

The Missing C That Threatens To Flood Us All.

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Abstract.

My paper argues that economics confuses an ideal world, where human needs are apparently central, with our actual economy, where satisfying human need can at best be seen as a by-product of a system with an entirely different and limited purpose. Marx's economics explains how the sole purpose of capitalism is to expand capital (big C) i.e. to make money. Furthermore, this limited purpose does not by happy accident trickle down to all, as Adam Smith first suggested, through production ultimately being for human consumption. Rather, the very nature of capitalist competition makes both production for production sake in boom (in the form of a build up of machinery and factory space etc, collectively termed constant capital, little c), and cyclical destruction of capital in crises inevitable. The system is thus inherently in conflict with its own restricted purpose. Marx concludes that if human needs are to be actually met i.e. human development is to become the central purpose of the system, we must move forward to a better form of society than capitalism. We shall consider these issues in the context of how we might save the environment, as the most basic human, or animal, need must be having a planet we can actually live on!

Key Words - Marx, value, use-value, crises, inequality, environment.

Introduction.

Our paper argues that economics confuses an ideal world, where human needs are apparently central, with our actual economy, where satisfying human need can at best be seen as a by-product of a system with an entirely different and limited purpose. Marx's economics explains how the sole purpose of capitalism is to expand capital (big C) i.e. to make money. Furthermore, this limited purpose does not by happy accident trickle down to all, as Adam Smith first suggested, through production ultimately being for human consumption. Rather, the very nature of capitalist competition makes both production for production sake in boom (in the form of a build up of machinery and factory space etc, collectively termed constant capital, little c), and cyclical destruction of capital in crises inevitable. The system is thus inherently in conflict with its own restricted purpose. Marx concludes that if human needs are to be actually met i.e. human development is to become the central purpose of our society, we must move forward to a better form of society than capitalism. We shall consider these issues in the context of how we might save the environment, as the most basic human, or animal, need must be having a planet we can actually live on!

Looking At 'Things' In An Unhelpful Way.

Economists are keen to refer to Adam Smith as the first great economist, but keep quiet about their choice to not employ his preferred unit of measurement, labour-time, in their own work. Classical political economists, from Adam Smith, through David Ricardo to John Stuart Mill, all employed labour-time concepts of value (Desai, 1979). Marx's choice, and development, of a labour-time concept of value simply followed the existing scientific tradition of political economy. But, as Marx explains, political economy became too politically sensitive to continue as a science, Marx (1976), pages 96 to 97:

'Let us take England. Its classical political economy belongs to a period in which the class struggle was as yet undeveloped. Its last great representative, Ricardo, ultimately (and consciously) made the antagonism of class interests, of wages and profits, of profits and rent, the starting-point of his investigations, ... With the year 1830 there came the crisis which was

to be decisive, once and for all. In France and England the bourgeoisie had conquered political power. From that time on, the class struggle took on more and more explicit and threatening forms, both in practice and in theory. It sounded the knell of scientific bourgeois economics. It was thenceforth no longer a question whether this or that theorem was true, but whether it was useful to capital or harmful, expedient or inexpedient, ... In place of disinterested inquirers there stepped hired prize-fighters; in place of genuine scientific research, the bad conscience and evil intent of apologetics.'

In the late C19th and early C20th conventional economic ideas, such as simultaneous equilibrium (Walras), marginal utility and marginal cost as the basis to demand and supply (Marshall) and optimal allocative efficiency (Pareto), were deliberately developed to counter Marx's method of analysing the economy (Lee, 2007). Let us try and summarise the method at the heart of conventional economics. All members of society, or rather agents in the economy (conventionally assumed identical by macroeconomists for 'convenience'), want to maximise their utility (happiness), so rationally trade their endowments (of resources, including their own labour) for commodities (use-values) to maximise their utility. It is a rational and fair exchange, with the ultimate point of the system being to maximise utility through consumption of use-values i.e. things.

Savings are logically interpreted as postponed consumption, encouraged by a reward for patience in the form of interest. To fund this interest investments must be sufficiently 'profitable'. The rate of interest acts to balance the level of investment to society's preference between current and future consumption. Or alternatively to a Keynesian, savings adjust to the level of investment (with investment being dependent on the rate of interest and business confidence). No matter which approach we follow investments must earn a 'real' return and not just a nominal return, which may vanish when prices are adjusted to 'real' terms through 'appropriately' accounting for inflation. Investments i.e. production processes, must produce a surplus of output over inputs in some way, but in what way, or rather in what terms?

Inputs, such as machines or raw materials are things, workers are concerned about their 'real' wage i.e. their consumption of things, entrepreneurs invest in things to earn a profit so they can buy things for their own consumption (or invest again in things, further postponing their future consumption of things). It is all about things. What things (endowment of resources) exist, society's or rather agents relative preference for different things, and the necessary by given technology combination of

things to produce other things, are now combined together in a grand utility maximising exercise (conventionally in a simultaneous economic model). We find the optimal quantity of each thing that we must produce to maximise society's (agents') utility. Furthermore we are only concerned with (actually calculate) the relative price of things, expressing the price of each thing as a ratio of the physical quantity of that thing against the physical quantity of any other thing i.e. one table equals two sheep, or four car tyres etc. Profit is ultimately seen as a physical surplus of the output of things over the input of things. Why must we have profit, or why aren't workers justly entitled to consume the entire surplus product? Quite simply we must justly reward the patient savers who made it possible to invest capital (in conventional usage meaning machines i.e. things again) and other providers of 'factors of production' such as land or entrepreneurship. It is not a conflictual system, but a rational sharing of the surplus of things between agents.

