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Preventing Technological Unemployment by Widening our Understanding of Capital and Progress

Making Robots Work for Us*

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DOI

[10.1080/17496535.2018.1512641](https://doi.org/10.1080/17496535.2018.1512641)

Publication date

2019

Document Version

Final published version

Published in

Ethics and Social Welfare

Citation (APA)

Naastepad, C. W. M., & Houghton Budd, C. (2019). Preventing Technological Unemployment by Widening our Understanding of Capital and Progress: Making Robots Work for Us . *Ethics and Social Welfare*, 13(2), 115-132. <https://doi.org/10.1080/17496535.2018.1512641>

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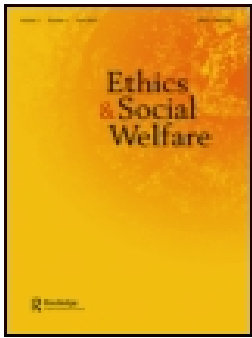
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To cite this article: C. W. M. Naastepad & Christopher Houghton Budd (2019): Preventing Technological Unemployment by Widening our Understanding of Capital and Progress: Making Robots Work *for Us*, Ethics and Social Welfare, DOI: [10.1080/17496535.2018.1512641](https://doi.org/10.1080/17496535.2018.1512641)

To link to this article: <https://doi.org/10.1080/17496535.2018.1512641>



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Published online: 05 Jan 2019.



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Preventing Technological Unemployment by Widening our Understanding of Capital and Progress: Making Robots Work for Us*

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ABSTRACT

Unless we direct technology, technology will increasingly direct us, with mass un(der)employment and a possible atrophy of the human soul (i.e. human thinking, feeling and will) as likely consequences. The root of such problems is a failure to understand capital fully, itself a consequence of a failure to understand fully the human condition. The solution is to complete today's incomplete theory of capital so that capital can take on its true role as the enabler of human capacities.

KEYWORDS

Capital; homo economicus; Aristotelian character; basic income

Introduction

Visions of a future where technology – especially automation, robotisation, artificial intelligence – will render human work unnecessary have led to support for proposals to provide individuals with a ‘basic income’ that is not linked to work. Such proposals are based on ethical solutions in the legal-political sphere such as the redistribution of income after ‘the market’ has done its work – or morality ‘after-the-fact’. The view taken in this paper is that the answer to technological un(der)employment¹ lies neither in more regulation from outside, nor in more freedom for markets, but in the development of the morality inherent to economic life itself, inspired by a wider understanding of capital and progress. For the phenomenon of technological un(der)employment is ultimately neither technological, nor economic or political, but cultural: a consequence of too-narrow a conception of capital and the principle that guides it.

A solution to unbounded technological progress leading to a ‘future [that] doesn’t need us’ (Joy 2000) requires a reconsideration of capital and of progress itself. Today we witness a peculiar co-existence of, on the one hand, ‘superabundant capital’ (Bain & Company 2012a, 2012b) in some places, and a shortage of funds in other parts of

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*This paper is based in part on joint work by the authors for the E.U. Seventh Framework Programme (FP7) research project *Creating Economic Space for Social Innovation* (CrESSI). The authors are grateful to two anonymous referees for comments on an earlier version of this paper and to the editors for their patience and encouragement.

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society. While capital is accumulating and preserved in ‘cash pools’ (Pozsar 2011), the initiatives of many individuals remain unfunded or under-funded. If human life has an end or purpose, and if, taking our cue from Aristotle, this end is the realisation of the individual’s *τέλος* (*telos*, purpose), or the full development of the individual’s human potentialities (Mill 1859; Downie 1966), capabilities (Sen 2001; Nussbaum 2011), capacities and aspirations (Houghton Budd 2011), this is hardly an efficient state of affairs.

The proposition of this paper is that the root of the problems we are facing with technology is a failure to understand capital fully, itself a consequence of a failure to understand fully the human condition. Our current concepts do not provide a satisfactory solution to the questions posed by technology because they throw light on only one aspect of capital – its role in financing physical production – and miss the other aspect: capital as an enabler of human capacities.

