and capital movement. That is, inventories serve to cushion variations in markets, prices are adjusted in light of inventories and investment moves towards sectors with higher profits.

Steedman's (1984) neo-Ricardian view is that deviations from equilibrium may be exacerbated by adjustments in one sector if it is purchasing produced inputs from other sectors with radically different compositions of capital (capital-labor ratios); that is, below-normal prices can be consistent with an above-normal profit rate (see also Nell, 1983). While such situations do exist, they are not essential because *movements* of prices in the adjustment process do indeed have a straightforward effect on rates of profit (Dumenil & Levy, 1987: 153). In general the

proximate cause of profit rate disequilibrium (and price deviations) is always the ill-behaved nature of the market mechanism. No one should be surprised that the allocative mechanize can, indeed, work perversely in certain circumstances. For example, where the *mass* of profit is unbalanced, low profit rate regions of the economy can continue to grow faster than high profit rate ones (Webber, 1987). But market misbehavior is a weak reed on which to build a theory of growth or crisis.

No one claims that convergence must be obtained under any and all circumstances, and the stability debate leads directly into the long-standing issue of growth cycles and capitalist crisis, which we will not take up here (see instead Harvey, 1982). While this debate is by no means settled, the orthodox resolution suggested by Dumenil and Levy does not satisfy all the critical conditions of the Classical model, as they hope. In particular, they adopt a weak form of competition, in which capitalists make adjustments but not innovations, and do not consider the systematic disequilibrium created by accumulation and strong competition. I shall put greater emphasis on investment as the instrument of both adjustment and change in a dynamic setting of growth and price formation. All these matters receive further consideration below.

Investment and accumulation

For neo-Classical economics there is only one kind of circulation: the passing to and fro of commodities in the market. Economic life consists of the transfer of goods to maximize satisfaction and income. Capital and labor are themselves commodities, which differ only in that they are 'rented' by the day or the year; their rewards are profit (interest) and wages, paid at some rate over time. Economic growth in the neo-Classical model is a process of 'adjustment' to factor supplies, consumer preferences, savings decisions, and exogenous shifts in the production function. In the sense that expansion occurs for reasons lying outside the system, neo-Classical theory 'is no *theory* of growth at all' (Harris, 1978: 247).

The Classical economists recognized another form of circulation: that of capital. They all shared the view that economic growth revolved around the accumulation of capital (Smith, 1776; Ricardo, 1821). Capital begins as money thrown into circulation in the hope of making a profit. In Marx's clearly developed presentation, the circuit of industrial capital begins with money committed to plant and equipment; labor-power and materials are then purchased, production takes place, sale of output follows and money returns to the capitalist in the end. But the money value of capital invested has now grown by the addition of surplus value.

Marx's formula for the circuit of capital is M-C-PC'-M'. The circulation of capital is therefore at the same time the *accumulation of capital*. Capital is restless, always in motion. Surplus value is repeatedly thrown back into production in search of further surplus value. Profits are the short-term return on investment, expansion of capital (as money, capital stock and output) the long term goal. *Accumulation of capital is the driving force of capitalist production and capitalist growth*, not 'profit maximization' (Marx, 1863: ch 24). Profit-maximization is a term appropriated from neo-Classical economics. This is not to say that the profit *rate* is an uninteresting operand in the process of accumulation: high profits signal that all is well while falling profits indicate dimming prospects for accumulation. Nonetheless, the fundamental concept in growth theory is the rate of accumulation not the rate of profit (Nell, 1983: 115).

The problem of capital accumulation languished among economists in the face of the sterile equilibria of neo-classicism. The classical Marxists, such as Hilferding, Lenin and Luxemburg, kept the notion alive through their debate over imperialist expansion and crisis tendencies in the early 20th century. But in the mid-20th century, the initiative passed to the Keynesian school on the issues of finance and investment (eg Keynes, 1936; Kalecki, 1954, 1971; Robinson, 1956; cf. Marglin, 1984). In particular, the puzzle of money, which had so preoccupied Marx, was curiously let slip in favour of the 'real' economy (Harvey, 1982). In this respect, the neo-Ricardian school has been even more wedded to the technical structure of production.

A considerable debt is owed the Keynesians, in particular, for focusing attention on investment (good surveys include Kregel, 1973; Harris, 1978: ch 8; Eichner & Kregel, 1975). Several aspects of investment – emphasized by Keynesian writers, but all commensurate with Marx's treatment of capital – need to be incorporated into a satisfactory model of growth. The most well known concerns whether incomes are converted into expenditures: without *effective demand* markets will not clear at full employment levels. The incomes in question are wages, profits and taxes. Keynes' ideas have been taken up by governments making effective use of their fiscal powers of taxation and expenditure, but the larger issue concerns the behavior of workers and capitaliats. Keynesianism has made Marxists more aware of the macroeconomic effects of wage income and worker consumption, as in Sweezy's (1942) theory of 'underconsumption' or French 'regulationist' theory (Aglietta, 1977). But Keynes' own focus was on *investment demand*, and it is this that needs to be brought more forcefully into Marxist thinking (Marglin, 1984: 128). Investment is central to any theory

because vigorous capital investment is the leaven on which long upswings of economic growth rise, and overinvestment is the main pendulum that drives accumulation into the excesses that precipitate crisis (Harvey, 1982; Devine, 1980; see also Abramowitz, 1976). As a general rule, Marxists would argue that the rates of surplus value and technical change ought to determine the rates of profit, potential investment and accumulation, while Keynesian models reverse this, making the rate of investment the driver of growth and determinant of the profit rate. Neither is quite right, as we shall see.

Three other closely related functions of investment need to be considered. First, investment is a principal tool of competition (Robinson, 1956). When we say that capital 'flows' towards higher profit opportunities, we mean that investments are being made (as loans and as direct purchases). Investment is also the central lever for pursuing competitive advantage, by expanding productive capacity (adding fixed capital, labor power). Second, investment is necessary for introducing new techniques, as well as for research and development on future technologies. Investment thereby affects the rate of technical change (Kalecki, 1971: ch 15). Third, investment must be made under conditions of uncertainty – the essential unknowability of the future (Robinson, 1979: xi). No amount of 'rational expectations' can overcome this fact of economic life, which is rendered worse by the great volatility of capitalist competition and technological change. As a result, investment can more easily stagnate despite possible opportunities or overrun the real potential for profit making.

Roy Harrod (1948), among the Keynesians, tried to investigate the stability properties of the economy over the longer run. He did so by means of a one-sector (aggregate) model in which the parameters of expansion establish a 'warranted' rate of growth which investment must track. Such a device has proved very useful for investigating the disequilibrium tendencies of capitalism over time, among other things (for a review see Harris, 1978: ch 2). But it relies on population growth as the exogenous determinant of the warranted growth rate. This will not do, for three main reasons. Growth of the labour force is endogenous, in the manner elucidated by Marx's theory of 'relative surplus population'; this also limits wage demands within certain parameters set by the rate of accumulation (Marglin, 1984: 120). Technical change propells growth at a faster rate than natural increase (one cannot assume constant returns to scale) (Pasinetti, 1981: 55ff). And growth is uneven among sectors. We shall return to all three of these issues later, in an effort to go beyond Harrod's Keynesian concerns in formulating a growth theory.[7]

Keynes got no further in explaining investment demand than 'the animal spirits' of the capitalists. For Marx, on the other hand, accumulation of money, as the general form of value and power over commodities, provides the historic basis for capitalist behavior (Marx, 1863: I-132,592). Two further elements of the Classical theory of growth, to which Keynesians pay too little attention are the competitive spur put to the side of the slacking capitalist and the changing technology that offers a vessel into which investment may be poured. We shall turn to these at some length before returning to investment.