What is money doing? Money is recognised as a more convenient way of exchanging things than barter, but is not allowed (as we shall see, more precisely not for long) to disrupt the 'real' relation between things i.e. the 'real' economy determined by society's 'real' preferences, endowments and technology. The value of money is simply defined by the quantity of things it can be exchanged for. If all prices double things' relative prices remain unchanged. 'Real' economists work in 'real' terms, and are not to be 'misled' by nominal money magnitudes. Economists thus arrive at an ideal level of production and distribution of things and an ideal growth rate of things over time (an optimal growth path).

To force their efficiently maximising models of the economy into economic difficulties, so as to stoop to recognise the economic problems of the far less 'perfect' world we actually live in, economists must disrupt their 'ideal' economies. They must introduce an imperfection/external problem somehow related to humanity's imperfection, rather than the inherent nature of the market, which they have already 'proved' is ideally optimal by its very nature. To account for booms and slumps they must allow their models to cyclically move away from, and back to, or around, their ideal/long-run equilibrium. Furthermore as is conventional since the 1980's assuming agents have rational expectations poses a further problem. Agents 'know' the parameters of the 'true' model of the economy, and act to maximise their utility now,

and for all points in the future through ‘knowing’ the economist’s model! If everyone knows everything, including the ‘fact’ prices will double if the money supply doubles, then if the money supply doubles agents will instantly rationally double prices, leaving the economy undisrupted at its ‘real’ equilibrium (Lucas, 1981). Faced with such rationality economists, following their absurd logic to its own conclusion, argue that for a change in the money supply to affect the ‘real’ economy the government must change it in secret! So economists look to information problems to allow their economic models to behave cyclically; markets would be perfect if agents had perfect information, but agents lack information and thus imperfectly maximise. Information problems can now convert purely random shocks to the economy into cyclical behaviour thus ‘explaining’ the whole process of boom and bust (Kydlund and Prescott receiving the Noble prize for this valuable ‘insight’ in 2004).

Economists are extremely imaginative in finding ‘possible’ external imperfections, as they must be given the need in economics, like many other ‘academic’ ‘disciplines’, to continually publish more and more novelties to make progress in one’s career. If an economist is writing in a period of labour unrest, unions can be modelled as the imperfection to explain the cycle. Alternatively policy makers may be blamed for inappropriate policy, from Hayek (see Desai, 1995) blaming policy makers for extending too much credit in booms, and thus causing slumps by putting the economy out of balance, to Circuitists (Parguez, 1996) complaining about the rentier behaviour of Central Bankers. Mainstream economists usually assume imperfections must be simply cleared to allow the market to efficiently adjust, whereas more heterodox Post-Keynesians (like Aritis, 1992) believe the government must listen to economists (follow their models) and manage away the consequences of imperfections. The ‘conclusion’ is the same, remove the external imperfection, as far as this is possible, to attain the best approximation of the perfect market.

So how does thinking in this way shape economists’ understanding of environmental problems and how best we can ‘solve’ them? In a sense economics is well prepared, environmental problems are just another imperfection/exogenous problem for their maximising models to address or be constrained by. In the 1970’s economists developed the notion of environmental damage as an ‘externality’. Assume production creates environmental damage, related in economic models through the

loss in utility the environmental damage creates to an equivalent quantity of things i.e. its 'cost' in 'real' terms. For society to efficiently account for this we must simply tax the producer a tax equal to the unit cost of the environmental damage. The marginal social cost of producing this output including the externality can now be efficiently equated with the marginal social benefit of consuming this output. The economy has a new efficient and rational equilibrium; the environment has been 'appropriately' accounted for. But the environmental damage has not stopped, as the tax shifts the supply curve to the left the 'equilibrium' level of output and accompanying damage has fallen, but it has not stopped. We have just raised a sum of tax 'equivalent' to how agents 'value' the damage i.e. enough to compensate them for the damage in money, meaning 'real' terms i.e. ultimately through being able to consume things. If the tax was sufficient to actually clean up the damage we could simply 'efficiently' do this, but what if the loss in utility caused by the damage is smaller than the cost of cleaning it up? Maximising utility in a conventional economic model may be best achieved by not putting right the damage and paying 'compensation' instead, or by only partially cleaning up the damage.

The outcome is essentially the same if we consider the 'rationality' of insisting on clean production. If the additional cost of clean production is less than or equal to the utility society gains from clean production there is no problem, but if it is greater insisting on clean production is not 'rational'. This logic applies to all environmental and developmental choices. It is only 'rational' to pay indigenous people to preserve their trees if the utility the funding taxpayer gains outweigh their lost utility through paying the tax. Likewise there is an efficient level of charity to the poor (who threaten the environment by tending to 'excessively' breed); it all depends on the utility gained by the donor. Economists argue to maximise world utility, ultimately the consumption of things, economic development is desirable for all countries. Clearly no one can argue with the desire for the entire world's population to have a decent standard of living. So economists can argue that in the long run utility might be maximised by allowing a temporary 'efficient' high level of environmental damage for the 'initial' phase of industrialisation. The population in such fast industrialising countries being more than compensated for any environmental damage by their much higher consumption of things. Protecting the environment emerges as a 'luxury' good. Developed countries already consuming more things, can, if they suffer

sufficient loss of utility through concern for the environment, forgo sufficient consumption of things to 'offset' in 'some way' developing countries rising consumption of things.