Completing today’s incomplete theory of capital by incorporating both aspects requires a rethinking of the nature and purpose of capital so that within its totality we distinguish between the capital that pertains to the physical economy – the production of material values, or goods – and the capital that belongs to the creation of non-material values, meaning the development and unfolding of human capacities.

We offer a view on capital and the economy that links the satisfying of material needs to the enabling and unfolding of our capacities – the latter rather than the former being everyone’s *telos* or purpose. If capital and technology were recognised as serving the *telos* of human life as well as material conditions, we would be taking the much-needed next step of educating *homo economicus* to include an understanding and indeed ethics capable of channelling capital and technology in ways that would permit human beings to unfold and develop their capacities further.

Humanity’s ‘permanent problem’

Unless we manage technology, we will increasingly be managed by it. Likely consequences are technological mass-unemployment (e.g. Frey and Osborne 2013; Spence 2014; Vogel, Kratena, and Hrubyai 2015; Acemoglu and Restrepo 2017) or technological *underemployment* – the transfer of people whose work has been displaced into low-paid, low-qualified work (Hassel 2011) that serves mainly to occupy or control people (Graeber 2013, 2015). Another possible consequence is a progressive atrophying of the human soul² due to an overdose of technology that displaces rather than supplements human capacities (Graeber 2013; Carr 2014; Head 2014; Spitzer 2014).

Such prospects raise questions regarding the normative economic principle that has been assigned to give direction to capital, influencing in turn which technological and technical developments get funding (Naastepad and Houghton Budd 2015). When guided by *homo economicus*, technology tends to be used as the handmaiden of the (neoclassical) principle of profit maximisation – or its modern version, maximisation of shareholder value – which considers human physical and intellectual work as a cost to be minimised; technological un(der)employment and an erosion of the human mind are two important potential social and cultural consequences (Naastepad and Mulder 2018).

The problem that causes technological un(der)employment, we suggest, is not capital per se, but the lack of a perspective which tells us how today's 'excess liquidity' (Rüffer and Stracca 2006) or 'super-abundant capital' can be used productively. That capital accumulation would, in our time, throw up serious problems, was foreseen by Keynes when, in his 1930 essay *Economic possibilities for our grandchildren*, he estimated that within less than a hundred years from then, standards of living would have risen more than enough to cover material necessities. If average living standards were eight times higher in 2030 than in 1930, Keynes speculated, people would have enough income to turn their attention to other things in life besides material subsistence. Humanity would have solved its economic problem. Beyond this point, the further accumulation of capital *for economic purposes* (i.e. production to support material existence) would make no sense.³

But what, then, is the purpose of capital when it increasingly separates itself from the economy and accumulates in 'financial markets'? Keynes (1930) pointed to 'the real values of life'. Developing the economy to a level where it can meet everyone's material needs is a temporary problem that will be solved through the accumulation of knowledge and physical capital and the resulting growth of production and productivity; humanity's 'permanent problem' is to recognise the purpose of the free time that the growth of knowledge and productivity will bring:

... for the first time since his creation man will be faced with his real, his permanent problem – how to use his freedom from pressing economic cares, how to occupy the leisure, which science and compound interest will have won for him, to live wisely and agreeably and well (Keynes 1963, 367).

Keynes warned that it will be only 'those peoples who can keep alive, and cultivate into a fuller perfection, the art of life itself and do not sell themselves for the means of life, who will be able to enjoy the abundance when it comes' (*ibid.*, 368). With dread, he wondered whether humanity would be able to find anything more amusing to do than continue to chase money and capital. Shall we be able to:

rid ourselves of many of the pseudo-moral principles which have hag-ridden us for two hundred years, by which we have exalted some of the most distasteful of human qualities into the position of the highest virtues (*ibid.*, 369)?

What are we to do with the free time *and* accumulated capital which are at our disposal once we have solved the economic problem? Keynes knew very well that unto itself economic theory does not provide answers to such questions. He himself hinted at qualities of life beyond material existence – suggesting, indeed, that these are more 'real' than the struggle for material existence itself – which would solve the problem of free time.