Second digression: The ill-behaved profit rate

We must take a moment to dispense with the illusion that the rate of profit – defined as the mass of profits over total capital (a flow over a stock) – guides investment activity. Although capital is invested in search of profit, the rate of profit is an unreliable regulator of investment behavior (on the empirical record, see Jorgenson, 1971). This is devastating for neo-Classical theory, for which the profit rate must be well behaved if firms are to establish optimal levels of output and mixes of inputs. Many Marxists and neo-Ricardians also see the rate of profit on enterprise as a clear signal for capitalists to shift their investments across sectors, disinvest in old plants, or move to foreign climes (e.g. Bluestone & Harrison, 1982). Yet the rate of profit (especially the market rate) is manifestly *not* a well-behaved variable.

There are, first of all, problems of calculation. There is no single way to calculate the rate of profit. Indeed, throughout the 19th century companies computed only profit margins, with investment charged as part of current operating costs! The method of determining the rate of profit on invested capital was invented in the 1920s (Chandler, 1962). Persistent difficulties still arise in handling such things as depreciation charges, inventories, joint production, variable age of capital stock, and inflation (Hill, 1979). Furthermore, businesses are forced to rely on accounting rates of return because these are the only practical data available (Hill, 1979).

Second, long run rates of profit are rendered obscure by the variability typical of short-run profits. Profits are not only cyclic but fluctuate wildly from year to year (Farjoun & Machover, 1983: 178; Capoglu, 1987: 32). How does a company find a clear trend line? The problem rests, at one level, in the fact that profits are a residual, and any change in conditions of demand, cost, currency values and so forth can have disproportionate effects on profit rates. At a deeper level, the cause lies in the shifting currents of production; with technical change the centers of gravity for prices can change radically, making for serious adjustment problems (Semmler, 1984: 31).

A third element is the reciprocal determination of profits by investment activity itself. As Kalecki said, 'workers spend what they get and capitalists get what they spend'. In other words, because investment plays a crucial role in keeping the accumulation process afloat, greater investment creates more profits. Obviously this turns neo-Classical theory on its head, and for this reason, Keynes downplayed the role of prices and price-led behavior (Kregel, 1980). The reciprocal effect also challenges neo-Ricardian theory, in which profits are determined solely by the distribution of incomes between capital and labor, not their levels of expenditure. Moreover, the mutual determination of investment and prices adds further force to the idea of investment bandwagons. The converse situation is self-reinforcing underinvestment as in Keynes' 'liquidity trap'.

These difficulties in the performance of the rate of profit as a regulator are not an obstacle for Marxist theory. Capitalists may be said to sit atop a mountain of surplus value generated by the vast production system they command. They by no means want to operate at bare-bones efficiency, even if they were able. They are content to ride the current in the stream of profits, and only notice the rocks when the level falls sharply (Farjoun & Machover, 1983). This does not mean they are indifferent to profit rates, only that the satisfactory performance of the capitalist economy does not rest fragilely on the regulatory signals of profits and prices. In other words, we must demote the profit rate from the heights it usually occupies in economic analysis.

The two faces of competition

Competition is our third fundamental force of capitalist growth, after the production and accumulation of surplus-value. Successful accumulation causes firms to grow and come into competition with one another. As this encounter is made, competition becomes a further spur to action, lest one fall beneath the feet of the herd galloping along beside (Weeks, 1981: ch 6).[8] Competition only becomes a central incentive as capitalism develops. Contrary to the myth of a golden age of 'competitive capitalism', competition was historically very poorly developed, especially across space. Capitalist development brings with it more intensified and widespread competition, to the point where the war among capitals now rages freely on a worldwide basis (Clifton, 1977). Although most Marxists since the 1930s (eg Baran & Sweezy, 1966) have seen in 'monopoly capitalism' the negation of true competition, there is a strong

current of marxist thought now in revolt against this idea (eg Weeks, 1981; Shaikh, 1980, 1982; Harvey, 1982; Wheelock, 1983; Semmler, 1984). The theory of monopoly capital focuses undue attention on the price sphere and supposed distortions of free markets, and it treats competition as a question of number of participants rather than fierceness of strategy and rate of change in the parameters of production (Weeks, 1981: 153).

There are two sides to competition, however, which have not been adequately sorted out. The *strong sense of competition* is the way capitals are pitted against one another in a struggle for survival, in which the weak perish and the successful grow even larger. It is a dynamic process in which capitalists are driven to revolutionize production to gain advantage over their fellows. The *weak sense of competition* is the way capitals jockey for advantage in markets: for market-share, for labor-power, for materials, and for money-capital.

Neo-Classical economics emasculates both senses[5] of competition. In place of the active struggle to survive it portrays firms as passive price-takers who meekly sell what they can; each is small in relation to the market, and cannot hurt its competitors even if it wanted. In place of competition of and for *capital* it stresses competition of *commodities*. Capital flows are actually irrelevant because every firm earns the same rate of profit. Smooth, homogenous production functions make for perfect adjustment, so profits cannot be out of equilibrium and no one can go out of business. Even when firms are recognized as having some size and power, in the modified version known as 'imperfect competition', their focus is price-control in commodity markets not productive change and destruction of their fellow combattants. A most uncapitalist world! This abolishes all the characteristic features of capitalist production: money, fixed capital, concentration and centralization, profit on enterprise, rivalry and collusion between firms, and even time itself (Shaikh, 1982: 78).

Weak competition and equilibration

Competition in markets has the effect of shifting labor and capital away from ineffective firms and sectors towards more efficient ones. Weak competition thus acts, in Classical models, as a regulatory mechanism for the allocation of social labor and capital, along with price and quantity adjustments (Dumenil & Levy, 1987). For competition to effect this reallocation, capital must flow from lower to higher profit industries. The circulation of capital is this mode of production's instrument for regulating social production. Circulation does not, therefore, only involve

intertemporal flows of investment in a single industry, as depicted in the previous section; it is an intersectoral process weaving together many industries (Marx, 1863: v 2, ch 21).

Prices and profit rates act as signals in the integrative / regulatory system of competition and intersectoral capital flows. The competition for capital rewards profitable firms and industries with capital to expand while denying funds to the others, causing them to run in place or even fall back. The result of weak competition is a *tendency for profit rates to equalize*. High profit areas will attract funds, creating new capacity and new competitors. Expanded output tends to lower prices, while the outlays needed to stay competitive – for larger plants, new technologies, greater marketing efforts, etc. – tend to rise. As a consequence, profit rates fall. Low profit areas will expell funds, restricting the growth of supply relative to demand, giving a lift to market prices and keeping costs in harness.