But what do we mean by in 'some way'? We must plug all possible sources of environmental damage and environmental 'restoration' in the entire world into our model, along with our desired level of environmental protection/damage, to find the most efficient rational combination of environmental restrictions, taxes and subsidies to ensure as little utility as possible is lost. So if people really enjoy flying let them, offset the damage by either reducing emissions elsewhere by limiting activities which deliver less utility, or by funding an 'appropriate' amount of environmental restoration. Economists accept that there is a free-rider problem, my utility is maximised if you act and I don't, and if you don't act I would have to act too much for it to be practical. To escape this 'prisoners' dilemma, governments must efficiently act to reflect society's collective fears, thus maximising their electorates' utility. To be given this mandate the democracy of utility maximisation, 'value' for money, requires the population to really take the problem of environmental damage seriously. So the more we worry the more 'rational' economists' think it is to save the environment. Furthermore we may 'rationally' conclude that it is optimal to not protect the environment now, but wait until technological progress allows this to be 'achieved' with less loss of utility in the future. It's like taking out a very favourable loan, don't pay now and actually pay less than you might have paid now in the future.

To sum up, scientists need to present economists with the necessary information so they can rationally calculate the world's optimal acceptance of environmental damage, given current technology, preferences and endowments. It sounds very 'achievable', explaining why the Stern review (2007) suggests so much can be achieved at such little cost. If the politics/preferences are right the economy can smoothly adjust to being as environmentally friendly as 'we' desire. Thinking we live in such an inherently perfect economic system makes everything potentially easy. But, as we shall explain, this is all too easy. Economists through their choice of method cannot conceive that instability is inherent in the nature of the market itself, or that 'development' leads to 'underdevelopment', or that production can be for the

sake of production and not consumption. So what if the economy is not just about maximising ‘our’ consumption of things?

Finding Capital.

Marx’s analysis of capitalism is based on understanding how two distinct processes come together to produce a particular social system, the capitalist social system. Marx (1976) Chapter Seven explains how in any society things, whether they be physical or not, need to be produced. The wheat must be grown and the sick must be cared for. Labour processes, the assembly of actual/concrete people and things, are necessary for production in all forms of society.¹ In contrast Marx identifies the valorisation process as being historically specific to capitalism. The name of the game is to valorise (expand) capital i.e. to make money. It is this specific capitalist process which must be understood to reveal the essential nature of capitalism. In pre-capitalist societies the traditional conventions of the dominant powers in society (in Europe the aristocracy, the church and the guilds) directly determined the nature of production and distribution. Social stability was prioritised over ‘economic’ progress/disruption, for example Marx quotes Lancellottil, writing in 1623, Marx (1976) page 554,

‘Anthony Müller of Danzig saw about fifty years ago in that town a very ingenious machine, which weaves four to six pieces at once. But the mayor of the town became apprehensive that this invention might throw a large number of workmen onto the streets, and therefore had the invention suppressed and the inventor secretly strangled or drowned.’

Marx (1976) Part Eight: So-Called Primitive Accumulation explains how, from the C16th onwards, traditional social relations were broken down in the UK. Rather than seeking to maximise social stability the Tudor aristocracy focused on making money, with the subsequent growth of the power of Parliament being the growth of the influence of those with money making as their central aim. The rural population progressively lost any ability to directly support themselves (ceased to own or have

¹ This is not to say that all forms of society share the same concrete labour processes. McCulloch (2007) points out how the pressure to make a regular profit (the valorisation process) ensures labour processes in capitalist society seek to regulate nature, rather than to follow nature’s own rhythms.

any access to land). ‘Free’ from the ability to support themselves, the rural population became agricultural wage labourers, Marx (1976) pages 874 to 875,

‘Free workers, in the double sense that they neither form part of the means of production themselves, as would be the case with slaves, serfs, etc., nor do they own the means of production, as would be the case with self-employed peasant proprietors. ... The capital-relation presupposes a complete separation between the workers and the ownership of the conditions for the realization of their labour. As soon as capitalist production stands on its own feet, it not only maintains this separation, but reproduces it on a constantly extending scale. ... the social means of subsistence and production are turned into capital, and the immediate producers are turned into wage-labourers. So-called primitive accumulation, therefore, is nothing else than the historical process of divorcing the producer from the means of production.’

Capitalists and workers must meet in the market, or more precisely, buy and sell commodities (capitalistically produced goods and services, sold to workers and between capitalists themselves), carry out production, then meet in market again, so as to facilitate the continued valorisation of capital, and thus reproduce their social relations. To understand the valorisation process let us consider the circuit of money capital (Marx, 1978, Chapter One). We assume for simplicity that no capital is fixed i.e. that all inputs are used up entirely in the production period. Let us also assume for simplicity, following Marx (1976 and 1978), that all commodities are priced, have appropriated values, at their produced values.

$$M - C \dots P \dots C' - M'$$

Capitalists must advance M capital in the form of money. M is transformed in circulation, immediately preceding production, into productive capital C of equal value to M. C comprises of means of production termed constant capital, c, and variable capital, v, which is the value of the labour-power (workers) hired. In production (P) means of production and labour-power combine to produce an output of commodity capital, capital in the form of commodities for sale, equal to C'. Commodity capital is now sold, thus changing form back into money capital M' of equal value to C'. But how can capital valorise/expand, $M' > M$ and $C' > C$?

$$M = C = c + v = c + ? = C' = M'$$

Constant capital is termed constant capital precisely because when it is used up in production, although it changes physical form, it transfers its value, not more value or less value, to the value of the newly produced commodity capital. If labour-power also just added its value v capital could not expand. Marx has deliberately assumed commodities are sold in the market at their values to present capitalism on the surface, in the sphere of exchange/circulation, as a fair and moral system. We must enter production to find the source of profit, Marx (1976) page 280,

‘The sphere of circulation or commodity exchange, within whose boundaries the sale and purchase of labour-power goes on, is in fact a very Eden of the innate rights of man. It is the exclusive realm of Freedom, Equality, Property and Bentham. ... When we leave this sphere of simple circulation or the exchange of commodities, ... He who was previously the money-owner now strides out in front as a capitalist; the possessor of labour-power follows as his worker. The one smirks self-importantly and is intent on business; the other is timid and holds back, like someone who has brought his own hide to market and now has nothing else to expect but – a tanning.’