In *Keynes – the Return of the Master*, Skidelsky (2010, 134) draws attention to Keynes's Aristotelian underpinnings – especially the idea that 'we cannot ... do fine actions if we lack resources'. It is in these terms, ultimately, that Keynes understood 'the economic problem': as providing the material conditions for non-material development. However, Keynes failed to formulate a full answer, because it seems not to have occurred to him – as we propose to do in this paper – to relate what he recognised as the 'real values of life' to the capital that is freed in the economic process.

A central motive in human life, and its distortion

Capital and its link with ‘the real values of life’ can be understood, we propose, by investigating how economic values are created, and by tracing the role of capital in this process.

In essence, the values that are created in economic life result from two sources in combination: *labour* applied to the natural world (e.g. cultivating the land, and processing, forming and shaping all sorts of materials taken from nature), and the organisation and improvement (so-called division) of labour by *capital*, but capital understood as applied intelligence. According to conventional (neoclassical) economics, value is created by three ‘production factors’, namely land or nature (*N*), labour (*L*), and capital (*K*). However, within the production process *N*, *L* and *K* stand in specific relationships to one another. Therefore, it would arguably be more precise to say that values are created by *L* as it works upon *N*, in combination with *K* (understood as human intelligence) as it organises *L*.⁴

In following out this ‘twin value theory’⁵ – value created by labour and capital in combination – and observing how capital is reflected in accounting, we find that capital is a phenomenon that we meet in three main ways. The capital that organises and ‘augments’ or ‘enhances’⁶ labour is *ideas* or ‘*intangible capital*’ – human knowledge, intelligence, consciousness, in short, human spirit.⁷ We use insights to make labour more effective, in particular by ‘extending’ labour with means of production (tools, vehicles, machines etc.), i.e. *physical* or *tangible capital* (‘fixed assets’ in terms of accounting).

In this perspective, therefore, all tangible capital originates in an idea, invention or latent capacity which arises *outside* the actual process of production, exchange and consumption of goods. This is capital before it materialises, as it were, as means of production. Of course, some ideas, such as the lyrics of an opera or a doctor’s intuition, do not become means of production; they may contribute indirectly to the creation of material value but they also have value and effects in their own right.

Economically speaking, the ideas embodied in tangible capital continually disturb economic life, upsetting existing production processes and related social and economic arrangements by enhancing the productivity of goods production – thus giving rise to a third kind of capital. A characteristic feature of the means of production – and economically speaking, the reason why they are developed, bought and installed – is that by making labour more effective, they obviate labour, hence ‘labour-saving’ devices. When labour is obviated, the money that was used to remunerate it is no longer needed for this purpose; in accounting terms it appears as profit on the Income-Expense account and accumulates as ‘own capital’ on the Balance Sheet. In this paper we call this *freed capital*.⁸

Common parlance often does not reveal the labour-obviating characteristic of capital. For example, the term ‘employer’ derives from the (Marshallian) notion that capital is a superior factor of production that has the power of giving employment to labour.⁹ However, rather than creating employment, the nature and essence of capital inheres in the fact that it *saves*, *obviates* or ‘*stretches*’ (enhances) labour. Higher capital intensity is associated with the obviation of physical and increasingly also routine mental labour in the economy.

This characteristic of capital has important social and cultural dimensions. Inherent to the labour-saving effect of capital is the fact that this process extends until it liberates

us completely from the necessity to work *directly* in order to satisfy material wants, that being done more and more by machines, automation and so on.¹⁰ In more familiar parlance, capital is the divider of labour, freeing us from the need to work for material ends, *but not from work altogether*. In Keynes's eloquent language, showing the Aristotelian connections in his thoughts, we become free to carry out 'fine actions' (Keynes 1930; Skidelsky 2010; Skidelsky and Skidelsky 2012).

Until this is understood, rising productivity may give rise to a social paradox *and* a cultural problem. It liberates us from the necessity to labour for material livelihood; but being without work deprives our existence of meaning. If the saving or stretching of labour by capital is not to render the human being irrelevant to the economic process (e.g. Joy 2000); if it is not to result in either a loss of work (*unemployment*) or its trivialising into labour-intensive and often low-paid and unchallenging jobs (*under-employment*), as in the economic and social set-up in most countries today (e.g. Hassel 2011; Graeber 2013), the social paradox created by capital, i.e. the *apparent* conflict between the benefits from productivity growth and its obviation of work, has to be resolved.