Strong competition

The stronger and more important function of competition is to drive capitalists to greater exertion to increase their rates of profit and accumulation. By gaining competitive advantage over its rivals, a firm can capture an extra measure of surplus value, or *surplus profit*. This dynamic vision of competitive 'super-profits' was emphasized by Marx in the discussion of capital accumulation (Mandel, 1975), and picked up subsequently by Joseph Schumpeter and his followers (Schumpeter, 1934, 1939). Such competition has a beneficial effect on accumulation as a whole, as other firms in the industry rush to follow the leader. If the product is a capital good, a lower price or better functioning will raise the rate of profit in sectors using it as constant capital. If it is a wage good, and its value falls, the reproduction cost of labor will decrease, and the overall rate of surplus value will increase. If the product opens up new markets and employs an additional increment of labor, more value is added to the system. Competitive advantage is usually treated by Marxists only in terms of costs, but it holds equally well for product innovations, as Schumpeter realized (cf. also Pasinetti, 1981: 68).

Capitalist competition thus has two sides, the allocative and the dynamic. The latter has very different implications for the rate of profit than the former, however. Strong competition disrupts the tendency towards equalization of profits and drives profits away from the norm: 'According to both [Marx and Schumpeter], competition has a double nature, being at the same time the tendency to give rise to extra profits and to level them out' (Bellofiore, 1985: 33-34; Farjoun & Machover, 1983: 34).

The economy is forever being thrown out of equilibrium by the efforts of capitalists to get ahead of each other. In such circumstances, equal profits are a sign that no one is innovating, that competition has come to a halt. An equilibrium state is a contradiction in terms for capitalism, synonomous not with calm but with crisis (Harvey, 1982: 389-90). *Disequilibrium is essential to capitalism*, not something introduced by exogenous shocks, as the neo-Classicals claim.

Competition cannot be reduced to a gentle jostling that smooths the profit surface like so many grains of sand; the economy does not seek a level, but persistent inequality *cum* competitive advantage. Furthermore, competitive advantage cannot be confined *within* industrial sectors, while profit rate equalization is assumed to obtain *across* sectors (eg Semmler, 1984: 36). Strong competition operates between as well as within sectors; it even operates between regions and countries. The motor of competitive advantage is change in the conditions of production. Competition leads capitalists to create new products, new machines, new divisions of labor, new methods of labor control and so forth. Because they are doing different things in different ways, some better, some worse, their profits vary, and do so systematically. We shall take this up below, but must first consider two common misconceptions of the origin of surplus profits and equalization of profits through capital mobility.

Two digressions: Perfect mobility and imperfect competition

Before proceeding, we must first cope with two paths of radical thought that branch off from the model of weak competition, and therefore skirt the central terrain on which the contest with neo-Classical and neo-Ricardian economics must be entered, that of production dynamics.

Perfect capital mobility: If money-capital were perfectly mobile and productive-capital perfectly adjustable, profit rate discrepancies would persist for no more than an instant. There would be no prospect of competitive advantage, no possibility of uneven development and no problem of 'capital switching' between declining and growing sectors, regions or countries (Harvey, 1985: ch 1). This is a neo-Classical never-never land, however. Profit rate inequalities exist because production takes place with real materials, real people, in real time and space. Perfect mobility is something capital strives for, but never achieves.

On the one hand, money capital can move about the world with great swiftness in the present age, a fact that has enormous significance for the ability of capitalists to invest in far-flung places in search of more advantageous combinations of inputs and markets, labor forces and technology, and to withdraw profits from the site of past investment. This raises the spectre of deindustrialization (Bluestone & Harrison, 1982; Martin & Rowthorn, 1986). The rapid 'global scan' of contemporary capitalists gives them new leverage over workers and communities, by increasing the effective pool of people and places competing for the blessings of capital investment (Walker & Storper, 1981). On the other hand, capital must encase itself in the straitjacket of fixed capital, in order to raise the productivity of labor. This leaves capital temporarily immobile, and makes it subject to a degree of leverage by workers, communities and governments. It may take a crisis to devalue such capital both technically and economically, so that it poses less of a barrier to disinvestment and locational change than before (Harvey, 1982). Capital immobility also involves the spatial fixity of workers and communities, and the value of labour productivity and continuity in a given place (Storper & Walker, 1983).

Thus capital is in a bind: mobility and immobility have both advantages and disadvantages. If capital has become more mobile in certain respects, it has also become increasingly encased in a frozen landscape of immense proportions, in huge industrial complexes and cities. Remaking these to suit the ever-changing needs of accumulation is a titantic endeavour, fraught with financial and political pitfalls. Capital must therefore unleash periodic gales of what Joseph Schumpeter aptly called 'creative destruction' which free up new forces of production from the embrace of the old. This process of 'modernization' can be highly disruptive to all who live through it, including capitalists. The trick, therefore, lies in maintaining a sufficient balance of mobility / immobility of capital, not just maximizing mobility and change (Harvey, 1982).

Monopoly and imperfect competition: In the theory of imperfect competition or 'monopoly capital', the concentration of capital in larger and larger firms eclipses the classic laws of competition and value (eg Baran & Sweezy, 1966; Kalecki, 1971; Bain, 1956). Competition is limited by barriers to entry and measured by industry 'concentration ratios', or shares of output markets enjoyed by a few dominant firms. Monopoly power and collusion allow big firms to set artificially high prices, and thereby generate excess profits.

In fact, empirical studies of the relation of profit rates to industry concentration ratios have made a very poor showing, with weak methodologies and abysmal regression statistics (for a good review, see Semmler, 1984: ch 4). Nor do wage shares or

capacity utilization rates show any better relation to concentration ratios (ibid: 129-131). Furthermore, concentration ratios and firm size have been shown to be chiefly a function of the capital intensity of certain mass production industries (Weston & Ornstein, 1973), while collusive price manipulations appear to be more the result of low profits than a cause of high profits (Ash & Seneca, 1976). Finally, small firms actually have similar short run profit rates to their larger brethren but their long run performance is worse because their profits are much more unstable over the business cycle (Singh & Whittington, 1968; Eatwell, 1971).

Imperfect competition, despite appearances, relies on the neo-Classical conception that competition is primarily about buying and selling commodities, price determination and the passive choice of techniques. The theory of imperfect competition is the 'dark side' of the theory of perfect competition, as Shaikh puts it. 'In perfect competition all of the tactics and strategy of real competitive battles are spirited away. Then, when faced with the unavoidable discrepancy between the fantasy world of perfect competition and the elementary facts of real competition, instead of overthrowing perfect competition orthodox theory seeks to reform it. Hence *im*perfect competition.' (Shaikh, 1980: 82)

Competition is not principally about high short-term profit rates from monopoly, but advantage from greater investment, efficiency, product quality, labor control, or good marketing (Weeks, 1981). High prices may or may not be useful to this end. Those early corporate giants who had any illusions on this score were soon disabused of them (Chandler, 1962). Monopolistic power is fundamentally hedged by the shifting ground of capitalist production. While centralization of capital is part of the normal evolution of capitalism, the key advantages of larger firm size lie in increased powers of production, more extensive marketing empires, better labor force control, diversified risks and financial clout – not monopoly power. At the same time, the growth of corporate and finance capital has intensified rather than diminished the scope of the struggle among capitals (Clifton, 1977; Harvey, 1982; Wheelock, 1983).

