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2003

Online at <http://mpra.ub.uni-muenchen.de/5586/>

MPRA Paper No. 5586, posted 4. November 2007

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Abstract

This paper constructs a theoretical framework for understanding what happens when markets break down. It argues that when this happens, the ‘invisible hand becomes visible’ and conscious agencies (classes, states, governments, etc) intervene in the economy. ‘External Intervention’ into the market is thus not an imposition on the market but a product of the market.

The paper grapples with what is arguably the most basic question in economics: are breakdown and recovery endogenous or exogenous? Do markets fall or are they pushed? Conversely, do they mend themselves, or does someone have to stick them back together?

The primary ‘finding’ of all dominant economic theories is that the market works: that breakdown is exogenous and recovery is endogenous.

I show that this finding arises from the shared starting point of these theories, the equilibrium or comparative static paradigm. This is equivalent to assuming that, the market works so perfectly that nothing needs to change.

It then becomes impossible to deduce endogenous market failure. This why is one of the primary shortcomings of mainstream economic theory is its inability to two-way causal links between political institutions and the market.

Prepublication version of: ‘When things go wrong: the Political Economy of Market Breakdown’ in Westra, R and Alan Zuege (Eds) (2003) *Value and the World Economy Today: Production, Finance and Globalization*, pp91-118. London:MacMillan, ISBN: 1 40390 002 7

Keywords: Divergence; stagnation; World Economy; Kondratieff; Development; Europe; US; value; price; TSSI; temporalism; profit rate; polarisation; inequality; globalisation; deregulation; imperialism; World Systems Theory; unequal exchange; dependency; North-South

When things go wrong

the political economy of market breakdown

Political Economy is when people ask themselves why they have no money

– Kurt Tucholsky

1 WHY THINGS GO WRONG: THE NEED FOR A THEORY OF MARKET BREAKDOWN

In this paper, I ask what happens when markets break down. I aim to show that the answer which any theory gives to this question depends on its implicit, or explicit, concept of value.

I begin with arguably the most basic question in economics: are breakdown and recovery endogenous or exogenous? Do markets fall or are they pushed? Conversely, do they mend themselves, or does someone have to stick them back together?

If markets can in fact go wrong of their own accord, and if there are circumstances in which they cannot correct themselves, then most modern policy nostrums are open to question: for example, that deregulation improves efficiency, that no-one loses from free trade, or that optimal growth depends on the free movement of capital. And since modern globalisation is virtually identical to the extension of the market, it leads one legitimately to ask whether globalisation itself has intrinsic limits.

The primary ‘finding’ of all dominant economic theories is that the market works. This rarely appears so crudely as the statement that it is infallible. Instead, such theories predict that it fails only when not permitted to work properly, and that it will always correct itself, left to its own devices: that is, breakdown is exogenous and recovery is endogenous.

I will show that this finding arises from the shared starting point of these theories, the *equilibrium* or comparative static paradigm.¹ The variables of which they speak are assumed, for the purpose of calculating them, to be constant. This is only possible if, and is equivalent to assuming that, the market works so perfectly that nothing needs to change.

This is not a neutral assumption. I will show that it makes it impossible to deduce endogenous market failure. To put it another way: if in fact, markets do fail of their own accord, equilibrium theories are intrinsically incapable of knowing, because they will always attribute the failure to something outside the market. Hence their primary finding tells us nothing about reality, because it is the only finding they can produce.

1.1 How do we know it went wrong?

Perhaps endogenous breakdown never happens. Perhaps the market really is perfect. How would we know? The problem is that equilibrium theories cannot tell the difference. In the language of Popper (1968), they are unfalsifiable. They cannot test for endogenous breakdown because they cannot demarcate it from exogenous breakdown.

Scientifically, they must therefore be tested against independent evidence. For this reason I will single out what I term the four ‘big’ facts of modern capitalism which are

¹ It may seem that my use of the word ‘paradigm’, differs from Kuhn (1962), because I define it to mean the method by which an economic approach determines its variables. I will argue that the equilibrium method imposes a meaning on concepts, and dictates procedures shared by all practitioners; this constitutes it as a paradigm in Kuhn’s sense.

the most universally recognised, the most persistent and regular, and the clearest expressions, of endogenous market failure:

- (1) recurrent structural crisis – prolonged 30-50 year periods of falling profits and low growth, such as the one we are now living through;
- (2) the growth without limit of inequality between nations;
- (3) the regularity of cyclical crisis;
- (4) the persistence of class struggle.

Each of these either directly prevents the market regulating the social and political relations required for its survival, or brings into being forces that so act. Each occurs persistently or recurs regularly, under a wide variety of circumstances. And each is more persistent, and more marked, the greater the extent of the market.

History matters. When an event happens once, surrounded by a maze of complex circumstances, a case can be made for any theory relating it to any of these circumstances. But when something happens repeatedly, or persists for a very long time, under circumstances that vary very widely, then we must discard any theory that relies on any circumstance not always present. The only circumstance persistently present, through two hundred years of the capitalist market, is the capitalist market itself. It is scientifically highly questionable to treat its repeated and persistent failures as produced by anything other than itself.

Is there a theory that can account for this? Yes – but it is treated as heresy. The equilibrium paradigm finds that the principal theory of endogenous breakdown, that of Marx, is incoherent. However this ‘finding’ itself rests on the same paradigmatic principle: it rests on the supposition that Marx himself was an equilibrium theorist.

I will show that an alternative, *Temporal Single System* (TSSI) Interpretation of Marx’s value theory offers a coherent explanation of the major observable manifestations of market breakdown. This capacity resides in two features of the interpretation:

- (1) Values and prices are non-equilibrium magnitudes, defined without presupposing the market keeps them constant.
- (2) The magnitude of value of every commodity is given by the total labour time spent producing it.

The evidence this was Marx’s theory will not be restated here and the reader is referred to the copious literature. She should note that whereas the standard interpretation is attributed to Marx on the basis of simple assertion, the attributions in this article are supported by evidence which she may accept or reject.

2 WHEN THINGS GO RIGHT: THE NEED FOR POLITICAL ECONOMY

The converse view, that breakdown is inevitable, is equally questionable. Market breakdown does not happen all the time, and is not a simple descent into the void but a definite dynamic process from which recovery is sometimes automatic, seldom impossible, and always costs lives. When the market fails it does not collapse but brings politics into play. It makes the invisible hand visible, and summons conscious forces into action as governments, peoples, and classes intervene to restore the means to reproduce themselves which the market now fails to deliver.

I seek to transcend the crude polarisation between infallible market success, and inevitable market breakdown, by establishing a proper boundary between what is actually endogenous and what is actually exogenous; between automatic processes of which individuals are only indirectly conscious, and exogenous acts which they know about, initiate, and take part in.

The requirement of a valid value theory is thus that it should be able to explain, and quantitatively account for, *the relation between the market and society*: specifically, its relation to the social forces summoned into existence by the regular and persistent failures which are intrinsic to it.

2.1 Breakdown as the consequence of motion

The essential starting point is a paradigm which is absolutely independent of the assumption of market perfection: the *temporal*, or non-equilibrium paradigm, which this article will explain. Its magnitudes are determinate whether or not the market is static.

This starting point is required because breakdown is produced by motion. All theories that begin by suppressing this motion end up attributing its effects to something external to the market: be it government, monetary regulation, trade unions, communism, terrorism, war, historical backwardness, exhaustion of the entrepreneurial spirit or, in left versions, a special régime of accumulation, anomalous business behaviour, the course of technological progress ... in this way, breakdown is produced by anything and everything except the economy itself.