Centrally v represents the value of labour-power; not the total labour-time actually worked in production, which we shall denote as L . Capitalists need only pay their ‘free’ workers sufficient wages for them to be able to come back to work the next day i.e. sufficient wages for labour-power to reproduce itself.² To make profit capitalists need to ensure that their workers work longer than the value in terms of labour-time of their wages. Say wages equivalent to 5 hours of labour-time are sufficient to reproduce the worker for the next day, but the capitalist makes the worker in return for his/her wages work 10 hours. The capitalist thus extracts 5 hours of unpaid labour, surplus-value, s , from the worker each day (a 100% rate of exploitation of labour/ratio of s to v).

$$M = C = c + v < c + L = C' = M' \quad \text{because} \quad L - v = s$$

The value in terms of labour-time of commodity capital C' /realised money capital M' exceeds the value of advanced productive capital C /advanced money capital M by the surplus-value extracted from labour in production. The secret of capital accumulation is appropriating the unpaid labour of those who work, and have no choice but to work, for capitalists. Marx thus identifies workers’ unpaid surplus labour as the sole source

² Marx usually assumes, for analytical convenience, that the price of labour-power, its wage, equals its value. When Marx considers wages and the process of accumulation as a whole (Marx, 1976, Parts Six and Seven) he imagines the real possibility that the price of labour-power may fall below its value.

of profit in capitalist society. It is this surplus-value which forms the basis of profit, which is subsequently distributed in the form of rent to landlords (monopoly 'resource' holders in general), interest to monied capitalists, dividends to share holders and as profit of enterprise/the 'wages' of entrepreneurship. Workers, the majority of the population, are thus exploited by a tiny minority of capitalists, who own capital i.e. control the means of production. Clearly power is by no means even in this essentially antagonistic social relation, revealing the misguided nature of mainstream economics 'comforting' picture of the economy, designed, precisely, to hide this central antagonism, Marx (1981) pages 968 to 969,

'Capital-profit (or better still capital-interest), land-ground-rent, labour-wages, this economic trinity as the connection between the components of value and wealth in general and its sources, completes the mystification of the capitalist mode of production, the reification of social relations, and the immediate coalescence of the material relations of production with their historical and social specificity: the bewitched, distorted and upside-down world haunted by Monsieur le Capital and Madame la Terre, who are at the same time social characters and mere things. ... vulgar economics, ... finds the natural basis of its fatuous self-importance established beyond all doubt precisely in this trinity, in which the entire inner connection is obliterated. This formula also corresponds to the self-interest of the dominant classes, since it preaches the natural necessity and perpetual justification of their sources of income and erects this into a dogma.'

All 'agents' in society do not 'fairly' interact to maximise their utility, and hence 'society's' total utility. Capitalists' actions are simply aimed at maximising the growth of their capital, while the majority's 'utility' matters not a jot. Furthermore, this does not mean capitalists extract surplus-value to simply consume it through their own personal consumption. The very nature of capitalism, if capitalists are to act appropriately as capitalists, and thus continue to exist as capitalists, compels them to invest their profit/expand their capital to keep ahead, or attempt to catch up, with their competitors. Marx (1981) pages 358 to 359, note by producers Marx means immediate producers, the workers,

'The *true barrier* to capitalist production is *capital itself*. It is that capital and its self-valorization appear as the starting and finishing point, as the motive and purpose of production; production is production only for *capital*, and not the reverse, i.e. the means of production are not simply means for a steadily expanding pattern of life for the *society* of the producers. The barriers within which the maintenance and valorization of the capital-value has necessarily to move – and this in turn depends on the dispossession and impoverishment of the great mass of the producers – therefore come constantly into contradiction with the methods of production that capital must apply to its purpose and which set its course towards an unlimited expansion of production, to production as an end in itself, to an unrestricted development of the social productive powers of labour. The means – the unrestricted

development of the forces of social production – comes into persistent conflict with the restricted end, the valorization of the existing capital.’

The ultimate point of our capitalist society is to expand capital as an end in itself. No matter if the environment is in danger, for capitalism to continue growth must continue; capital must expand. People’s utility and the state of the environment simply do not come into this central aim at all. The extent that the environment is an ‘externality’ is much deeper than conventional economics can imagine. Furthermore, as we shall explore, capital cannot expand smoothly. Capital creates a barrier to itself through its own restricted end, as expressed by the tendency for the rate of profit to fall as capital accumulates in boom (Marx, 1981, Part Three), explaining why the capitalist economy must boom and slump. To sum up, we have explained the significance of one missing C, the concept of, in all its forms, of capital in general, so let us now focus on constant capital, the little c.

The Missing Little c.

It is up to ‘us’ to sort out our rubbish in the right bins to help save the environment. If we see ‘peoples’ consumption of use-values as the ultimate point of the economy it is easy, backed by our own personal experience, assuming we are not capitalists, to think that this is the dominant form of consumption in the economy. It follows that the economy’s total output ‘must’ essentially be these use-values for ‘peoples’ consumption, as Smith argued (Marx, 1978, Chapter 19) everything boils down to wages and profits in the end. Statisticians follow this logic to calculate countries’ total output/gross domestic product (GDP). GDP is the total value of ‘final’ goods and services sold to ‘us’; don’t count capitalists’ sale of goods to each other in the production process on the way, as this would be double counting. Or include both intermediary and final goods and services, but only include the value added at each stage to avoid double counting. Or, to reach the same end, focus on incomes, total wages and profits, to calculate GDP. We *all* know this is the right way to calculate total output, as it confirms to our illusion that the economy’s purpose is to maximise our consumption.