Uneven growth and technical change

We have so far developed a model of an economy based on surplus value, driven by capital accumulation, and agitated by strong competition. The last of the structuring forces at work in capitalist growth is the development of the forces of production, or what is usually referred to as 'technological change'. Adam Smith begins his investigation into the wealth of nations with the

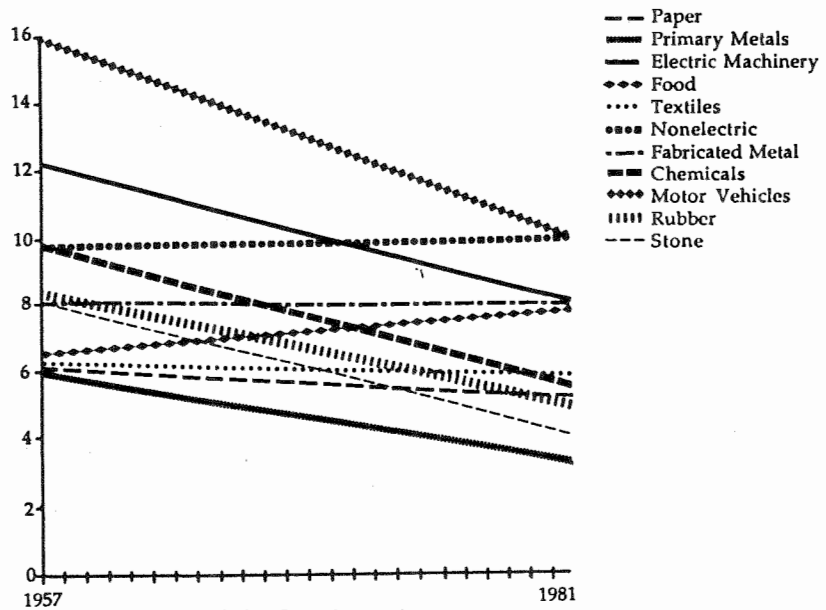
discussion of how manufacturing has raised the productivity of labor through division of labor (Smith, 1776: 3 ff). Ricardo was sidetracked by the dispute with the landed class into the dismal Malthusian concern with diminishing returns and economic stagnation – an obsession that Jevons later made into a pillar of neo-Classical economics. Marx returned to a careful analysis of technical change or the drive for relative surplus value (increasing labor productivity). But he set Smith against Ricardo by arguing that technical progress was doomed, under capitalist relations of production, to generate a falling rate of profit (Harvey, 1982; Harris, 1983). In the 20th century, mainstream economics (including Keynesianism) hardly discussed technical change at all, with the notable exception of Schumpeter (1934, 1939). Like Marx, he argued that because of the strong drive for competitive advantage, capitalism has been profoundly revolutionary of the forces of production. For Schumpeter, however, the wellspring of technical invention, science, lies mainly outside the economy. He therefore failed adequately to theorize three things: the role of learning and the importance of labor as a 'force of production'; the dynamics of investment in propelling growth and crisis; and the way industrialization is constrained and enabled by the technological structure of every industry (Walker, 1985). Later, however, Schumpeter (1943) did see science and technology as endogenous, even to the point of seeing the entrepreneurial function being displaced by bureaucratized systematic research and development. (Freeman, Clarke & Soete, 1982). Two basic aspects of technical change in the process of industrialization shall occupy us here: the uneven development of industries and the general expansive powers denoted by the phrase 'increasing returns to scale' (cf. Pasinetti, 1981: 66-71).

The history of capitalism is the history of its industries. Yet economists have given surprisingly little attention to the specifics of different industries in both micro (firm-level) and macro (national) models (but see Kalecki, 1954; Steindl, 1952). Capital accumulation and strong competition promote the adoption of new technologies and methods of extracting surplus labor, but do not determine the exact course of technical change. In short, there are 'systematic and persistent' forces at work setting the parameters of growth across industry (Nell, 1983). Industries differ systematically in a number of ways: rates of growth in output, rates of growth in productivity, rate of technical innovation, and size of research and development budgets (Chenery, 1960; Kendrick, 1961, 1973; Salter, 1966; Mansfield, 1981). Of particular importance in light of our discussion of competition and capital mobility, profit rates among sectors are persistently

unequal, with no evident tendency towards convergence (Weeks, 1981; Farjoun & Machover, 1983; Semmler, 1984; Capoglu, 1987).

Rates of profit are not random, however. Empirical studies consistently show significant relationships of profit rate differentials to productivity, capital intensity, wage costs, market share and growth of output (on industries see Schwartzman, 1959; Ornstein, 1973; on firms see Ravenscraft, 1981; Gale, 1972; for a review see Semmler, 1984: ch 4). Such differences rest on the fact that industries make different things, using different raw materials, machinery and labor processes (Walker, 1985, 1988a). Industries rest on different technical foundations that keep movements out of step with one another; they develop along *divergent trajectories* (Rosenberg, 1976; Nelson & Winter, 1982). Thus we see a succession of fast-growing 'leading sectors' such as steel in the 1880s, plastics in the 1950s, or microelectronics in the 1980s that outperform other industries (for a history, see Schumpeter, 1939). Industries grow because their products open up new worlds of useful consumption for individuals and other industries, and because they can be produced with increasing ease, lower costs and better capabilities. Other industries limp

TREND PROFIT RATES IN U.S. MANUFACTURING INDUSTRIES, 1957-1981



(After Capoglu, 1987)

along because their day in the sun has passed or has yet to come: their products are too expensive or too limited in capacity to have a large market or to be produced at a reasonable cost.

Technological progress has often been called 'dynamic economies of scale', although it includes much more than advantage of size in the strict sense; it means better machines, better designs, greater labor skills, a wider division of labor, and so on. The secret of industrialization is creating more from less. In the dynamic process of economic growth, technical change proceeds not on the basis of factor substitution in response to relative prices, as in neo-Classical models, but by leaping over existing factor constants to produce something that was not there before, in ways that were not imaginable before. While today's prices are not to be entirely gainsayed in the application of resources, nonetheless *growth pushes past the present structure of prices* to create a new fabric of production (necessary labor time, technical coefficients), on which a new set of prices will arise (Kaldor, 1961, 1972).[9]

One cannot confine industry growth and difference to technology alone, of course. Consumption patterns are not entirely reducible to technical capacities and costs of production – although 'learning by using' with new product technologies is an important part of the development of demand (Rosenberg, 1982). Changing tastes and expanding income can pull an industry forward. Then, too, wage rates are crucial to the success of industries. Per-unit wage rates *over time* depend on the dynamics of learning, labor supply and employment relations, including such things as on the job training, immigration flows and union organizing drives (Stroper & Walker, 1983). Wages are therefore dynamic over time. Because consumer demand and wage rates are not reducible to technology, the fashion garment industry does very well year after year on the basis of shifting tastes alone, while standard garments rack up profits by employing cheap immigrant labor. Silicon Valley has grown even faster than it might otherwise have done owing to the spur of military demand and the lack of unionization in the region. But for all that, the age of microelectronics has been opened up by the breakthroughs in semiconductor technology. The wage-profit split is secondary in most cases to progress in the labor process, once capital moves from the production of absolute to relative surplus value, ie once capital begins systematically to develop the forces of production (cf. Brenner, 1977). Over the long haul wages have been irresitably pushed upward by the working class in some reasonable relation to productivity advances (Kaldor, 1956). In general, growing industries can afford to pay their workers (or key segments) well, sharing some of the excess

profits that rapid accumulation brings: this has happened repeatedly, from Singer's machinists to Ford's assembly line workers to Silicon Valley engineers. This is not to say that fast-growing industries always *do* pay well; they can sometimes grow even faster by paying workers badly, as in California agriculture. Nonetheless, low wages in sectors such as garments today are fundamentally conditioned by difficulty of technical change. Cheap labour and absolute exploitation are the low road to industrialization, important principally in the early stages of capitalism; technical change and relative exploitation are the high road that most industries hit as capitalism takes hold of the forces of production.[10]