Only a concept that permits the market to move can account for the effects of its movement. To put it another way, stasis is a special case of motion, and not the other way around. A waterfall is not a curved lake: a lake is a flat waterfall. The waterfall's curvature is caused by the motion; if we constructed a theory of water from which motion was suppressed, we would conclude that all bodies of water are necessarily flat and that waterfalls must be a supernatural creation. This is, effectively, the position in which the equilibrium paradigm places those economic theories unfortunate enough to adopt it.

Rational ethics require that the actual motion is laid bare. Consequently two things are required. The analysis of the economy has to be conducted in terms of quantitatively determinate and measurable variables; and the definition of these variables must be independent, without qualification, of the assumption that the market is functioning while they are determined. It requires, in short, a theory of value.

2.2 Motion of what?

The peculiarity of the capitalist mode of production is that its social outcomes are the consequence of private actions. This is the reason, specific to capitalism, that its agents are not directly conscious of the results of what they do. This is the reason also that they become conscious when the results fail them.

The traditional distinction between the 'micro' world of price and value and the 'macro' world of investment, distribution and growth, is therefore artificial: prices are the means by which the market effects social change. The market is the organiser of competition, a struggle for a *share* of something. When oil doubles in price, it does not just modify the relation between one car and one pump; it reallocates access to the whole of a key world resource, on which depends everything in the world economy from the power and wealth of nations to the progress of the business cycle. It takes resources from those who purchase oil and gives it to those who sell it. This is why people go to war about it.

In order to understand how the market interacts with society it must first therefore be understood as a part of it, as a mode of social organisation which allocates definite resources to definite functions on which its existence depends. Breakdown occurs when one of these functions is threatened with non-existence.

The visible expression of this mode of organisation is money, to be precise, the money price of commodities. The idea of value arises because although money organises things other than itself – above all, production – and although it provides a quantitative

measure of the results, it does not do so directly. Money price can be increased by fiat or a printing press, regardless of the resources which gave rise to it or the results which it pays for. We cannot therefore know, when prices or profits rise or fall, what produced the change. The decisive requirement of a value theory is to distinguish those variations in money output which arise from production, from those variations that do not.

At least two aspects of production affect the money price of its results, namely the physical size or use-value of the produced commodities, and the social resources that produced them. There is therefore a choice of value concepts. Can we better explain the market's insertion into society by conceiving of money as representing physical, or social, resources?

I will show that the the equilibrium paradigm is indissociable from one particular concept of value, which TSSI scholars term the use-value or *physicalist* concept. According to this the value of output is in some sense defined by its quantity. Equilibrium can produce no other value concept, and physicalism is most coherent in an equilibrium paradigm.

Temporalism is however compatible with a wide variety of value concepts – including less coherent variants of physicalism; the Kaleckian concept which is, in essence, that money is value directly; and Marx's concept that the substance of value is labour time. Which of these is conceptually preferable cannot be deduced from temporalism but must be established independently.

2.3 The limits to growth – social or physical?

The market achieves the organisation of society through competition. Competition arises because the resources allocated by the market are limited; what one person gains, another loses. The question is, from where do the limits come: from things, or people? Money organises society, not nature, and mediates between producers, not products. A theory that makes it appear as if the market mediates between things will make heavy weather of explaining its insertion into society.

Furthermore if capitalism's limits are imposed by physical resources, it is hard to see where the present phase of market breakdown comes from. Physical limits may well be important in the future, but right now now physical output is around \$5,000 per person at 1995 prices, having doubled in the last thirty years. This is absolutely enough for food, clothing, education, health care, a dignified old age, and quite a lot of fun, for everyone on the planet. The fact that these are denied to over three-quarters of the planet can only be possible if these physical resources are distributed by a social and not a natural law.

This law can be understood only through a value concept that recognises output as it really is, as a magnitude fixed by the human resources actually at society's disposal – its labour time.

This explains why there are winners and losers, why whenever one social function is augmented and one social class, class fraction, or nation is rewarded with additional value, another social function is threatened and another nation, class or class fraction loses out. It explains why growth sets limits on itself, by reducing the profit rate and hence the investment in production. It explains why the diversion of investment capital to financial and speculative ends is an alternative to, and not a complement of, productive investment. It explains why when one nation gets richer, others get poorer.

It also explains class struggle, which is by no means the same thing as exploitation. Marxists spend a disproportionate time accounting for the obvious fact that workers do not receive everything they produce. The real question is: why fight it? Why is their wage not regulated like other prices by market forces but by organised bodies of people,

by laws, by strikes, and by force? Throughout most history and in all nations, capitalist accumulation generates opposition to itself. It is hundreds of times higher in some countries than others and varies enormously over history. It is determined as Marx puts it 'morally and historically', in short, exogenously.

At the end of the day, the argument for a labour value concept is that there is no other basis on which these regularly and persistently observed phenomena can be explained. If every price rise is simultaneously an increase in output, why has no nation ever discovered the means both to accumulate and speculate, simply allocating the extra output as required? If profit is reducible to physical output, why does it fall most persistently during protracted periods of accelerated growth? If either monetary or physical growth can genuinely raise social output without limit, then why don't the rich nations simply raise the poor ones up to their standard? And if there really is no intrinsic social limit on output it is an impenetrable mystery why wage-workers and property-owners cannot live in harmony. Over two hundred years of the capitalist market, no-one found a means to distribute the extra output peaceably. Either class struggle is the most phenomenal worldwide stupidity, or it is time to question any theory which predicts that the market can create value without work.

3 EQUILIBRIUM , PHYSICALISM AND DOGMATISM

3.1 Use-value: a disguised concept of value

Two excuses are offered for not treating value as quantified productive activity. The first is that price and quantity (use-value), being visible on the surface, are the only magnitudes economics need deal with. Value is 'not necessary'. The second is that productive activity cannot be independently quantified, because Marx's attempt to do so ended up in incoherence.

The claim that 'quantity' of output is visible on the surface is however trivially fraudulent. How much 'food' does a restaurant sell? Where is it measured? Where is it recorded? A unique quantitative measure of a collection of heterogeneous goods, as is well known, does not exist.

Even more problematic is the entire idea of physical surplus or net output, which is, according to the use-value concept, the actual result of production. With technical progress, there is a negative net product of almost everything because like is not replaced with like. Old goods are not reproduced but phased out and replaced with new ones. Without a positive net product, most physicalist results are false or even meaningless. Not least, an economy can have surplus labour but a negative physical profit rate. See Kliman (0000, Freeman 1997).

These inconsistencies do not stop people who should know better arguing that they work with quantities because a labour time value concept is logically inconsistent. The real attitude of equilibrium economics is thus not that physical quantity is perfect, but that there is no other. It may be bad, but there is nothing else.

Conceptually, however, it is perfectly reasonable to suppose that 'behind' price lies not the produced thing but the process that produced it. The issue is whether this concept is consistently quantifiable. What has to be proved, therefore, is not that value is a necessary category but that production can in fact be quantified and that no contradiction arises. Once this is achieved then value can legitimately be conceived as the amount of 'production' contained in a commodity, and a straightforward scientific test between competing concepts of commodity value can be applied: namely, to see which best explains reality.