Alternatively let us imagine the economy comprises of two industries (sectors), industry I producing means of production (intermediary goods) and industry II producing means of subsistence (final consumer goods) (Marx, 1978, Part Three). For simplicity let us assume no constant capital is fixed, all constant capital circulates/is entirely used up in the production period. Also, for simplicity, let prices/appropriated values equal produced values by assuming both industries share the same ratio of constant capital to variable capital (organic composition of capital). Let us set the rate of exploitation of labour (ratio of s to v) at 100% in both industries. Also, for simplicity, let us implicitly set prices such that £1 represents the monetary expression of one hour of labour-time i.e. if c equals £100 its value in labour-time is 100 hours. Finally, again for simplicity, we assume the economy is simply reproducing itself (Marx, 1978, Chapter 20) i.e. is not growing, but producing at the same level each period, with capitalists personally consuming all profit.

Table 1 – Simple Reproduction.

Industry	Constant Capital c	Variable Capital v	Surplus Value s	Total Capital $C' = M'$	Profit Rate $s / (c + v)$
I	£800	£200	£200	£1200	20%
II	£400	£100	£100	£600	20%
Total	£1200	£300	£300	£1800	20%

Industry I produces sufficient means of production, £1200, so that industries I and II can apply the same level of constant capital input next period. Industry II produces sufficient means of subsistence, £600, to allow industries I and II to again employ next period a total of 600 hours of labour-time for a variable capital of £300, and to allow capitalists in industries I and II to consume means of subsistence equal to £300 (the entire profit). The industries are in balance, industry II can buy the £400 of means of production it needs to renew production by selling workers and capitalists in industry I £400 of means of subsistence. £1500 of capital (c plus v) is advanced at the start of the period, which grows by the surplus-value extracted from labour in production, £300, to a total capital of £1800 at the end of period. As we assume simple reproduction capitalists personally consume the entire growth of their capital, applying £1500 of capital again next period.

Conventionally GDP would be calculated as v plus s , at £600, the total value added by living labour in the period. In simple reproduction we assume all s , like v , is consumed in the form of means of subsistence, so GDP equals the output of industry II. But £1200 of means of production were also produced in the period, total output is thus £1800.³ Yes these means of production are not being used for workers' or capitalists' personal consumption, but this does not negate the fact that they were produced. In terms of the valorisation process constant capital is simply transferring/preserving its value through production. We start with constant capital with a value of £1200, and finish with new commodities, which embody this value of £1200, plus v and s , £600, a total value of £1800. As we assume no constant capital is fixed it has all been applied and used up in production, changing physical form as it transfers its value to newly produced commodities. Yes its preservation of value, but through production of new commodities. Likewise the value of variable capital is preserved, paying wages of £300 at the start of the period ensures workers still exist at the end of the period, to be hired again for the next period (note this period's workers consume means of subsistence produced last period). So preserving the value of variable capital requires the production of commodities, just as preserving the value of constant capital requires the production of commodities, so how can we justify including the former in our calculation of total output but not the latter?

If we wish to calculate how much capital has actually expanded over the period we should only consider surplus-value. However, if we wish to consider how many commodities have actually been produced in total, to preserve the value of capital advanced and augment it with a surplus-value, it makes no sense to exclude constant capital.⁴ Total output, plain and simply, is $c + v + s$ (£1800), not $v + s$ (£600).

Conventional estimates of total output/GDP thus severely underestimate what total

³ If the economy is growing/capital is accumulated part of the surplus-value (in the form of means of production and means of subsistence) is invested as additional c and v input next period. Conventional GDP would still equal v plus s , represented by the total output of industry II, plus the excess of industry I output of means of production over the total input of means of production in I and II. So, absurdly, the production of 'extra' means of production is recognised in GDP, but not the production of the same level of means of production!

⁴ If some constant capital is fixed, meaning it is not entirely used up in production, only the used up portion of fixed capital transfers its value to newly produced commodities. The value which remains, has not been used up yet, of fixed capital at the end of production is still part of total capital, but it is not part of the period's total output.

output actually is. This is not to say that capitalists can't be forced to productively consume in an environmentally friendly way, sort out their bins properly, but hiding this huge act of productive consumption from GDP cannot help us to understand the importance of this form of consumption. Whereas society relies on 'our' goodwill to sort our bins out in our own 'free-time', capitalists have no such 'free-time'. The produced unit value of any commodity depends on the average labour-time it takes in that industry, over all producers, to produce that commodity. Assuming sorting out the bins is not compulsory by law, competition between producers will ensure this expenditure of labour-time does not count in forming the commodity's value. So if a capitalist does take the time to sort out their bins they must fund this from their profits, ironically from labour-time extorted for free from workers.⁵

'Progress' But Uneven Development and Inherent Instability.

Let us first explain the importance of an industry's organic composition of capital (ratio of constant to variable capital) to the value it appropriates i.e. the price competition will tend to establish in that industry. If each industry appropriated the surplus-value it extracted in production, industries with an above average ratio of c to v would make a lower profit rate than industries with a below average ratio of c to v, Marx (1976) page 421,

'Everyone knows that a cotton spinner, who, ... employs much constant capital and little variable capital, does not, on account of this, pocket less profit or surplus-value than a baker, ... For the solution of this apparent contradiction, many intermediate terms are still needed,'.

Marx (1981) Part Two provides us with the solution to this apparent contradiction, Marx (1981) page 264,

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|------|------------------------|--|
| I. | $80_C + 20_V + 20_S$. | Rate of profit = 20 per cent.
Price of the product = 120. Value = 120. |
| II. | $90_C + 10_V + 10_S$. | Rate of profit = 20 per cent.
Price of the product = 120. Value = 110. |
| III. | $70_C + 30_V + 30_S$. | Rate of profit = 20 per cent.
Price of the product = 120. Value = 130.' |

⁵ Clearly some capitalists as a marketing exercise strategically choose such a 'waste'. This may allow, through a favourable price premium, the individual capitalist to earn a profit in excess of the surplus-value they themselves extract, but only at equal cost/lost profit to capitalists elsewhere.