Disequilibrium growth and prices of expanded reproduction

We arrive, as is proper, to the problem of price and profit rate formation at the end of our theory of growth. But what has come before leaves prices and profits riding on very stormy seas. Taking a reading of one's position on such roiled waters requires that we find some steady points for our calculations, one relatively fixed, the other responsive to movement. As shall be seen, these two points are rates of sectoral growth and investment targetting.

Profit rate equalization and prices of production

The Classical problem of price determination has been posed in debates over Marx and Sraffa in the following static, multisectoral formulation. (Weak) competition, in moving capitals towards high profit sectors and away from low profit ones, reallocates the total surplus value available. There is a tendency to distribute surplus value according to the capital invested.[11] That is, every chunk of capital invested in industry demands its fair share of the social surplus value produced, represented roughly by an average rate of profit. In this manner prices come to 'deviate' from labor values. To deal with this, Marx, following Ricardo's lead, developed the concept of 'prices of production', defined as cost price (cost of capital and labor-power) plus profits. Prices of production are a second approximation to market prices, if you will.[12]

If we assume that profit rates settle down to equality across sectors, and that the rate of surplus value is uniform, then prices of production are the same as values only if the composition of capital is equal across all sectors; if capital / labor ratios differ across sectors, prices will not equal values. Following Sraffa's inventive solution using a 'standard commodity' everyone agrees that the problem is soluable in some form, but debate still rages

over what it all means. One thing is for sure: disaggregation, heterogeneous capital and variable capital / labor ratios explode neo-Classical capital theory, in which profits are a reward for the marginal value productivity of equipment (Harcourt, 1972; Harris, 1978). *Distribution cannot be derived from the technical conditions of production*: it depends on class relations of exploitation and conflict over who gets how much.

But the effects on the labor theory of value are highly contentious (Steedman et al, 1981; Mandel & Freeman, 1984). Steedman (1977) denounces value theory, making much of the apparent violation of Marx's precept that total values ought to equal total prices of production and total surplus value equal total profit. On the other hand, Sraffa's treatment of profits ignores the relation of profits to exploitation of workers, and leaves profit rate determination curiously ungrounded from the real development of wage levels (Laibman, 1978; Goodwin, 1986). Shaikh (1982, 1984) provides what is, to me, a convincing solution, showing that the apparent deviation of total surplus value and total profit is due to the 'loss' of value created in luxury (non-basic) goods in the calculation of prices of production. He interprets it as the expectable results of the circulation of capitalist revenues and the relative autonomy of the sphere of circulation from the sphere of production; but a simpler solution suggests itself. Profit and prices are determined by the social and technical conditions of production and reproduction: labor time, fixed capital, the wage bill, and so forth. The one part of profit that is free from such productive determination is that which goes to 'revenues', which capitalists may spend as they like without regard for reproduction of the economy (cf. Pasinetti, 1981: 152).

The dilemma of unequal profit rates

Nevertheless, for a dynamic system the traditional representation of the formulation of prices of production is inadequate. Shaikh is right to chide the neo-Ricardians for relying on a model of competition and equilibrium that is suspiciously close to neo-Classical theory (Shaikh, 1978; 1980; 1982). A glaring first-order problem with the conventional transformation is inequality of profit rates. Without equalization of profit rates there is no longer a determinate solution to the simultaneous price equations (Farjoun & Machover, 1983: ch 6; Robinson, 1977). The answer proposed by Farjoun and Machover is a purely stochastic one, that profits and prices are, beyond the level of values, random.

Values may be a good first approximation of prices, but

there remains the second order problem of allocating capital among different sectors. Prices must include some redistribution of surplus value according to capital *invested* (including depreciation and new capacity). If not, it would never pay to raise the organic composition of capital by investing in fixed capital, as no extra measure of surplus value would accrue to the sector that does so: its rate of profit would fall immediately. Capitalism would thereby be rendered static.[13]. The only way to solve the price problem is to allow for uneven profit rates generated by structural conditions of growth in different sectors.

Prices with uneven technical change

Technical change further complicates the price equations because the parts of the interrelated production system are moving in different directions. This instability of input-output coefficients creates a fiercesome 'index problem'. The ineluctable change in the products and processes of industry renders every commodity, every machine, every measure of output transient. In a sense, this makes an even stronger case for labor as the single standard of value that is invariant *over time* (Freeman, 1984; see also Walker, 1988a).

This is the approach taken by Luigi Pasinetti (1981), who constructs a model of 'structural change' in a pure industrial system on Classical foundations. Pasinetti, while closely identified with Sraffa, puts technological progress not input-output relations at the center of his model. It is still multisectoral, for the lesson of Quesnay, Marx and Leontief about heterogenous industry has been learned. But he controls for the interpretation of sector by means of a standardizing device as clever as Sraffa's standard commodity – the vertically integrated sector – which makes the entire economy *appear* as a set of mutually independent final commodity producing sectors (Pasinetti, 1981: ch 6). Every industry is then allowed a characteristic 'natural rate of growth' owing to technical change. In this Pasinetti follows the method of Harrod in establishing a 'warranted' or 'potential' growth path from which capitalism may deviate.[14] But his approach allows for many rates of growth among industries and bases them on technical change and expansion of consumer demand rather than population growth. Solving for prices in such a dynamic system of production equations requires the use of a 'dynamic standard commodity' weighted in terms of the rates of change of labor requirements of its component parts (1981: 104-106).

Pasinetti's price and profit solution has the remarkable feature of returning to a pure labor theory of value, in which the price of any commodity is the weighted sum of its constituent direct labor, indirect labor (used up constant capital), and 'hyper-indirect' labor (new fixed capital that expands productivity over time) (1981: 132). The measure of labor time is, in this case, a moving one that takes into account the rate of change in labor productivity. Pasinetti holds to the classic principle that labor is the only ultimate 'factor of production' and that the essence of technical progress in economic terms is the development of labor's productivity (1981: 132-33). Prices as pure labor values depend, however, on the restrictive assumption that profit rates are equal to sectoral rates of increase in per capita output (and consumption) (1981: 130). Profit must, in short, be equal to investment, which perfectly matches an exogenously determined rate of growth in production and demand. Pasinetti argues, in the fashion of Marx, that prices cannot be equal to values under capitalism due to the tendency for profit equalization (1981: 151). He, too, falls prey to the veil of weak competition, and in so doing abandons the central fact of uneven sectoral development from which he began. In my view, a multisectoral dynamic model such as Pasinetti's 'natural system' is the proper foundation for a valid theory of price formation. That is, the transformation from values to prices needs to take into account both different capital/labor ratios between sectors, as in the static account, and different rates of investment in new capital.