3.2 Equilibrium: necessary foundation of physicalism

There are reasons to think that an independent concept of production is not merely empirically required, but logically superior. The fundamental issue is that things are produced before they are consumed. If the value of output is in any meaningful sense caused by something, it is hard to avoid the conclusion that this ‘something’ is located in production. This point is clearly recognised by the marginal school, and was the reason the general equilibrium approach of Walras and Marshall triumphed over the Austrian school of Böhm-Bawerk and Hayek.²

The equilibrium paradigm brushes this efficiently under the table. If nothing changes, causation becomes timeless. It is equally coherent to argue that the inputs determine the output to which they give rise or that the output ‘determines’ the inputs required to produce it. The chicken determines the egg and the egg determines the chicken. The question ‘which came first’ becomes meaningless because the egg that hatched the chicken, and the egg the chicken lays, are now the same egg.

The equilibrium paradigm, and the physical concept of value, are thus mutually interdependent both logically and in the history of thought.³

An illustration helps understand the issues at stake. Suppose at a given point in time which we will call t , a capitalist buys 100 units of some use value and, during production, creates 160 of the same use-value.

$$100 \rightarrow 160 \quad (1)$$

Two issues arise. First, what relation is there between this fact and the price of the product? Second, what implication does this have for capitalist profit? There is a simple accounting relation between price and profit. Designating the price at time t as p_t , the profit is the difference between $160p_{t+1}$, which the capitalist receives, and $100p_t$ which she spent. The profit rate r is therefore⁴

$$r = \frac{160p_{t+1} - 100p_t}{100p_t} \quad (2)$$

The problem is that this equation tells us nothing about what p_{t+1} , p_t and r actually are. The best we can get is an algebraic identity obtained by re-organising (2):

$$100 p_t(1+r) = 160 p_{t+1} \quad (3)$$

These relations are, however, hopelessly indeterminate.⁵ They add nothing to our knowledge of why money sales are bigger than money expenditures. They are mere algebraic relations between two independently-determined magnitudes.

Thus, suppose the price of the consumed inputs is £100 and the price of the sold product is £180. ‘Production’ has added £180. But we would get the same result if, for example, we produced nothing, but prices increased by 80 per cent through inflation. And indeed, it is equally possible that the output might sell for £170, or £110, or even £90. There is

² See for example Dobb (1973:184)

³ Sraffa does not differ from the marginalists in this respect. The ‘physical size’ of a commodity cannot be isolated from its utility and each is just an aspect of the more theoretically adequate concept of *use-value*: thus, I cannot consume the experience of an egg separately from the egg. The claim that Sraffa created an alternative foundation for political economy is questionable; rather, in exhibiting the logical incoherence of marginalism, he demonstrated the logical incoherence of the use-value concept itself.

⁴ The time subscript will be omitted for simplicity where it is not necessary to the calculation

⁵ In the marginalist variant, there would have to be more than one commodity and the equations resulting would be different, being derived from a supposed knowledge of marginal utilities and production functions. However in both cases, the end result is a set of equations like (2) in which the rate of profit is a function of physical quantities, input prices and output prices. We illustrate our point with the physical quantity variant.

no way of distinguishing which part of the money profit is really ‘produced’ and which arises from monetary changes.

At this point equilibrium is introduced, in a form which TSSI authors term ‘simultaneism’. If we abstract from all the vicissitudes that might make p_{t+1} different from p_t , that is, if we suppose that the market works so perfectly that there is no need for prices to change, we can write

$$p_{t+1} = p_t \quad (4)$$

Physical increase is then the only effect of production. There is no price effect, because we have eliminated it. Although we have no more knowledge than before about the actual magnitude of money output, we can calculate the *relative* increase in output – that is, profit:

$$r = \frac{160p_t - 100p_t}{100p_t} = \frac{60}{100} = 60\% \quad (5)$$

Nevertheless, the approach does not actually solve the problem. The profit rate is completely independent of price and we have still not determined what p_t actually is. The money price p_t could be £1 or it could be £100.

The solution offered is characteristic of the equilibrium paradigm. When there is more than one product, it turns out that the same method will tell us in what ratio commodities must exchange with each other to ensure that the profit rate is the same in all branches. This is price, but not as we know it. It still does not tell us how much money any given commodity costs. As Townshend (1937) devastatingly points out, general equilibrium theory does not actually determine absolute prices and the price level makes no difference to profit.

3.3 Physicalism: necessary outcome of equilibrium

Implicit, but never stated, is that this exercise does not just determine profit and prices but defines them. The meaning assigned to the concept ‘profit’ is no longer ‘the extra money made by the capitalist’ but ‘the solution to the simultaneous equations constructed by supposing prices do not change and that all profit rates are equal’. The meaning assigned to ‘price’ is no longer ‘the money paid for something’ but ‘the relative prices that satisfy the same set of equations’.

Furthermore ‘cause’ is reduced to ‘calculation’, and is banished from the realm of time to the realm of algebra. If we want to find out whether one thing causes another, all we do is substitute a new value for the allegedly causal variable into the equations and, if another changes, the independent variable is said to have ‘caused’ it.⁶

Thus ‘determination’ does not merely calculate price or profit, and does not merely facilitate the identification of causes; it redefines what price, profit and cause actually mean. ‘Determination’ itself really means ‘definition’. This is why the equilibrium method is not neutral; it imposes a set of concepts. When an economist says that she or he has determined profits, she doesn’t mean profits as anyone else understands them; she means ‘the profits that would occur, if the market worked’.

This brings us full circle. The argument against accounting for production in terms of an independent and quantifiable magnitude is that there is no need, because price and physical quantity are visible on the surface and so we should deal with them directly. But quantity we cannot measure in aggregate in any case, and price is replaced with something else. Whether or not the v-word is used, this is a value-concept. To determine

⁶ Compare this the traditional view of science: ‘The sequence in time is thus the sole empirical criterion of an effect in its relation to the causality of the cause which precedes it.’ (Kant 1933:288)

whether it is an adequate concept, it should be tested both against reality, and against alternative such concepts.

3.4 Intrinsic dogmatism

The problem is now the following: the equilibrium paradigm is incapable of recognising any other value concept. We have seen that equilibrium renders physicalism coherent. It now emerges, however, that it renders nothing else coherent. In the calculations made above there is only one possible profit rate, and it is equal to the physical profit rate. The equilibrium paradigm defines value to mean use-value: it makes physicalism the only possible value concept. Indeed this is why the post-Sraffians claim that the 'physical quantities' method constitutes a sufficient foundation for economics and that 'value' is a redundant category.

Without the calculation, there is no definition, no ontology, just an atheistic void. The fear of this void seems to make it impossible for equilibrium theorists to step into the light and consider even the possibility of a non-equilibrium world. It appears to them a kind of madness. In Foucault's sense, equilibrium theory is literally dazzled by reality.

This leads to what I term the *intrinsic dogmatism* of the equilibrium paradigm; it leaves no discursive space for any other concept. Physicalism emerges not as one concept among many, but as the only possible concept. The equilibrium paradigm not only makes it impossible to conceive of the possibility of temporalism; it makes it impossible to conceive of the possibility of any other meaning to the words it uses. Van Parijs (1980:1) can thus write

It cannot be shown in general that a rise in the organic composition of capital leads to a fall in the rate of profit...A falling-rate-of-profit crisis is not a theoretical *necessity*; indeed, it is not even a *possibility* under conditions of competitive capitalism

without pausing to consider that this applies *only* to the equilibrium, physical profit rate. Since the observed profit rate does indeed fall with rises in the organic composition, there is at least some basis to question an approach which says this is logically impossible.