The solution, we propose, is to widen our understanding of why we work and the form this takes – a yet unresolved *cultural* question. A clue may be given when we look again at the economic dynamic introduced by ideas and the means of production in the economy, and in particular at the freeing of capital thereby.

In times past, the majority of the working population had to spend the whole working week labouring to meet material needs. Collectively and economy-wide, and in the absence of distributional problems, the total of our output *as producers* would be divided among us all *as consumers*, enabling everyone to receive the goods he or she needed. Today, however, as a consequence of the growth of human knowledge and the emergence of industrial machines, computers, robots and so on, the goods that are needed by people are produced with only a fraction of the labour required earlier to produce similar value. When labour is obviated in production, economic balance – the balance between supply and demand, or between what we collectively need as consumers and what we collectively provide as producers – is distorted. Those whose labour is no longer needed in production lose their work, and unless initiatives are taken to prevent this, *effective demand*¹¹ will shrink.¹²

Economic balance can be restored at a new level, which may happen in different ways. For example, if an expansion of total production is required, the labour that is obviated could be re-employed in an expanding physical economy. On the other hand, if an increase in physical production is not needed, people will seek new opportunities to use and develop their capacities. This, as we aver, is not only a central motive in human life¹³, but the main characteristic and indeed next stage of any 'developed' economy worthy of the name. People will seek new work for example as teachers, scientists, nurses, doctors, therapists, actors, writers or musicians. However, they will only succeed in finding new work if this new situation is funded. Where, therefore, are we to find the capital required to fund this new potential?

Ideas and *physical capital* bring about an economic dynamic that gives rise to *freed capital*.¹⁴ Whether or not technological un(der)employment will arise depends on whether this internally generated capital is used to fund the further development of the capacities of those whose labour has been obviated. In this sense, technological

un(der)employment is not a technological or economic problem but a cultural and a social one; its existence depends on how we understand and organise capital. Technological un(der)employment arises when the capital that is freed by productivity growth is not linked to capacities when labour is obviated. For many today, the answer to this problem is becoming 'basic income' provision. But, while a 'basic income' may mitigate the distributional problem, it does not address the underlying cultural problem – our (related) narrow conceptions of capital and progress.

In following out how value is jointly created by labour and capital, we saw that capital starts with (1) an idea or *intangible capital* that materialises as (2) *tangible capital* or means of production that obviate labour, thereby giving rise to (3) *freed capital*, capital freed from its link to physical production. If freed capital were used to fund the furtherance of ideas, knowledge, capacities (in short, education in the largest and life-long sense), it would alter the future of all who have capacities to unfold but lack the funding to do so, while simultaneously reducing 'excess liquidity'.¹⁵ But would this be possible with the conception that is currently guiding capital?

According to the allocative principle of neoclassical economic theory, capital must be allocated to uses that maximise profits or shareholder value, and technological and technical development will be seconded to this goal. And because such ideas are now exported to worlds outside the corporate one¹⁶ – such as health care, education, research, jurisprudence,¹⁷ domains which previously were acknowledged as non-economic – everything is turned into 'markets' for financial investors and re-organised in ways that comport with the neoclassical imperative.

In this perspective, labour is considered a 'cost'. In neoclassical theory, in particular, profit (π) is defined as the difference between the total revenue (TR) a business receives and the total cost (TC) it incurs,¹⁸ the latter including the remuneration of labour. Because, relative to overall expenditure, a major expense in health care, education, the arts, etc. is the remuneration of the (time-intensive) work of doctors, nurses, teachers, therapists, judges, artists, etc., efforts are directed at reducing this work mainly through standardisation, automation and robotisation. As a consequence, the natural tendency of work in these realms to increase is reversed (Naastepad 2019; Naastepad and Mulder 2018).