This conception of price formation corresponds to the spirit of Classical political economy. I suggest the term *prices of expanded reproduction* to capture the dynamic element. That is, centres of gravity are now set by long run conditions of uneven growth in different industries, which are determined by the real terms of production, but in way that includes change. Unit costs (and behind them, labor time) are still the foundation for price formation, but in a way that combines both levels in the present and change over time. Surplus value is still generated from labor and reallocated among industries, not just in terms of *already invested* capital and its composition, but in terms of *future* build up of production in faster- and slower-growing industries. Because of the latter, prices of reproduction are a *third approximation* to market prices.

Complications in the price calculations must necessarily arise in practice from relaxing certain simplications in the model, of course. The tendency to profit equalization created by weak competition will certainly cause measurable deviations from warranted profit rates, as capital is torn between equalizing returns on equal investments and promoting the rapid development of advanced sectors for faster accumulation. Luxury consumption from capitalist revenues will also inevitably distort

prices by a determinant amount (Pasinetti, 1981: 151), as we saw previously. The method of constructing vertically integrated sectors is a useful simplication that bumps up against the highly imperfect constitution of industries in practice, and may be questioned in terms of its correspondance to the meaningful bases on which technology develops; for example, microelectronics forms one of the most powerful angles of attack on product and productivity change today, yet cannot be meaningfully aggregated in terms of final commodities (Walker, 1988b; 1985).

I wish to make two further modifications of Pasinetti's line of thought in light of our first principles about the capitalist economy (cf Harris, 1982). Pasinetti is thoroughly Ricardian in his 'naturalization' of the economy in the name of abstracting from actual social relations. This device, while useful for isolating the forces of production, cannot be taken too far. First, he has no concept of surplus value, so wages, not profits, appear as the residual (1981: 140). While I agree that long-run wage increases are largely a product of technical progress, capitalist rates of growth across sectors or nations are affected as well as wage rates (absolute surplus value) and the resultant level of profits and reinvestible funds. All the advanced capitalist countries have developed in good measure through wringing absolute surplus value from their workers at various places and times. Favorable wage and labor conditions have to be included in the parameters of sectoral growth, not just an abstract technology. (Aggregate wages and effective demand will also be a factor in the speed and sustainability of growth (Aglietta, 1977; Harvey, 1982)).

Second, Pasinetti lacks a theory of capital circulation propelling growth. Capital accumulation consists of the expansion of real capital goods – in the hands of certain people – not a circuit beginning with money (Pasinetti, 1983). As a result, investment is a curiously passive instrument, and there are no capitalist actors. Industry simply adjusts to the exogenous conditions of 'structural change', as the crucial variables 'unfold in full view' (Harris, 1982: 41). A model of an economy growing along a golden age equilibrium path has a rarified quality that does not help us capture the mechanisms for coping with the degree of disequilibrium in the system.

Is it possible to retain the Classical scheme of prices of (re)production where any attempt to create fixed equations involves an artificial freeze-frame of a system in motion? Some post-Keynesian theorists, such as Joan Robinson and David Levine, think not (Harcourt, 1981). There is too much flux, too much uncertainty. But this converts the unknowable into the inconsequent. The difficulty is to wrestle with a system in

motion that is *structural and yet indeterminate* in its actual outcomes – a common problem in social science (Sayer, 1984). We therefore need to abandon unduly ordered models for an assessment of the more rough and ready approach that capitalists actually practice – one that confronts uncertainty and the active role of capital investment head-on.

Investment and pricing in disequilibrium

Investment and Dynamic Price-Setting

Investment plays a pivotal role in economic growth and thus in price formation. Investment has the basic function of moving capital from lower to higher profit opportunities. But it also acts as a means of unlocking competitive advantage and the growth potential in promising situations and of coping with the inherent uncertainty of competition and change. Investment is thus a key instrument in the hands of capitalists – which brings us full circle in our search for a dynamic theory of prices and profits.

The first role of investment is to realize the growth potential of various industries. Recall that in Pasinetti's model the condition of stable growth is that investment enlarge productive capacity at a rate consistent with the underlying warranted rate of expansion in each sector. In this view, the growth trajectory sets the rate at which a sector absorbs profitable investment – empirically, a very reasonable starting point (Jorgenson, 1971). The real growth rate thus becomes the rate of accumulation of capital.[15] We require, of course, means by which such an outcome may be arrived at, such as adjustment of investment plans in light of the utilization rate of fixed capital (Dumenil & Levy, 1986; Jorgenson, 1971). But even a dynamic adjustment model is not sufficient, for it assumes that investment does all the adjustment and the rate of technical change is exogenous and known.

Investment has a more forceful role to play than adding capacity according to known specifications, however: *an industry's growth potential must be actively unlocked by investment.* Much has been said about the process of 'learning by doing' through experimentation, problem-solving and experience in production (Rosenberg, 1976; David, 1975). This idea has been used to attack the simple notion of technical change as 'embodied' in fixed capital. Nonetheless, learning and technical change in dynamic industries are never particularly 'disembodied,' either, because they must be backed up by resources, labor and fixed capital, in a continual interaction between investment and innovation. In short, the rate of technical change (or 'warranted growth rate', in general) is *not* known or ever

knowable beforehand. Such an assumption makes an insupportable division between technical invention and industrial practice.[16]

Investment rates are thus not established unambiguously by conditions of sectoral growth and technical change, even though they are certainly *structured* by the underlying long-run conditions of particular technologies and their potentials. Computers are, after all, not shoes. Pasinetti's neo-Ricardian theory shares unwarranted assumptions of exogenous technological change and knowledge aforethought with Schumpeter and the neo-Classicals. Schumpeter treated 'invention' as the fount of economic growth, but had it triggered by developments in science and engineering lying outside the ambit of the economy, from whence it was introduced by entrepreneurial capital. Growth cycles rise and fall entirely on the basis of clusters of innovations (Mensch, 1979). Neo-Classical models assume that production functions present a well ordered menu of alternative techniques among which one can choose, and that this choice can be extended to future techniques in terms of rational expectations and investment in R&D. Neither approach is sustainable (Freeman et al, 1982; Nelson & Winter, 1982: 195-205; Walker, 1985).

Once again, there is *no Archimedean point* from which all else follows, whether it be labor time, technical coefficients or growth rates. Capitalism is, after all, an imperfect system of organizing production that unleashes a torrent of unforeseen change, and should be modeled as such. Allowance must be made not only for random fluctuations in supply and demand, as in stability models, but for anticipating and creating the future course of a dynamic industrial economy. There must therefore be a degree or freedom for investment in our model. Investment acts as leaven in the process of growth, not merely in terms of aggregate spending (investment demand) – as in Keynesian theory – but also in terms of developing the forces of production. But I do not allow investment the liberties accorded it by most post-Keynesians (eg Robinson, 1962: 82-83). In Keynesian theory the conditions of production are little considered, or treated as exceedingly pliable (for further discussion see Harris, 1978: ch 8).[17] Investment has to reverberate off the structure of production, which it cannot create out of whole cloth.