This dogmatism extends to Marx, whose views are tested not against reality but against logic. His equilibrium interpreters seem unable to conceive that the inconsistencies they claim to find in his theory might flow from their own interpretation, and not from the theory itself. They mostly do not even consider it necessary to examine the evidence of Marx's own writings. Marx *must* have shared these conceptions: why? Because no others are possible.

The paradigm inhabits a sealed world of its own conceptions. It does not merely reject the alternative as absurd and impossible; it cannot even understand what it is. In the same way, the anti-Galileans could not comprehend how the earth could be other than the centre of the universe, because as Kuhn explains, 'centre of the universe' was what they meant by 'earth'.

3.5 Winning a one-horse race

To do the paradigm justice, its substantive (and logically legitimate) claim is not that its prices or profit rates are the real ones, but that they are abstractions that in some sense 'governs' the real ones; the physicalist profit rate is a centre of gravity for actual profits, that fluctuate around it.

The problem is that even a cursory inspection reveals the physicalist profit rate cannot possibly govern the money rate. 70-90 per cent of fluctuations in reported rates of return

on capital arise directly from changes in the organic composition of capital; but as van Parijs notes above, this is logically impossible within the equilibrium paradigm

The claim therefore relies, to a great extent, on the very fact that nobody does it better: that there is no other candidate for the status of ‘centre of gravity’. In a one-horse race, a three-legged donkey will win. However there are other horses, except they have been disqualified. Not only are there many different temporal profit rates, but as we shall see one particular temporal rate – the labour-time rate – does indeed fall as a result of rising organic composition, above all during long periods of technical progress.

Where does the error arise? From the abstraction employed, which does away with changes in price – the actual cause of the variations. Equilibrium abstracts from the most important determinant of all – motion.⁷

4 MONEY, MOTION AND MARKETS

4.1 Price movements and the rate of profit

The equilibrium paradigm, to be precise, does not suppose prices are constant, but that they do not change during production. Consequently, price changes have no impact on the profits. In point of fact, prices at the start of production never equal prices at the end. This is not just a random difference: technical progress drives down prices. This has been obscured by systematically inflationary policies, but is evident in the relative prices of commodities in which technical progress is most rapid, such as computer chips, which fall fastest.

There is now a marked tendency for a return to a régime of generally falling prices, definitely in world commodity markets and in the case of Japan, in almost all markets in terms of the national currency. This has enabled Brenner (1999) for example to theorise the fall in the profit rate explicitly in terms of falling prices.

Brenner’s attributes this to competition, which is a matter for empirical observation. However, it is only *logically possible* under temporalism, a fact he himself has yet to acknowledge. Within the equilibrium paradigm, no change in prices or values can possibly affect profits. In any simultaneist expression for the profit rate, the denominator – capital stock – and the numerator – current profits – are expressed in terms of the same set of prices. Prices always cancel out, top and bottom. No price change for any reason whatsoever can possibly impact the profit rate.

Actually, price changes do clearly affect profits and we can show, and indeed calculate this effect. Suppose, to fix ideas, inputs were purchased at £1 per unit, so that £100 was laid out altogether. But suppose the sale price was £150. In that case the money profit rate would be £50 and the profit rate not 60 per cent but 50 per cent. Why? Because while production was in process, prices rose. This is an effect of motion.

Let us deal with this in a more general way. To simplify matters and focus on the effect of the change, we will write p in place of p_t and $p + \Delta p$ in place of p_{t+1} .

The basic production equation (3) becomes

$$100 p(1 + \text{£}r) = 160(p + \Delta p) \quad (6)$$

where $\text{£}r$ is the money profit rate, from which it is not hard to show that

⁷ In general a temporal average must diverge from a moving fixed point solution. Given exogenous parameters a_t and an endogenous state vector x_t the general temporal trajectory is given by $x_{t+1}; a_{t+1} = f(x_t; a_t)$ for some f or in the continuous case $x'; a' = f(x; a)$. The general equilibrium or comparative static trajectory is $x_t; a_{t+1} = f^*(x_t; a_t)$ or in the continuous case $f^*(x; a) = 0$ where f^* is the fixed point of f with respect to x . The exogenous vector a becomes the only source of change. If, however, a is changing secularly (which is the case, given technical change) then f^* cannot possibly equal f .

$$\overset{\text{£}}{r} = \overset{\text{e}}{r} + (1 + \overset{\text{e}}{r}) \left(\frac{\Delta p}{p} \right) \quad (7)$$

Where $\overset{\text{e}}{r}$ is the equilibrium rate. The money profit rate is equal to the equilibrium, physicalist profit rate plus an extra term governed by the rate of change of prices. Where prices are falling, as is generally the case with technical change, it will sink below.

The effect becomes even clearer if, instead of von Bortkiewicz's (1984) very schematic assumption that advanced capital is consumed in a single period, we recognise that fixed capital persists and grows from one period to the next. Profit is calculated over the whole of the advanced capital and not just that which is consumed. The greater this is, the greater is the price effect since the capitalist's profit is reduced by the fall in price of the whole of her or his tied-up capital.

This corresponds exactly to what is observed in reality. If a capitalist lays out £1,000,000 on a brand new factory, then this money sum must be found before any surplus can be realised as profit. If, while the process is going on, the price of a new factory sinks to £500,000 then the capitalist is not entitled to write this £500,000 off on the books without paying it. $\text{£}1,000,000 \times (\Delta p/p)$ is deducted from the realised profit which is substantially lower than the hypothetical physical equilibrium rate.

4.2 The temporal determination of the magnitude of value by the time of labour

Can we, in the light of the above, simply construct the dynamics of capitalism from the dynamics of prices and quantities? This Post-Keynesian idea is essentially the project of Kalecki, and has a lot more in common with Marx's theory than much Marxist theory. The problems remain those identified in section 2.3: with *what* does the money interact? What is it that gets allocated when money prices change? In the equilibrium paradigm there is only one choice: use-value. In the temporal paradigm there is a variety of choices and, in particular, value can be theorised in a non-contradictory way as the 'quantity of production' that gives rise to output.

We begin by noting that a commodity's physical size is by no means its only visible surface property apart from money price. For example, the living labour employed in its production is a perfectly measurable and accessible magnitude.⁸

The principal difficulty arises because, first of all there are other inputs to production and second, labour is generally involved in producing them. The question is then what these inputs contribute to value or, which is the same thing, what does past labour add to value?

Ricardo's solution is really quite simple: past labour adds itself. If a ton of steel is made of a year of labour and a ton of iron, and if we know the iron contains two years of labour, we can deduce that the steel contains three years – one current year and two past years. The problem is, however: how do we know the iron contains two years of labour? The equilibrium approach asks how much labour which would be required to reproduce the whole of society unchangingly. The temporal approach takes the labour at some given point as an initial condition; as a datum given externally.

To fix ideas, suppose at the start of our example production process that goods containing 100 days of past labour are consumed in production, and that 20 days of living labour transform them into an output. Just as Laplace did not need to know where

⁸ One may conceive of value as the result of any particular input and this by no means a stupid idea. Thus the physiocrats conceived of output as the contribution agricultural produce. It is perfectly meaningful to construct an 'energy value', as the energy expended in producing of a commodity. The issue is not to exclude such ideas by pure logic but to enquire what they can actually explain.