Governing capital by utilitarian-neoclassical principles may lead to a type of rationalisation that prevents the creation of work outside the economy proper, thus precluding a solution to the obviation of labour in the economy and bringing about technological un(der)employment. Rather than using the 'productivity dividend' – the labour and capital freed by human intelligence – to support the further growth of human capacities, it is used for further accumulation. The reason is simple: Conventional capital theory is a product of an incomplete theory of value, which recognises value only in terms of the satisfaction of material needs, but does not have an eye for the role capital could play as an enabler of human capacities. Benthamite utilitarianism¹⁹ leads us to view technological innovation and economic growth as the essence of, rather than an aid towards, human progress, and to undervalue or misdescribe the cultural aspect of society.²⁰ Rather than directing capital and technology in ways that work *for* us – by allowing capital to enable individuals and so humanity as a whole to meet their aspirations – we permit them to distort this fundamental human motive.

Capital and capacities²¹

For millennia, and especially since the ‘Scientific Revolution’ which began at the end of the Renaissance, human beings have lightened human labour with the help of technology. With the growth of human self-awareness and knowledge, elements of labour have been objectified and externalised into tools and machines; the Spinning Jenny, steam machines, cars, computers and robots carry out tasks previously performed by human labour. Increasingly, routine mental tasks are also being taken over by machines.

To the extent that machines liberate people from unpleasant, monotonous or unhealthy labour and enable them to pursue new aims in life that are experienced as valuable, this is an advance in the human condition. But is this also true when creative and often complex human work, which is highly valued by those undertaking it as well as those benefitting from it because it helps them to develop further as human beings, is replaced with standardised, automated or robotised procedures? Does not then technology reduce work *unduly*?

There has been no dearth of ideas that subsequently found application in the economy. Human beings have used their ability to think to make life more comfortable by inventing new goods, such as trains, cars, aeroplanes and telecommunication, with the consequence that living standards have increased manifold. If we ask where the phenomenal increase in economic growth in the last two and a half centuries has come from, the answer is clear: it has come from the growth in human knowledge and intelligence – an expression of our growing self-awareness or (to borrow a term from Carl Jung) ‘individuation’.²² It is this that has produced the inventions and division of labour (between human beings and between human beings and machines) that have raised economic productivity. The creative human mind is the main factor behind the enormous growth of economic value. The mind does not produce goods or commodities directly (this is done by labour); but it is the fountain-head from which ideas for new and better commodities and production processes flow. The growth and refinement of knowledge and ideas have clearly been very productive economically.

But how does human ingenuity itself grow? According to endogenous growth theorists, knowledge can be ‘produced’ commercially (Romer 1990, 1993). It is true that our ability to think has been successfully applied to achieve economic goals. And obviously, to be useful at all, the growth of human knowledge needs to be a resource which the world can ‘tap’ into in order to solve real-world problems, including economic needs. But leaving the growth of human knowledge, including the direction of technological change, to be determined entirely by economic considerations – meaning today those of profit-maximising commerce – may have major drawbacks (e.g. Suarez-Villa 2009, 2012; Berman 2012).

When the idea of progress is framed only in terms of the tenets of materialism and material wealth, means and ends tend to become confused – in this case, treating technological and economic progress as an end in itself and so distorting a main motive in human life: namely, the development of an independent cultural life, including the development of morality, creativity, and a self-actualisation that includes responsibility for others.

If in addition to having their material needs met, human beings value higher goals in life, capital and the principle currently guiding it²³ will require a reconsideration. However useful Benthamite morality may have been in promoting the accumulation of

capital in conditions where capital was scarce, living standards low, and economics only in its infancy – as in 17th- and 18th-century Britain where this philosophy originated – does it provide an adequate answer to the financial, social and cultural problems of today? Does it leave room for a principled decision as to the direction one wishes to give to technological advancement, or does it pre-empt that decision, by regarding technological progress as progress itself?

Could the stage society currently finds itself in, and especially the challenge of technological un(der)employment, be seen as a riddle humanity has to solve before it can take a next step in its development – rather than as something that happens inevitably and that should be alleviated and thereby maintained and supported through a ‘basic income’?