Uncertainty and Investment Targeting

Capitalist growth is structured along the contours of its varying industries, but at the level of the agents, parameters are uncertain. Capitalists operate in the dusk, if not in the dark. They have some sense of the potential for profitable investment,

given past performance. But they cannot treat existing profit rates and prices as infallible guides because where disequilibrium and change are rife, it is impossible to know what the future may bring. Instead they require flexibility in determining prices and output, as in adjustment models. More than this, they actively *use profit and price as means to an end*: an effective investment strategy that may lead to competitive advantage and growth in a dynamic environment,

The Keynesian theory of investment has the virtue of treating uncertainty in investment and pricing very seriously. For the same reason, however, post-Keynesians have not been warm towards the Classical theory of production prices as centers of gravity because of what this seems to imply about known parameters. They have instead emphasized pragmatic 'rules of thumb' in the way capitalists actually establish prices. Kalecki (1971) argued that prices are simply conventional mark-ups over unit costs, which depend on monopoly power (Kalecki, 1971). Alfred Eichner (1976, 1980) has gone beyond this imperfect competition model to portray mark-ups as a practical means of generating funds in a dynamic setting. In his model, investment precedes price setting and profit determination. A level of investment is chosen that requires commensurate capital funds. Such funds are raised internally through profits. Prices are 'targeted' at a level sufficient to generate the profits needed to finance the desired flow of investment (see also Kenyon, 1979).

Investment targeting needs to be anchored to the long-run growth trajectories of different sectors, however, and not left free-floating according to the spirits of various capitalists. Gokhan Capoglu (1987) has shown that industry prices can be estimated closely as a function of costs plus unit profits, where unit profits are explained in terms of investment levels. Investment, in turn, is a function of industry growth rates (Jorgenson, 1971; Clark, 1979).[18] In other words, capitalists generate characteristic growth rates for their industries by adjusting price and quantity expansion through their investment policies. High prices (relative to unit costs) allow fast-growing sectors to generate extra funds for expansion, while in declining sectors low prices undercut competitors and keep out new investments. This implies a greater degree of coordination among price, quantity and capacity variables over the medium to long-run than in the supply-demand adjustment models discussed previously. Investment targeting also works to allocate capital across sectors in relation to unequal growth rates. External funds (loan capital) can be attracted and repaid by this method.[19]

Giving capitalists a measure of control over prices and profits accords with reality, and further reduces the independent

role of 'markets' in setting the parameters of production (cf. Walker, 1988b). Business practice has been added to production conditions as the real basis of exchange. Contrary to neo-Classical theory, in which prices hem in producers, prices have a good deal of play in a dynamic setting. Elevating price to increase investment, for example, does not immediately dampen demand by cutting painfully into consumer incomes or the profits of firms. This is clearly so where technical change is causing the price of a product to fall, and the question is only one of keeping prices relatively elevated with respect to falling unit costs. Growing industries always create their own market through the attractiveness of new or improved products, as well. Businesses and individuals are willing to pay a premium for commodities that have a special payoff in usefulness. Furthermore, as a product becomes integrated into the processes and products of other industries, or the infrastructure of everyday life, the elasticity of demand decreases. The result is that firms usually operate in the inelastic portion of demand curves (Koutsoyiannis, 1984).

Divergent industry growth paths provide a structure around which disequilibrium growth occurs, and prices and profit rates must be established that bear some relationship to the underlying conditions of growth in various industries. Yet because investment has a measure of causal force, such divergent growth rates are not absolutely 'warranted' by exogenous forces. There is, of course, no presumption of a perfect fit between investment activity and the growth potential of industries. Discovering that potential is a problem to be solved by capital, and is always solved imperfectly, even badly. There can be too much investment in an industry and or the economy as a whole, leading to a crisis of overinvestment. There can also be a misallocation of funds among sectors, so that fast-growing industries are starved for funds and slow-growing ones glutted. That is, 'microeconomic behaviour is not in accord with the macroeconomic constraints imposed by the structure of the system' (Harcourt, 1981: 50). General convergence around long run centers of gravity, or warranted growth sectoral rates, does not imply stability (Dumenil & Levy, 1987).[20]

Price Targeting and Prices of Reproduction

The imperfections and 'agency' of price targeting might appear to abolish the need to have recourse to prices of reproduction. But this is no more true for targeted prices than for the wobbling of market prices set by supply and demand in Classical models. Investment in such models acts simply as a

means of adjustment to other circumstances. I have introduced a different source of imperfections in the alignment of actual prices with prices of reproduction, which is the uncertainty and anarchy under which capitalists operate. These might be called *practical prices of reproduction*. I also allow for long-run change in the centers of gravity themselves, due to the actions of capitalists. While the Classical formulation allows for changes in market conditions affecting centers of gravity in the long run, and the warranted growth path model makes the uneven shift in sectoral centres of gravity a persistent aspect of the economy, in both cases investment follows the 'real' determinants of growth. In the present model, long run costs change according to the *endogenous* impetus to growth from the expansion or contraction of investment (and learning by doing). Demand levels are also affected by the buoyancy of investment (and learning by using). The investment rate is treated as having an independent (if secondary) influence on growth. I thereby let Keynes into the house of Classicism by the back door – a door opened by Marx in his analysis of the circuit of industrial capital.

There is nothing elegant about price determination in this environment of competition, dynamism and disequilibrium: no exact transformation from values to prices, no well-behaved profit rates, no certainty that investment will pay off. Yet still capitalism functions, in its imperfect way. The trick is in capturing the essentials of a complex and messy industrial system that is changing over time. The solution does not lie in tidy mathematical equations that make too many restrictive assumptions, in stopping time, in probabilistic models, or allowing excessive scope for subjective behaviour. It lies in joining together enough facets of the capitalist economy as we know it to create a suitably supple account of how the system works.

Conclusion

Our discussion opened with critical remarks on the neo-Classical, or exchange, theory of the economy and its obsession with marginal matters. We have seen that prices and profit rates can be returned to the secondary position they once held in Classical political economy: revolving around conditions of production and long term reproduction. They still hinge on the allocation of social labor and of capital to different industries, but now according to evolving sectoral technologies and rates of accumulation. Furthermore, practical price determination requires the action of capitalists probing an uncertain future. By thus freeing ourselves from the grip of neo-Classical price theory,

we may return to questions of industrialization in time and place with a clear mind. This was my original purpose.

I have tried to present the case for a Classical theory of production and growth in an undivisive way, without remaining merely eclectic. We need to bridge some of the chasms that divide left economic theorists, in the spirit of the 'revival of Classical political economy' now in process, through constructive dialogue among the Marxian, Ricardian and Keynesian traditons. Sraffa and neo-Ricardians have reasserted the importance of putting production and distribution before price, and of the unity of production and consumption in an input-output system. Keynes and the post-Keynesians have insisted on the significance of investment in the accumulation of capital and of uncertainty about the future of business behavior. Other threads of the Classical heritage have also been recovered, with the help of Pasinetti and Schumpeter: the priority of change over fixity, of strong over weak competition, and of disequilibrium over profit equalization, and of technological change over distribution in the evolution of industrialization.