God put the planets in order to calculate their subsequent motion, we do not need to enquire why this past labour was 100. The value of the output is

$$100 + 20 = 120 \quad (8)$$

Provided we can calculate how much of the produced 120 units of value remain unconsumed and pass into the next period of production, we may repeat this calculation by adding in the living labour of this next period, and so on indefinitely.

It may seem that value is indeterminate because there is no basis to ascertain the initial condition. Actually this problem has two quite separate aspects; first, do we know its actual magnitude and second, does it exist?

Whether *we* know this magnitude should not be confused with whether it exists. For the equilibrium paradigm, a magnitude is determinate only if we can calculate it, but the stars pursue their majestic course regardless of whether we count them. Capitalism itself establishes the labour in a commodity, regardless of whether we measure it.

This would be of limited use if capitalism also made this magnitude unknowable. But this is not so. It turns out that if the initial condition is misestimated, the error does not propagate but decays exponentially and effectively vanishes after a few periods. We may thus begin with almost any reasonable initial estimate of the labour content of consumed capital and within five periods derive labour values whose magnitude is statistically indistinguishable from the true value.

This is temporal determination. Its conceptual basis is a sound technique known as mathematical induction, which underlies much foundational mathematics. Its method of calculation is behind virtually all modern physics.

The true content of equilibrium, from a temporalist standpoint, is that if all exogenous sources of change are held constant, endogenous change will under very general conditions also die out and the system will, mathematically, settle into an equilibrium state. This is why, theoretically, equilibrium is a special case of temporal motion and not vice versa. Ricardo's attention centred on this 'long run' condition of the economy without, I suspect, ever fully understanding the difference between the temporal and equilibrium determination of this long-run condition.

Marx found value theory in this state when he absorbed it from Ricardo and transformed it in two vital respects: first, he made the motion of the economy its principal determinant and second, he derived from this a diametrically opposite understanding of money.

4.3 Value, money and price

For Ricardo, as for the neoclassical economists, the purpose of value was to determine the magnitude of price. For the Ricardians, therefore, the theory had failed if they couldn't calculate prices. But in reality for a variety of reasons (of which the equalisation of profit rates is only one) price is not quantitatively equal or at least proportional to value, and so the Ricardians concluded that the primary mission had failed.

Marx inverted the problem. From the outset he insisted that price could not be equal to value because the market itself, with its ceaseless failure to equate supply to demand, systematically raised price above and below value both in individual spheres and, during the course of the business cycle, for all goods taken together. Value for Marx was not therefore the proximate determinant of price.⁹ To the contrary, deviations of price from value are the only way that value can come into being at all:

⁹ The quantitative relation between value and price appears in Marx as a law of *motion*, in the average and over time: as the labour content of any commodity falls, so will its relative price.

If M.Proudhon admits that the value of products is determined by labour time, he should equally admit that it is the fluctuating movement alone that makes labour time the measure of value. There is no ready constituted 'proportionate relation' but only a constituting movement' (Marx 1935:62).

For Marx, value was the *content* of price; it was a quantitative estimate of the amount of labour that a given money quantity represented in exchange. If, therefore, a commodity whose value was 100 hours exchanges on the market for an amount of money which represents 100 hours of past labour, it sells at its value. If, however, it sells for an amount of money representing 200 hours of past labour, then its price is double its value; that is the commodity exchanges for more labour than went into its production.

But, for Marx, the total value produced by society cannot so be altered. It is impossible, in circulation alone, to increase the value in existence. Therefore exchange is a zero-sum game. If one capitalist successfully appropriates 100 hours more than was added in production, other capitalists somewhere else lose, and the total losses equal the total gains.

The sum of values in circulation clearly cannot be augmented by any change in their distribution...the capitalist class of a given country, taken as a whole, cannot defraud itself. However much we twist and turn, the final conclusion remains the same, if equivalents are exchanged, no surplus-value results, and if non-equivalents are exchanged, we still have no surplus-value. Circulation, or the exchange of commodities, creates no value (Marx 1977:265-6)

The price system, for Marx, is therefore *the means by which* past social labour is transferred from one capitalist to another. Prices are simply disguised past labour. The requirement of an analytical framework is to penetrate the disguise. The most decisive element of this analytical framework is established at the very beginning of Marx's work, in chapter 5 of Volume I of *Capital*: price movements cannot create or destroy total value. This is why, and how, the price system is the disguised form of social competition. The money measure of the social resources at stake may vary, but the resources themselves are not altered by thus. Therefore, whatever one gains, another loses. This is the core which underlies the mechanisms of unequal exchange, periodic crisis, structural crisis, and class struggle.

4.4 Three magnitudes, three profit rates

Now consider the physicalist proposition that profit cannot be determined independent of prices. I will bring together the three numerical accounts of our system scattered around the text.

	Used	Produced
Use-value	100	160
Value	100	120
Money	100	180

There are three profit rates and they can be calculated without reference to unit values or prices, being simply the surplus divided by what is advanced. These rates are thus *dependent on the unit* – in essence, on the value concept. Thus the value rate is 20/100, the physical rate is 160/100 and the money rate is 180/100. The money profit rate is above the physical rate and the value rate is below it.

Now consider unit values and unit prices. The unit value of the commodity in each period is simply the total labour time embodied in the output, divided by the size of the output, and the unit price is simply total price likewise divided by the size of the output.

	Time t	Time t+1
Use-value	100	160
Value	100	120
Money	100	180
Unit price	1.00	1.12
Unit value	1.00	0.75

We thus have falling unit values and rising unit prices.

4.5 Money, representative of social labour

A third ratio can be calculated, which unlike unit value and price which apply to individual commodities, applies to the whole of society. This is the quantity which, following Ramos (1995), TSSI authors term the Monetary Equivalent of Labour Time or MELT.

In the example above, the value in society is initially 100 and its price is £100. Consequently the 100 hours are represented, in exchange, by £100. Anyone who owns £1 can purchase a share of society's stored-up labour equal to $100/£100 = 1$ hour.¹⁰ One hour is *equivalent* to one pound.

This is a direct relation between money and labour, independent of the physical medium. This magnitude, just like unit value and unit price, is variable. Its variation is the decisive link between the money and value profit rates.

	Initial	Final
Value	100	120
Money	100	180
MELT	1.00	1.50

The money profit rate is affected by three independent factors: the value profit rate, the rate of productivity growth, and the rate of money inflation relative to goods. Each factor has a bearing on the actual course of accumulation and each must be independently analysed.

Notwithstanding, we can decompose the money profit rate in one of two ways. We can think of it as the physical rate, augmented by price inflation relative to goods. Or we can think of it as the value rate augmented by the rate of change of the MELT. Representing the MELT by e_t , total value by V_t , total price by P_t , the value profit rate by ${}^h r$ and the money rate by ${}^{\pounds} r$ it is not difficult to show that

$${}^{\pounds} r = {}^h r + e'(1 + {}^h r) \quad (9)$$

where $e' = \Delta e/e$ is the rate of change of the MELT. In the example above we thus have

$${}^{\pounds} r = 0.8, {}^h r = 0.2, e' = 0.5 \text{ and} \\ {}^{\pounds} r = {}^h r + 0.5 \times (1 + {}^h r) \quad (10)$$

Both the movement of the value rate, and the relation between it and the money rate, can thus be expressed independently of physical quantities.