The future growth of human capacities crucially depends on an answer to the question: what is the purpose of the emancipation of labour *and* capital from production? The growth of human knowledge and its application in the economy frees us progressively from the necessity to work *only* for livelihood. Rather than a problem, this is a profit or benefit that opens up new prospects. A problem arises only if we view freed capital merely in the context of the satisfaction of physical needs and fail to grasp the wider nature of capital, especially how it relates to the development of capacities.

As Malthus might have put it, but very unfortunately did not, the growth of productivity and freed capital is almost unlimited, but the need of human beings for material goods – goods that feed, clothe and house the body – is eventually limited. For centuries, capital has been used mainly to expand *physically* productive capacity, that is, to support growth of the production of goods.²⁴ But the need of human beings for goods is not without limit.

Slower growth of the physical economy does not mean that total value created does not grow, nor does it mean that individuals will work less. Human beings work not only for *material* livelihood. While the amount of labour needed for the physical economy is reduced by machines, etc., the time thereby freed up can be used to develop and enjoy other aspects of human life, such as better education and health care, better laws and jurisprudence, and all sorts of reflection including research, philosophy, and the arts.

Freed capital – arguably the fruit of *past capacities* – could be spent to fund *present* and *future capacities*: the aspirations of human beings, peoples and humanity as a whole that arise especially when we experience more than just material existence and long to grow not only in material terms but also, and perhaps especially in a non-material sense.²⁵ If capital is allowed to circulate for this purpose, rather than preserved and used to multiply merely financial wealth, technological un(der)employment appears not as inevitable but as the consequence of a limited understanding of capital; and capital will also become a constrained rather than a rampant phenomenon.

Property rights

Regarding the transfer of freed capital towards the initiatives of individuals aspiring to use and develop their capacities, questions are often raised regarding property. There are many who lay claim to the capital that is freed by productivity growth, including workers, managers, shareholders, and the state. However, if anyone in particular were a candidate for the ownership of freed capital, arguably (analogously to copyright) this would be the inventor of the technical or organisational improvement that liberated this capital from the production process in the first place. And yet, if it were possible to

link a particular invention to one or more specific inventors, one would likely find that their inspiration derived at least in part from their teachers, parents, colleagues, friends – in short, from many others who inspired them and who, in turn, received their knowledge and ideas from many others. It would perhaps be most practical as well as accurate, therefore, to say that improvements in the production process originate in the general development of knowledge, intelligence, ideas, i.e. in cultural progress in general. In that sense, inventions and innovations cannot really be seen as the property of any individual; they are, rather, the fruits of intelligence and cultural life more generally. Even if they were seen as the ‘intellectual property’ of one or more individuals, one might ask which would be more economical: to link freed capital to (the *past* capacities of) inventors, or to what freed capital could achieve for society as a whole by funding the unfolding of *present* and the development of *future* capacities – i.e. education in the widest sense of the term? From an *economic* point of view, is it questions of ownership that we need to ask, or how freed capital is used most productively?²⁶

As regards property, we may also consider how the means of production that bring about the economic dynamic that frees capital are financed. Businesses typically attract debt and equity to finance (a) the means of production (‘capital goods’, ‘investment goods’), and (b) working capital, i.e. the funds required to pre-finance intermediate inputs (that are used up in the production process) and the remuneration of labour (wages and salaries). Working capital can be seen as a flow, in the sense that *working capital loans* are often created and amortised several times a year, depending on the requirements of the day-to-day production process. Likewise, the means of production can be understood as stock,²⁷ in the sense that they typically last longer than a single production year (remaining on the Balance Sheet for up to 20 years or more), with the loans to finance them (*investment loans*) having a ‘lifetime’ corresponding to the productive life of the means of production; the money that financed them ‘dies’ (is *amortised*) as the means of production grow older and reach the end of their productive life.

Suppose for the moment (if only for the sake of the argument) that both working capital and the means of production are financed by loans only (rather than equity). Because such finance mirrors the (consumption and investment related to the) goods produced in a particular year, the sum of investment and working capital loans in a particular year will (roughly) equal the value of the goods created in that year. If working capital and the means of production were financed by loans, what would this imply for ownership?