In this second illustration of the problem in Marx (1981) Part Two Marx does not define any constant capital as being fixed, so all constant capital circulates transferring its entire value to the output of each industry. The total produced value of output equals 360 hours of labour-time (120+110+130), priced at 360 (120+120+120) what? As prices are expressed in money the total price of output must be £360, one unit of money represents one hour of labour-time. Total price/appropriated value equals total produced value, with total profit, £60, equalling total surplus-value, 60 hours of labour-time. Labour is maintained as the sole source of value and surplus-value. In capitalism competition, the movement of capital between sectors in search for profit ensures activities with different organic compositions of capital will tend to share the same rate of profit. The price of each industry's output will tend to its price of production, its cost price c plus v , equal to 100 for each industry, plus the average profit rate, equal to total s over total c plus v , $60/300 = 20\%$. The price of production is thus £120 for all three industries. Industry II appropriates 10 more hours of surplus-value than it extracts in production because industry III appropriates only 20 of the 30 hours of surplus-value that it extracts in production. Commodities' prices, their appropriated values, are still determined by their produced values, but in a more complex way, through a transformation.⁶

In our global economy equalisation of profitability across industries implies that developed countries, which tend to be more 'capital' intensive (higher ratios of c to v), will experience a transfer of value from developing countries, which tend to have

⁶ Kliman (2007) records how 'Marxist' economists have challenged Marx's solution of the 'Transformation Problem'. In 1906-07 Bortkiewicz (1952 and 1984) first employed a simultaneous and dualistic method, imagining price (appropriated value) in money and value (produced value) in labour-time as separate systems, to assert that Marx's theory of value is internally inconsistent. Sweezy (1942), and then Samuelson (1971), helped this 'fact' to become 'mainstream Marxism', with Marxists attempting to modify Marx's value theory to make it consistent. Centrally Steedman (1977) proved that taking a simultaneous approach ensures values are perfectly proxied by physical quantities. Marx's concept of value is made redundant, leaving Marxist economists working in the same physical/use-value/'real' terms as mainstream economists. The Temporal Single System Interpretation (TSSI) of Marx (Freeman and Carchedi, 1996) argues that Marx actually employed a sequential approach, and imagined prices and values within the same single system i.e. prices being sequentially dependent on values and values being sequentially dependent on prices. At the end of production the monetary expression of labour-time (total appropriated value/prices expressed in money divided by total produced value expressed in labour-time) allows us express commodities' produced values and their appropriated values either in units of labour-time or units of money. Applying a sequential and non-dualistic approach to Marx's value theory ensures the apparent internal inconsistency, identified by Bortkiewicz, disappears or rather was never there in the first place. Kliman (2007) explains how hermeneutically it makes no sense to apply a particular method to an author, and then label them as inconsistent, when an alternative method exists that ensures their work actually is consistent.

more 'labour' intensive industries (lower ratios of c to v). Capitalist 'fair' trade is thus fundamentally 'unfair' in human terms. Furthermore, recognising that total profit is given by the total surplus-value extracted in production in the global economy helps us to understand the role of monopoly in developing countries' underdevelopment. Marx (1981) page 1001 explains that if a monopoly, for whatever reason, can successfully charge a price above its price of production, and thus enjoy higher than average profit, then it is not being subject to the transformation procedure. Monopolies' profits have to be subtracted from total profit, with the remaining profit being equally distributed, according to capital advanced, in the competitive sector of the global economy. High monopoly profits are a drag on all competitive firms' profit rates, but it is capitalists in developed countries who are aggressively seeking the enforcement of intellectual property rights to create monopolies. This places a disproportionate burden on developing countries, precisely because more of their industries are in competitive sectors of the world economy. Additionally, high monopoly prices, notably on medicines or producer goods with the latest technology, may price these commodities out of the reach of many people and capitalists in developing countries.

So far so bad for developing countries, but in capitalism the problem goes further. We must recognise that in all industries there are above average, average, and below average productivity producers. Let us, for simplicity, assume that no monopolies exist in any industries, and consider an industry with the economy's average ratio of constant capital to variable capital. Competition will ensure all producers in the industry will realise the same price for every unit of the commodity, every use-value, they produce. An average productivity producer will have, by definition an individual produced unit value of their output equal to the average for that industry. As the industry has the economy's average ratio of constant capital to variable capital, this average unit produced value will equal industry price/appropriated value, ensuring the average producer will appropriate the same value as they produce and earn the average rate of profit for the economy as a whole. Above average productivity producers will produce more use-values per unit of capital advanced, so their output will have a lower individual value than the social average, and consequently realise above average profit i.e. more surplus-value than they produce. Conversely, below average productivity producers produce less use-values per unit of capital advanced,

so have a higher individual produced unit value than the social average, and realise below average profit rates i.e. less surplus-value than they produce. So equalisation of profitability across industries transfers surplus-value, and unequal productivity within industries also transfers surplus-value.