Anticipating section 6, suppose for illustrative purposes that prices are proportional to the values and that the productivity of living labour rises at a steady rate. In that case the general price level would systematically fall and the factor e' in equation (19) would be negative. Thus the *effect of technical accumulation is to lower the profit rate below the physical rate*. It is not difficult to show that values will fall in such a way that the price

¹⁰ This is not the same as Adam Smith's 'labour commanded' which refers to the price of living labour. If the wage is £1, and an hour's work produces on average £2 worth of goods, the MELT is £2/hour, not £1.

effect is greater than the productivity effect. Under a wide variety of circumstances this is the case, and in particular it is invariably true for the case of maximum expanded reproduction in which the whole surplus is reinvested. The first result was established by Kliman and McGlone (1988); the general case was stated by Freeman (1995b). A definitive debate on this question was conducted in the pages of RIPE (Zarembka 2000) at the end of which Foley (2000) concluded that

I understand Freeman and Kliman to be arguing that Okishio's theorem as literally stated is wrong because it is possible for the money and labor rates of profit to fall under the circumstances specified in its hypotheses. I accept their examples as establishing this possibility.

The argument has been in existence in one form or another for fifteen years, no-one has provided a refutation, and all those who have examined it have had to accept that the argument is logically sound. In short the labour rate of profit can, and does, fall as Marx stated, under cost-reducing technical innovation.

5 THE APPROPRIATION OF VALUE BY MEANS OF MONEY

5.1 The exogenisation of money

It is not hard to see why, from an equilibrium standpoint, it makes no sense to construct an independent measure of value in terms of productive resources. For, this magnitude cannot possibly affect the profit rate which is given solely by the physical proportions of inputs and outputs. Value 'is redundant'.

Unfortunately, however, so is price. The equilibrium profit rate is unaffected by prices except for the wage which is in any case represented as a collection of goods, rather than a money price.

This is one aspect of a much deeper problem: within equilibrium, *money* is redundant. It is a veil, a mere numéraire. As Bridel (1997:xiii) notes, citing Hahn (1982:1):

The most serious challenge that the existence of money poses to the theorist is this: the best developed model of the economy [the Arrow-Debreu version of a Walrasian equilibrium] cannot find room for it

Within such theories therefore money cannot, logically, play any determinative or causal role. It is recast as an external, as something that has to be 'properly managed' – that is, exogenously determined – because in the equilibrium determination of prices and profits, it is the great undetermined, an ironic recognition of the market's inability to regulate its own supreme variable. Modern economics sets great store on money but at its heart all is a large black hole: namely, it has no endogenous theory of it.

The reason for this difficulty is that economics has purged its conceptual vocabulary of the thing money really consists of, namely, value. Money represents social effort. It does so not because the market works, but because it doesn't. If the market did work perfectly, money would not be necessary and every economic transaction could be conducted in terms of barter.¹¹ Producers seek money itself because it represents a fluctuating, and not a fixed, social power of acquisition. If all rates of exchange were perfectly stable, and all goods could always be sold, there would be no need to single out one particular commodity as a store of value. Any commodity could be money and the only issue would be technical convenience.

¹¹ Indeed if the market worked perfectly the *market* would not be necessary. Agents should be able to implement the rationally-obvious rates of exchange, production and consumption without the tedious intermediary of actually buying and selling.

But prices are not stable and sale is not guaranteed. Capital retreats into money during a slump because as a universal, unlike any particular commodity it guarantees the next purchase. But insofar as modern money takes the form of debt, money itself fails as a store of value and is not repaid. When universals fail, no particular is safe. This puts money itself at the centre of all the market's storms, since it incarnates in itself all the market's contradictions. An adequate value theory must, therefore, provide an integrated account of the relation between money and value.

5.2 Money as the agent of value appropriation

In the literature on Marx's theory, the principal focus of the discussion concerns the so-called transformation problem and far too little attention is given to the substantive issue of endogenous market failure. The concept of money is the link between the two because money is the form in which the capitalist acquires value.

Consequently, there is no transformation problem in the form it is normally discussed. Marx did not 'forget to transform inputs' which, being expressed in money, are already transformed. Inputs transfer a value to the product given by the labour time this money represents in circulation, an aliquot share of the total value in society.

The value-price distinction then has two, completely operational and quantitative aspects. In the first place, every money price expresses a quantity of labour. If the MELT is for example £52,000 per year, and the price of a computer is £2,000, then this represents two weeks' labour on the market. But this price will be higher or lower than the labour time required to produce the computer. If, for example, the manufacturer spent £500 on parts and machinery and if half a week's labour was expended on it, then its value is one week or, in money terms, £1,000. It is hence overpriced; its price is above its value. The quantitative distinction between value and price is not abolished, as in the value-form school approach.

What happens when the price of a computer rises above its value? From a monetary standpoint, £2,000 now acquires £1,000 worth of goods, From a social standpoint, two weeks of social labour acquire one week in return.

The exchange is unequal. This is what really 'lies behind' the price mechanism – the competitive appropriation of social resources through the constant rise and fall of prices.

5.3 Profit as the agent of capital movement

Were this the only function of the price mechanism, production would probably not occur. The difference between capitalism and precapitalist trading societies is that production is itself organised by past labour in the form of capital. The 'interest taken by the capitalist' is not a quick bargain but a long-term high profit which arises from placing capital where it can make more money than elsewhere.

The laws of motion of capital arise because this individual placement reacts back on general social conditions. Market breakdown arises when these general social conditions fail to maintain the conditions necessary for individual capitals to function.

All capitalists seek to appropriate labour as much in excess of the labour they part with as possible, in proportion to the labour they advanced. The average profit rate is an ideal never attained: in Marx's words

Between these spheres that approximate more or less to the social average, there is again a tendency to equalization, which seeks the 'ideal' mean position, i.e. a position which does not exist in reality. (Marx 1981:273)

The average rate has occupied the attention of most theory, again driven by the equilibrium obsession with equal profit rates. But capital as such is concerned only with excess, super or *surplus* profit:

In fact the direct interest taken by the capitalist, or the capital, of any individual sphere of production in the exploitation of the labourers who are directly employed is confined to making an extra gain, a profit above the average Marx (1972:197)

This difference is also more important than price-value deviations:

The tendency of price of production is only to tolerate such surplus profits as arise, under whatever circumstances, not from the difference between the values of commodities and their prices of production, but rather from the general price of production governing the market and the individual production prices differing from this; surplus profits which therefore do not arise between two different spheres of production but rather within each sphere of production. (Marx 1981:895)

The market reconciles these divergent individual actions to produce social results by averaging them, not by forcing them into uniformity. General conditions are established in the market which regulate all producers: a single price for each commodity, an average rate of profit, and so on.

The market exists because these social results are also the social conditions that sustain it. However it can, and does, produce social results that act in a quite contrary direction, and remove conditions essential for its own existence. The function of value analysis is to uncover how these failures happen.

6 VALUE AND THE COURSE OF CAPITALIST ACCUMULATION

6.1 Bonsai capitalism: the myth of the static economy

The focus of equilibrium theory is to explain how the market stabilises. The most fundamental mistake of this approach is that a stable market cannot exist. Like any organic entity, the market maintain itself by moving. As Marx (1978:199) notes:

This assumption [simple reproduction - AF] is equivalent to assuming the non-existence of capitalist production and therefore the non-existence of the industrial capitalist himself. For capitalism is already essentially abolished once we assume that it is enjoyment that is the driving motive and not enrichment itself...It is moreover technically impossible.

The most general two laws of capitalism are therefore technical progress and accumulation. When either slows, an essential function of capitalism is removed.