As a long line of economists have sought to explain – starting with Schumpeter (1912),²⁸ Keynes (1937),²⁹ and Kalecki (1954)³⁰ through Minsky (1963, 1975) to Kaldor (1980, 1981) and others – a characteristic feature of the modern credit-based monetary system is that loans that entrepreneurs demand from licensed commercial banks³¹ to finance the means of production and working capital are created *ex nihilo* (see also Keen 2014; Werner 2014).³² But if the loans requested for these purposes are created ‘out of nothing’, are they, or should they be anyone’s individual property?³³ Or are they, rather – being based on a decision made on behalf and for the benefit of society – a gift from society to society?

Of course, it is not really the case that banks create credit ‘out of nothing’. Banks provide loans against the ideas of entrepreneurs – and ultimately against the needs (of their customers) which the entrepreneurs aspire to meet. In this sense, the credit advanced by banks is a societal phenomenon which only appears to originate in the banks. To meet

their customers' needs, entrepreneurs need to be credited with a loan – but without collateral; what used to be called 'lending to the man not the asset'. If, in this sense, the means of production belong to society – because they are financed by and for society – could we say that the capital freed by them also belongs to society? If the capital that is freed by productivity growth is a fruit of cultural and social life as a whole, should it not be used to fund the further development of capacities, arguably the source of all further cultural and social progress?

Typically, the surplus created by the economic dynamic that is set in motion by the working of intelligence in the economic process exceeds the amount required to repay investment loans. If this surplus is accumulated and preserved rather than given away to fund the (social and cultural) initiatives of individuals, it tends to take the form of equity seeking a return by demanding 'rationalisations' and reorganisations geared towards capital preservation and multiplication.

On the other hand, if the surpluses created by intelligence are allowed to 'die into' the funding of capacities, they only, as it were, disappear into a 'sink' on one side of the economy, in order to reappear as a 'spring' (of new values) on the other. That is the very nature of cultural economics. Whereas in the physical economy costs and benefits occur in the same 'space' and time, so to speak, in cultural life the costs and benefits are linked via the back of the moon.

The ethical underpinning of the circulation of capital

Technological un(der)employment arises not for lack of capital, but for lack of funding on conditions that meet the requirements of the activity being funded. Today, freed capital ends up in financial markets and manifests as 'superabundant capital' or 'cash pools' that have separated from the 'real economy'. It becomes 'footloose capital'³⁴ which, habitually, continues to seek short-run financial returns – thus causing technological un(der)employment – because currently dominant economic theory (with its origins in 17th- and 18th-century utilitarian economic thinking) does not provide a complete answer to the question what capital is and what purpose it serves in contemporary society.

As a result, the debate about capital has become political, centred on distributional conflict, with the political Left and Right taking the sides of 'labour' and 'capital' respectively, although more recently the two sides seem to be joining in proposals for a 'universal basic income' – currently promoted by the Left but originally found in proposals by advocates of the 'free market' (such as Milton Friedman) as well as by socialists. What finance needs, however, 'is to be given neutral ground', which cannot be achieved until the debate switches from the ownership of capital to the wider nature of capital,³⁵ especially, its use to support capacities, which it can do only if it is permitted to circulate.

Freed capital derives from and in turn can support people's capacities only *if* it is allowed to switch from the realm of material fulfilment to the realm of non-material aspirations. Yet, in currently dominant economic theory, value is found only in the consumption and possession of material goods, and capital has been linked to this value only.³⁶ As a result, capital and aspirations are often in different places, unable to see or find each other. Poverty more and more means: lack of resources to finance the development and deployment of one's capacities. When capital is not freed for this purpose, how can 'fine actions' develop?

If human life has a *telos*, a state of fulfilment or completion, then so, too, do technology and capital. In other words, technology will serve the human being best and capital will be most truly capital the closer both enable human beings to find fulfilment. Conversely, it is only as human beings come closer to their fulfilment that technology and capital will be given this role. It is in this sense that we understand Aristotelian *ἦθος* (*ethos*, character, or the inner sense of what is right and worthy in human life).