In the end, however, I still believe that Marxian theory provides the most thoroughgoing set of categries with which to approach the capitalist economy and its expansion. I do not read Pasinetti as a vindication of Ricardo nor Robinson of Keynes, brilliant though their insights have been. This paper should not be misread as 'arriving' at the conclusion that either technical change or investment is the answer to the price question. On the contrary, I have sought to build out a well-rounded model from the foundations laid down by Marx (though one could surely take all of this much farther). To reiterate, the theory of value grounds prices in the conditions of production, and particularly in the central fact of social labour for human industry. The theory of surplus value explains the origin of profits as a surplus gleened from social labor, and removes any illusions about zero profit margins; efficiency is secondary to exploitation among the functions of the capitalist class. The theory of accumulation make it clear that this is a system always in motion, for which equilibrium is anathema. The theory of circulation shows the way capital flows through the hands of capitalists as investment and back again. The theory of competition provides a specific mechanism for the urgency with which capitalists seek out new sources of surplus value. The theory of technical change (and relative surplus value) introduces the transformative power of industrialization, as capitalism unleashes the forces of production. Marx's theory of capital still offers the soundest approach to economic growth and decline in the contemporary capitalist world.

Notes

1. I would like to thank Gokhan Capoglu, Michael Storper and Donald Harris (unbeknownst to him) for guiding me along the line of thought developed in this paper. Thanks also to Shaun Hargreaves-Heap and Jane Wheelock for their editorial comments.

2. Unit costs have an unambiguous effect on prices in every empirical study. For an excellent discussion of the Classical center of gravity concept, and review of the empirical literature on price determination, see Semmler (1984), especially chapter 2 and pp 69-76. It is doubtful that Keynes returned to a Classical formula of price based primarily on costs, despite Robinson (1979: xix; also Harcourt, 1981).

3. For a well-reasoned argument as to why labor is the best measure of value, see Farjoun and Machover (1983: ch 4).

4. Farjoun and Machover's (1983: 180-81) estimates put it very close to 2/1, which was always Marx's working approximation, but their very rough measure of value added over wages is suspect. See also (Amsden, 1981).

5. Joan Robinson has observed that 'Piero [Sraffa] has always stuck close to pure, unadulterated Marx and views my amendments with suspicion' (Robinson, 1977: 56n).

6. The reader can pass over this section and subsequent digressions without losing the thread. Such 'digressions' are not a product of my wandering mind, however, but of real issues which have sent the debate on value, price and profit down side paths.

7. Steve Marglin (1984) has lately used a one-sector model in an effort to reconcile the Marxian emphasis on surplus value (interpreted loosely as the priority of the wage rate) and the Keynesian emphasis on investment demand in determining rates of profit and growth. The union is achieved by recourse to the rate of inflation as a critical mediator between the demands of workers for wage-increases and of capitalists for investment funds (accumulation). This is a very suggestive line of reasoning, which allows for the 'veil of money' to play an independent role in the class struggle over distribution. But I must persist in excluding money from the discussion here.

8. Many marxists reverse things by arguing that competition creates the drive to accumulate, basing their argument on a single line from Marx (1967: I-592) and missing the larger argument of Volume 1 about the rise of money and drive to accumulate capital.

9. Robinson (1979: xiv) was right to chide Sraffa for getting bogged down in the 'reswitching' of techniques. Puzzles as to which technique to choose at different wage-rates pale before the dynamics of growth (also Pasinetti, 1981: 188-98). Sraffa's wrong turn took him right back toward Marshall (see Sraffa, 1926).

10. Sraffa's formulation of price equation allows a misleading degree of freedom to wage and profit variation, compared with either the Marxian or Keynesian (Robinson, 1977).

11. The capital intensity of an industry (capital to output ratio) may or may not reflect the physical composition of capital, or degree of mechanization, as Pasinetti makes clear (1981: 181-88). Marx implies that development of the latter implies growth of the former, but, as is well known, such 'counter-tendencies' as the declining cost of capital goods

renders the long-term movement rather neutral (Harris, 1983). Leontief fell into the same trap as Marx in posing his famous 'paradox' of international trade (Pasinetti, op. cit.).

12. Estimating prices by moving from a base of values and adding levels of causality, or by moving from the abstract to the concrete, is part of Marx's method (Shaikh, 1982: 70). I consider four layers of determination in this paper: labor-time, capital invested, rate of growth and investment under uncertainty. I do not deal with price-value deviations caused by rent (Walker, 1975; Barnes, 1988).

13. We cannot therefore dismiss the formation of prices of production as a purely distributional attribute of capitalist social relations, with no effect on allocative efficiency, as Weeks (1981) does.

14. The composite represents a sort of 'super golden age' equilibrium growth path (Harris, 1982). We are not concerned here with deviations from such norms, on which Pasinetti takes a Keynesian view of the unlikelihood of full-employment equilibria being realized (see 1981: ch 10). Edward Nell puts it thus: 'What the systematic and persistent forces determine, then, is the rate of accumulation ... All that is necessary, in this view, is to redefine the long-period method with the rate of growth playing the role formerly assigned to the rate of profit' (Nell, 19832: 115).

15. The rate of accumulation combines both rate of turnover and mass of capital. A sector with high profit may not be able to absorb much investment due to a limited growth rate (Nell, 1983: 114).

16. This error, which is very widespread, can be traced back to Schumpeter (see Walker, 1985).

17. I recall this clearly from a course taken from Joan Robinson at Stanford in 1969, although most of what that brilliant woman said was beyond my ken at the time!

18. Capoglu achieves very high regression coefficients, better than Eichner's (1976), using a similar equation for prices (p = f [cost + investment]) but explaining investment in real terms.

19. The role of credit in raising funds varies across countries. In the US, industrial corporations have long preferred to generate funds internally, keeping the ratio of investments to internal funds (I/IF) close to 1.0 across all industries (Capoglu, 1987). (Internal Funds (IF) defined net of dividend payments). Equity financing is only about 2% of new capital funds raised each year in the US. In Japan and Germany, on the other hand, external funding by banks is much greater, and I/IF is lower – about ⅔ in Japan, ⅘ in Germany. The test of the model depends only on the variance of industries around the national average: faster growing industries and firms manifest relatively lower I/IF ratios (greater borrowing), and vice versa.

Disparate national borrowing practices rest on long-standing institutional relations between banks and industrial companies. German and Japanese industrialists have very close ties to banks, including common holding companies; this encourages them to risk high leverage financing because they expect the bank to bail them out owing to its greater loan exposure and 'special relationship' to that one company (Economist, 1986). US industry remains much more independent of the banks, borrowing from many banks and having special relations with none. Bank regulation and anti-trust enforcements have helped prevent cosier relations.

20. Interlocking sectors raises the added problem of maintaining proportionality where industries are moving at different speeds. If industries do not mesh as they grow, there will be a grinding of gears in industrial expansion, with shortages of some intermediate goods and glut of others (Marx, 1863: II-495; Mandel, 1975; see also Hawkins, 1948). Pasinetti (1981) drives the point home by showing that every possible equilibrium is immediately upset by the uneven development of industries. The uncertainty problem facing capitalists is thus compounded by the fact that the variable potentials of different sectors must be unlocked at rates that maintain technical proportionality in growth.

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