Technical progress is the quintessentially capitalist source of superprofit. Market value is an average which is normally well below the individual value of the most advanced producer. If, say, a computer chip manufacturer doubles her output then until the industry as a whole catches up, she gets twice as much money. Without technical advances, there is therefore no motor driving force behind capitalist investment.

Without accumulation the individual capitalist cannot benefit from superprofit. No matter how high the profit rate, the volume of returns depends on how much capital is invested. A profit rate of five hundred percent will still yield only five pounds, if only a

pound is invested. Each capitalist therefore strives to increase the total invested and, aside from mutual swindling, the only stable way to achieve this is to invest the surplus. Accumulation and technical change are not, therefore, just by-products of the market but a condition of its existence. Breakdown occurs when either ceases or is interrupted. The key to understanding breakdown is, therefore, to understand how these processes themselves bring about their own cessation.

6.2 Accumulation and the rate of profit

The rate of profit is the most general variable governing the historical evolution of capitalism. However it is easy to misunderstand why. Its level as such is not the source of breakdown, since monetary inflation can raise it arbitrarily. It is however the average of a distribution. Individual producers compare their rates with other options. Breakdown arises, therefore, because price movements create alternative sources of superprofit to production.

As Farjoun and Machover (1984) argue and Wells (2001) definitively establishes, actual profits are never equal but are distributed around the average. Consequently actual prices are always above or below the equal-profit rate, and ceaselessly fluctuate around it.

When the average rate sinks the whole swarm of rates around it shifts also. The swarm's behaviour is then determined, not by its centre but by the outlying capitals. Beyond a certain point their profits in value terms are negative which, as stressed from the outset, signifies that they represent a declining share of total value.

Were production the only possible destination for capital seeking to expand, the absolute profit rate would make little difference, since surplus profit would compete only with private consumption. But in fact, price movement brings into existence non-productive destinations for capital which, when the rate sinks beyond a certain point, become dominant and throw accumulation into reverse.

The absolute level of the profit rate therefore, fixes what proportion of total capital is thrown into production, and what proportion into unproductive speculation.

To see what drives, it, I extend the illustration to three periods. To study the effect of accumulation alone, isolated from distribution, I suppose the whole of the product re-enters production but that in each period, 20 days are still employed, which implies some technical progress. I also suppose the entire product is invested, and study the maximum rate of profit, assuming the wage is zero. Technical progress is assumed and the physical product rises relative to both labour and physical inputs. Inflation is assumed and the money rate of profit rises faster than the physical rate. Profit rates, unit prices, and unit values are calculated as before.

Period	1			2			3		
	In	Out	<i>r</i>	In	Out	<i>r</i>	In	Out	<i>r</i>
Use-value	100	160	60%	160	300	87.5%	300	600	100%
Value	100	120	20%	120	140	16.7%	140	160	14.3%
Money	100	180	80%	180	360	100%	320	800	150%

The value profit rate will continue to fall as long as value is invested. This law proceeds independent of technical progress. Because and as long as value is accumulating, the invested value sum will rise until and unless the capitalists stop ploughing value into the system and start taking it out – disinvesting in value terms.

6.3 Countervailing tendencies and the short cycle

Does this mean that the profit rate necessarily declines for ever? No – it continues as long as, and to the extent that, accumulation proceeds in value terms. This is not identical to physical accumulation and Marxist authors look in vain for a recovery mechanism expressed in terms of the physical liquidation of stock. The profit rate is not about physical stock. A capitalist who loses a factory has lost her *money*; destroying the factory does not make things better.

Nor is bankruptcy or debt default an adequate mechanism for the reduction of accumulated value although it certainly is one of the means by which accumulation itself is brought to a halt. The non-payment of a debt simply transfers the problem of payment from the debtor to the creditor, whose money worth is reduced by the amount of the loss but who still has to pay her own creditors.

There is only one permanently effective mechanism for stably restoring profitability, which is to run down the value of stocks by using up the accumulated value – by disinvesting. In short, the only definitive way for capitalism to offset accumulation is to stop accumulating.

This can happen while physical accumulation proceeds, albeit at a slower rate. A slump is, in effect, the slowing down of physical accumulation to the point where the decline in the value of existing investment proceeds faster than the physical additions to investment. This is the mechanism that permits a recovery in the profit rate and the reason that the rate varies rhythmically over the period of the business cycle. It is possible only to the extent that a degree of technical innovation persists; if to take the extreme case there is no innovation and therefore no general decline in values, then the slump can succeed in restoring profits only by running down physical accumulation itself, and disinvesting in physical terms.

6.4 Why inflation doesn't work for ever

Why does an inflationary increase in money prices not offset falling profits?

A little bit of thought reveals what this idea really entails. An additional profit arises when goods are increasing in price. But this also means that merely holding onto goods becomes a source of profit. In our example, since the product rises from 1 to 1.12 in the first period, a capitalist could make a healthy profit of 12% without producing anything. Since in the course of the cycle all prices do not rise together, profit in value terms can always be found where they are rising exceptionally fast. Alongside all the multitude of productive profit rates a new destiny for capital emerges – speculation.

This is reinforced whenever and wherever the capitalist can secure an additional guaranteed income stream by securing a monopoly over a particular necessary function for the rest of capital. *Rent* arises in every case, above all land but also on machinery in the form of lease arrangements, buildings as such, and so on, and becomes part of the expected income from mere ownership.

This is enormously accelerated by the credit system and the emergence of fictitious capital. Credit itself becomes a source of income, and every capital automatically compares the rate of return on investment with the general rate of interest. Financial instruments, representing claims on future income, outstrip the general rise in the price level in the boom phase. Finally money *itself* becomes a source of value profits in the slump phase, since during a period of falling prices, it represents an increasing claim on value. Liquidity preference under conditions of falling prices is a perfectly rational strategy, and brings about the growth of money capital at the expense of industrial capital.

The mechanisms of the short cycle remain to be fully explored. As is clear from Evans (2003), the most innovative work on the business cycle comes from writers unhampered by the blindness to financial and monetary phenomena which has blighted Marxist work. The problem is that without an underlying value framework, mechanism and cause are confused. The driving force of the cycle is the repeated oscillation between productive accumulation and speculative accumulation and this is driven by the dynamics of the productive sector, not the financial sector. It is driven, above all, by the relative levels of superprofit to be obtained from investment in technical innovation and in speculation, which is in turn driven by the overall movement of the profit rate.

The next and final stage of analysis, therefore, concerns the effects of technical change as such.

6.5 Divergence and unequal exchange: the limits of technical change

Perhaps the two most striking facts of contemporary capitalism are that, in the age of space travel, the internet, and global communication, the majority of the world's population do not have a telephone; and that while medical science challenges mortality, hundreds of millions are dying of curable diseases. The second great limit that capital sets on itself is that, to the degree that it develops human capacities by the boundless advance of science, it denies access to these advances to an ever growing part of humanity.

The secular divergence of wealth is in a certain sense the most decisive tendency in capitalism because unlike the falling profit rate, it never stops. The difference between the richest and poorest nation at the end of the Twentieth Century is seven times bigger than it was at the beginning.

The neglected process of unequal exchange has been explored by writers such as Amin, Palloix, Emmanuel, and Dos Santos, but its workings do not make sense outside of the temporal paradigm. Mandel stands alone in having attempted a serious temporal analysis. This inadequacy is further testimony to the crippling legacy of the equilibrium paradigm.

Secular divergence arises from the coexistence in the market of many producers of the same product employing different technologies. It is the outcome of a self-reinforcing process – in technical terms, a positive feedback loop.