Marx (1981) Part Three explains that higher productivity results from introducing new technology, which tends to increase both the scale of production/size of firms and the proportion of constant capital applied compared to variable capital, raising the organic composition of capital. The search for above average profit thus provides an impetus for firms to invest their profits and to merge/concentrate, creating ever-larger firms with ever-higher ratios of constant to variable capital. Let us leave aside for the moment the central significance of the tendency for the organic composition of capital to rise to the behaviour of the profit rate over time. All firms, in every industry, need to invest to improve their productivity, to stay ahead, attempt to catch up, or to just not fall further behind, but it is the most productive who will have the largest profits and thus the ability to stay ahead through investing most.⁷ This ‘natural’ process of competition explains why the capitalist economy has an in built tendency to grow, for capital to accumulate, but it does not ‘naturally’ lead to the below average catching up. Below average firms, with the thinnest profit margins, are under greatest pressure to exploit their workers. They may push wages below the value of labour-power, leading to the moral and physical degeneration of their workforce. Below average productivity firms exist in all countries, by definition in ‘local’ industries not subject to international competition, but capitalism’s historic tendency to uneven development has concentrated the above average productivity firms in developed countries and the below average in ‘developing’ countries.⁸ Productivity improvement, the progressive side of capitalism, leads to uneven development; development begets underdevelopment, Freeman (1996) pages 253 to 254,

⁷ Potts (2007) explains how leading firms invest in research and development to stay ahead. Research and development discovers new production processes and use-values, but a commodity’s value depends on the labour-time required for its reproduction, not its invention. We thus contend that research and development is an act of consumption of profit/surplus-value that, if successful, allows the capitalist to appropriate more surplus-value than they produce. So research and development represents a ‘waste’ of surplus-value, conducted to attract surplus-value from those who cannot ‘afford’ to ‘waste’ it.

⁸ We could more accurately refer to developed countries as subsidised by more than their own human effort countries, and developing countries as ‘charitable’ donators of part of their human effort to the non-needy countries; its Robin Hood in reverse.

‘Capitalist progress is simultaneous destruction and construction irrevocably intertwined. In raising the *average* productivity of human labour it directly lowers the productivity of *most* human labour because it concentrates the value of each commodity in the hands of a minority, those who deploy the most advanced technology. Otherwise there would be no incentive to deploy the new technology. The more technology becomes a universal component of all means of production, the more pronounced this phenomenon and the less protection the benefits of nature afford to those denied the fruits of technology. This, one of the absolute limits on the capitalist mode of production, has been surgically excised by the mainstream theories, both non-Marxist and supposedly Marxist, which seek to understand it.’

Whether capitalism’s tendency to increase productivity ensures the impoverishment of the majority of the world’s population is only relative or absolute is a matter of statistical enquiry (see Freeman, 2004, for such an enquiry). The overall point is unaffected; capitalism’s inherent uneven development will lead to a widening gap between developed countries and ‘developing’ countries, and between those associated with above average, average and below average productivity firms within countries. Marx thus provides a clear theoretical explanation for the growth of inequality, both between countries, and within countries; a phenomenon conventional economics cannot account for.

So use-value is key in capitalism, but indirectly, through helping to determine the distribution of total profit between firms, with total profit not being dependent on use-value, but on the total surplus-value extracted from labour. The tendency for productivity to increase, for more use-values to be produced per unit of labour-time, ensures the growth of use-values must be faster than the growth of capital in value terms. *So the form of growth that matters to the environment, the proliferation of objects, is higher, and a mere ‘side-effect’, of the growth rate that matters to capitalists.*

Productivity improvement indirectly benefits firms by cheapening commodities in labour-time terms and thus cheapening variable capital (workers). As commodities cheapen a set use-value based standard of living requires the payment of lower wages, allowing v to fall relative to s , producing relative surplus-value (Marx, 1976, Part Four).⁹ With productivity improvement allowing capitalists to appropriate a greater share of the working day we might imagine that profitability would steadily rise over

⁹ Surplus-value can also grow absolutely if the length of the working day, or the intensity of labour, is increased (Marx, 1976, Part Three).

time. However, as we explained, technological change/the accumulation of capital tends to raise the organic composition of capital. Constant capital, whether it is fixed or circulates, grows at a faster pace in value terms than variable capital, so given living labour is the sole source of surplus-value, total capital advanced will tend to grow faster than total surplus-value. The profit rate, $s / (c + v)$, will tend to fall as capital accumulates (Marx, 1981, Part 3). It seems irrational, growth, with accompanying productivity improvement, will tend to lower the profit rate until it is low enough to disrupt accumulation i.e. lead to crisis.¹⁰ Individually capitalists are acting rationally, behaving as capitalists should, but the sum of this process is inevitable self-defeat in crisis. This is why Marx believes that ‘The *true barrier* to capitalist production is *capital itself*’ (Marx. 1981, page 358).

In crisis (recession) capital sacrifices itself! Individual capitalists, particularly those with below average productivity, go under. Some capital is physically lost, old machines are scrapped and factories are closed forever, but much capital is just morally depreciated, reduced in value through its reduced price. In this way the value of constant capital rapidly falls. Some workers are made unemployed, those who remain in work may have their wages pushed below the value of their labour-power, and/or be forced to work more intensively, and/or have their working day increased. Together much cheapened constant capital and a higher rate of exploitation of labour combine to restore the profit rate to a high level, and so return the economy to accumulation/growth again. The cycle is not accidental, or externally imposed, its part of the essential nature of capitalism. Potts (2010a) explains how Marx thought that falling profitability in boom would cause capitalists to increasingly switch their profit, and even their capital entirely from productive investment to speculative investment.¹¹ When speculative bubbles burst it appears that a purely financial crisis has erupted, not the inevitable crisis that is necessary to restore profitability in value

¹⁰ Simultaneous ‘Marxists’, like conventional economists, through employing a use-value based approach, dispute the tendency for the rate of profit to fall (Okishio, 1961). As productivity increases the profit rate in use-value terms rises, but as Kliman (1996) makes clear, this is not the profit rate that Marx believes has a tendency to fall. Profitability in value terms falls precisely because of the rising organic composition of capital that increases productivity/profitability in use-value terms. Potts (2009) employs a common scenario of a growing economy, with rising profitability in use-value terms, to show how, if we take a simultaneous and dualistic (to price and value) approach, the profit rate, identical in use-value and value terms, rises. In contrast, if we take a sequential and non-dualistic approach, the profit rate in value terms falls as it rises in use-value terms.