There are two basic mechanisms. First, superprofit arising from technical superiority never vanishes. As fast as it is reduced to zero in one branch, a new source of superprofit emerges in another and the capital always pursues the highest rate around. To this must be added a distinctive mechanism which is very characteristic of modern globalisation. Consider what happens if the price of the computer considered above falls from £2,000 to, say, £1,500 – as happens all the time. The difference is pocketed by the sellers of the computers, who thereby transfer the costs of technological change entirely to the purchasers.

The mechanism is dynamically self-reinforcing. There *is* no long-term steady state; the excess profits of the advanced producers are invested in even more advanced technology, sustaining and extending their lead. The 'development of underdevelopment' as Andrew Gunder-Frank so accurately designated it, is a product of the market itself and not of any special historical circumstance.

6.6 Long waves

What, then, is the actual historical course of events unleashed by these processes? It is empirically clear that once a certain organic composition of capital has been reached, each successive cycle restores profit rates at a lower level than before. The cyclic

process is therefore accompanied by a long-run, secular decline of the profit rate over a 30-50 year period – the Kondratieff or long wave. Unlike the business cycle, there is no endogenous mechanism of recovery from this decline and it therefore brings into play exogenous, social forces on a vast scale that seek to re-organise the entire organisation of world production so that one *particular fraction* of capital can rise above all the rest, by extracting an exceptional share of world value production.

The scale is vast. Endogenous recovery from the business cycle ruins individual capitalists and businesses. Exogenous recovery from long declines lays waste peoples and nations. The fractions that gain and lose in the short cycle are banks, corporations, and industrial sectors; in long waves the winners are the the charmed circle of dominant nations and their retinues in the third world, and the losers everyone else. This is why the recovery, if and when it happens, only follows an intrusion of rude politics into the smooth flow of the market; war, revolution, and barbarity. It is why, and how, technology has become the fifth horseman.

The particular form in which divergence now irrups into politics is war. War is nothing more than the ultimate form of economic competition, which arises when the purely economic mechanisms described above render countries ungovernable or threaten them with economic destruction.

Such exogenous interventions have, in the past, however, achieved the launch of a new phase of expansion and this has been the clear and even stated goal of US economic policy in the last two decades. Essentially, the US has functioned, through financial deregulation, as a vacuum-cleaner for the world's savings. Importing several hundred billion dollars annually, it has sought to re-establish its productive lead of the fifties by a focussed drive for world domination in Information and Communications Technology.

This rational – for the USA. The endogenous process behind a long wave of expansion, once launched, has been documented by researchers (see for example Perez 2003) and arises because technology revolutionises a *core branch* of the world economy; an industry which is an input to all others. 1848-73 was the age of steam and the railway; 1893-1914 the age of steel and electricity; 1947-65 the age of oil and cars. This becomes the target of a prolonged wave of investment, but also revolutionises all other branches of industry, providing the basis for an investment surge throughout the economy. Any nation producing this core technology rises up the pecking order.

The contradiction is, first, that accumulation itself leads to a declining profit rate for the reasons already discussed, choking off the expansion and, second, the process is phenomenally uneven. It divides the world ever more sharply between producers of the new technology, whose domination is at each stage further reinforced, and consumers of it who become dependent. The world market does not spread the technology; it concentrates it. The phenomenon of capital export, observed by Hilferding, Hobson and Lenin, and still a vital part of advanced country operations today, is only one aspect of an overall pattern which *organises the world labour market* on a world scale under the direction of the new technology. The typical structure of the world corporation, repeated in each phase of expansion, is a core in the centre, serviced by outsourced labour-intensive activities in the periphery. This is no different today when the core technology is service-driven and the tributaries are mass industrial production, than a hundred years ago when the core technology was industrial and the tributaries were agricultural.

Inevitably therefore, nations and corporations strive to convert the source of superprofit of the core technology into a monopoly and to extract from it a rent, a stable superprofit. Rail cartels in the 1870s, the steel and electricity cartels of the early part of the last century, the oil cartels in the modern age, and the rise and rise of Microsoft are all

classic manifestations of this process.¹² Governments and nations are only too conscious of the benefits to their own capitalists, and the regulatory régimes surrounding core products are the focus of much international politics.

Today the most vivid, and advanced, expression of the process is the legal formalisation of intellectual property rights via the TRIPS agreement of the WTO. Effectively, this serves to convert technical advantage *as a whole* into a source of rent. The role of technology in dividing the world to haves and have-nots is nowhere clearer than in the conflicts over this new commodity form. Yet the contradictions of the form highlight the reasons that capitalism cannot generalise the gains from technical progress; for the first time, 'free trade' in a commodity depends on the restraint of trade in all other commodities. The pharmaceutical and agricultural companies rushing to patent genes, drugs, seeds and animals are battling not to provide them to the third world, but to prevent the third world making them.

6.7 The age of war

We do not yet know if Greenspan will achieve his lifelong objective of launching the fifth Kondratieff. The evidence, overwhelmingly, is that it has not started yet. Not only is world growth at its lowest in thirty years, but US growth is no higher than twenty years ago, and still well below golden-age levels. It has outstripped the rest of the world only by driving all others down. More decisively still, the telltale sign of a productive lack of competitiveness – a huge and growing trade deficit – shows no signs of going away.

In consequence the US's relation to the rest of the world bears a far stronger resemblance to the relation which the UK held in the 1890s, than that of the US in the 1950s or the UK in the 1850s. Does this rule out a new Kondratieff? No: despite the structural instability imposed by the UK's weakness, the period 1890-1914 saw the 'Belle Epoque', a prolonged phase of technical revolution and expanded growth.

The problem is that the Belle Epoque ushered in World War I. This highlights a crucial difference in modes of super-power domination. In the first type, seen in 1848-1873 with Britain, and 1947-65 with the USA, one power establishes exceptional productive dominance providing it with exceptional technical super-profits. It runs a trade surplus and finances the expansion of capital outside its borders, which is why the USA could build a new Germany in 1945 where Europe signally failed in 1918. The second type, however, arises when a power that has lost productive dominance nevertheless organises the commercial, financial and military system of world capitalism to recapture on this terrain what it can no longer appropriate technically. It monopolises, in short, the non-productive sources of superprofit to its exclusive advantage, leading to a hypertrophy of finance capital and all the other phenomena associated with classical imperialism.

As the Belle Epoque demonstrates, a system of great-power relations based on such economic relations is structurally unstable even if a phase of expansion ensues. The dominant power cannot hegemonise its partners because it cannot offer them anything, and competition between dominant powers becomes the highest form in which economic competition is organised.

¹² The relation between monopoly rent and profit has often been mistakenly reversed because from an equilibrium standpoint, any deviation of profits from the average must be caused by something exogenous. Rent is tribute exacted from stream of surplus profit, and monopoly is the fixation of the right to this rent in a particular form of property. No-one exacts rent from an unused building. The profit causes the rent, which brings about the monopoly, not the other way around. Baran and Sweezy's account of 'State Monopoly Capitalism' inverts this essential causative relation.

A Kondratieff expansion, whether or not it occurs, is not therefore a solution to the current fairly tendencies towards market failure. The solution lies in a different quarter, to which Marx would of course have turned: the conscious forces flung into movement by this failure and their capacity to replace the market by something better. Whether or not they succeed will depend on whether or not they understand the tasks facing them; theoretical clarity, in this situation, is not an optional extra but a militant duty.

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