¹¹ In shares, government bonds, other forms of tradable debt etc collectively termed by Marx fictitious capital, a capitalisation of a return to create an imaginary sum of money/capital.

terms, the only terms that ultimately matter in capitalism. Kliman (2009), see pages 52 and 53, calculates that profitability in value terms in the US corporate sector fell during the Golden Age, fell further in the 1970's, and then since the 1980's has cycled at a still lower average rate (or has further declined on average, depending on which rate we consider). Kliman (2009) argues that sufficient crisis to decisively restore the profit rate has been avoided through governments expanding credit. Surplus capital and easy credit have combined to drive globalisation (free movement of capital internationally), fuel speculative bubbles everywhere, and create a usurious expansion of lending to the public in developed countries (Potts, 2010b). Such attempted postponement/limitation of crisis is however no cure, growth and productivity improvement have averaged at much lower levels in the last 30 years than during the Golden Age (Kliman, 2009). Only time will tell if the current crisis will be sufficiently large to decisively restore the profit rate and return us to a strong boom, finally breaking the recent pattern of continual relative stagnation.

The Beast You Can Not Tame?

So given the essential nature of capitalism how easy is it to save the environment while retaining capitalism? We suggest imagining that this can be achieved at little 'cost' is completely unrealistic, and doubt if the political commitment to take and police sufficient action to save the environment can be reached at all, in our essentially competitive, antagonistic, unstable and deeply unequal world. But let us assume that we did agree on sufficient clean production and restorative measures to save the environment. Insisting on clean production would increase the unit value of commodities, increasing the value of labour-power. If capitalists increased workers' wages to match the increased value of their labour-power profits would fall. Alternatively, if they kept wages constant, workers' wages would fall below the value of their labour-power. Furthermore, to pay the tax necessary to fund restorative measures, workers' take home pay must fall and/or firms' post-tax profits must fall.

Capitalism is not a consensual system able to accommodate reduced profitability; rather it already has an in-built solution to falling profitability, change through crisis. Crisis will morally and physically destroy constant capital. Individual capitalists will

be ruined. Some workers will suffer unemployment, those in work will be under pressure to work longer, more intensely and for lower wages, likely to be below the value of their labour-power. As the value of labour-power is influenced by social convention (Marx, 1976, Chapter Five), in developed countries workers can become used to fewer necessities, causing the value of their labour-power to adjust down to lower wages. In developing countries, where the value of most workers' labour-power includes few such 'luxury' necessities, wages falling below the value of workers' labour-power will lead to those workers, and their families, existing in a 'crippled state' (Marx, 1976, page 277). As below average producers are more likely to go under, and are concentrated in developing countries, the already poor are likely to be hit hardest. Furthermore, the technology to produce cleanly is likely to be developed by leading producers, and have a high monopoly price. Environmentally clean technological progress is thus likely itself, like any new technology in capitalism, to lead to further uneven development and inequality in the world. If such technology is subsidised the necessary tax must ultimately be paid by workers in developed countries, so as to allow capital its profit and avoid capital having to restore the 'balance' through crisis.

Finally, once we have the beast tamed i.e. sufficient crisis has occurred to return to accumulation as usual, but now in an environmentally clean way, this does not mean that capitalism will suddenly become benevolent to people as well. Cyclical crisis will still ruin lives; the advanced capitalists/countries will still go forward at the expense of everyone else. Production for production's sake will continue to occur, only for capital to become a barrier to itself, while the, at least relatively, improvised vast majority of the world's population looks on.

Of Course There Is An 'Easy' Way.

To satisfy many human needs we really do require use-values, quantities of things. A society designed to actually satisfy those needs could achieve this unencumbered by production for production's sake, systematic uneven development and recurrent crises. Marx believed that the ultimate point of a superior society to capitalism would be the development of humanity as an end in itself, Marx (1981) page 959,

‘This realm of natural necessity expands with his development, because his needs do too; but the productive forces to satisfy these needs expand at the same time. Freedom, in this sphere, can consist only in this, that socialized man, the associated producers, govern the human metabolism with nature in a rational way, bringing it under their collective control instead of being dominated by it as a blind power; accomplishing it with the least expenditure of energy and in conditions most worthy and appropriate for their human nature. But this always remains a realm of necessity. The true realm of freedom, the development of human powers as an end in itself, begins beyond it, though it can only flourish with this realm of necessity as its basis. The reduction of the working day is the basic prerequisite.’

Fundamental choices would still have to be made. Kalecki (1972), summarised in Potts (2001), explains how we would have to balance the need to invest in production and technological progress, to better satisfy human needs in the future, with the requirement of devoting sufficient resources to satisfying human needs today. Society would have to balance the time necessary to produce use-values to satisfy needs with peoples’ need for leisure i.e. decide when the realm of necessity ends and the true realm of freedom begins. Kalecki (1972) argues that to meet these challenges we must develop a use-value-based system of democratic rational central planning. Ironically, such a society based on producing use-values to satisfy human needs is closer to the abstract world conventional economists imagine we live in, than the capitalist system we actually live in. However, rather than imagining that a benign market can relieve people of the responsibility of having to make collective decisions, such a system would directly rely on people making democratic collective decisions. Saving the environment in such a society would initially cost us some time, by increasing the working time necessary to produce the use-values required to satisfy our needs. But a healthy environment is not an externality; it is a prerequisite for human development, while we could reclaim this time quickly, and equally for all, by sharing improvements in technology.

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