It is from the vantage point of *telos* and *ethos* that we suggest that, in addition to the first, intangible type of capital, there are two further kinds of capital – one financing the production of goods required to sustain livelihood, and one serving capacities, implying the building of character and unfolding of purpose.³⁷ Correspondingly, there are two tasks for the economy – to generate the goods required for material well-being, and to generate the capital that will enable people to develop their capacities – and two corresponding main categories of funding: lending and giving.

The switch from Benthamite-utilitarian *homo economicus* to Aristotelian *character* will require a major turn of the human mind; whether defined as ‘education of our desires’ (Skidelsky 2010, 135), ‘spiritual perfection’ (Mill 1859; Keynes 1930), or ‘excellence’³⁸, this will have to be schooled by practice. Supporting the further growth of capacities, this turn of the mind itself depends on the further growth of capacities, for which funding is required. When freed capital is made truly available for this purpose, it will become possible to manage technology – that is, to use it in the furtherance rather than displacement of people’s capacities. Rather than solving the problem of technological un(der)employment, this will prevent it altogether.

On the other hand, when we allow creative human work and human intelligence to be displaced by technology, entire realms within which human beings typically develop and exercise their capacities may no longer offer such opportunities. Freed capital may be used to provide the growing number of people without work with a basic income. But what is the point of first allowing technology to destroy work that is experienced as meaningful by those undertaking it as well as those benefitting from it, and then providing those whose work is displaced with a ‘basic income’, but not with opportunities to participate fully in society in all its aspects – economic, political and cultural?

Basic income is seen by many as a free gift – from those with work and property to those without – that would permit those without work to enjoy life, to learn, to make oneself useful to others, to do whatever one likes. However, other scenarios are quite likely. While an ‘unconditional income’ may help the rich to ‘ease their social conscience’, might it not also ‘further divide society’ into ‘those with good prospects for interesting employment and high income ... engaging in school and study’ and those ‘parts of society already at a disadvantage in terms of education’ (Hassel 2017)?

Worse yet, are we heading for a ‘Brave New World’ in which ‘everyone’s physical needs have been satisfied’ and people will ‘love their servitude ... which is their fate’ (Huxley 1946) because they have been administered the ‘sweet poison’ (Hassel 2017) of basic income – the ‘ultimate, personal, really revolutionary revolution’ – for ‘without economic security, the love of servitude cannot possibly come into existence’ (Huxley 1946)? A ‘Cowslip’s warren’ where people, like Richard Adams’s anthropomorphised rabbits, ‘knew well enough what was happening ... but even to themselves ... pretended that all was well, for the food was good, they were protected, they had nothing to fear but the one fear ... they

forgot ... [preferring to] liv[e] in the enemy's warren and pay his price' (Adams 1972 [1976]). Where 'the human race would be at the mercy of the machines' which make decisions for them because 'computer scientists succeed in developing intelligent machines that can do all things better than human beings can'?³⁹ Where 'the individual is increasingly deprived of the moral decision as to how he should live his own life, and instead is ruled, fed, clothed, and educated as a social unit, accommodated in the appropriate housing unit, and amused in accordance with the standards ...', thus 'render[ing] himself obsolete' (Jung 1957, par. 499–501)? Where 'the freedom to daydream under the influence of dope and movies and the radio' is encouraged with the aid of the 'sciences of life' that will modify 'the souls and flesh of human beings' to make them forget that they are no longer needed (Huxley 1946); where 'life will be so purposeless that people will have to be biologically or psychologically reengineered' (Joy 2000) to be able to endure it?

Or can we 'choose to decentralise and to use applied science, not as the end to which human beings are made the means, but as the means to producing a race of free individuals'? (Huxley 1946, 231). Both capital and technology originate in human intelligence; would we not be far more rational and efficient therefore if, in turn,

science and technology would be used as though, like the Sabbath, they had been made for man, not (as at present and still more so in the Brave New World) as though man were to be adapted and enslaved to them? (Huxley 2013, 225)

Conclusion

Technological un(der)employment is caused not by technological progress *per se*, but by a view of economics which considers work as a cost and capital and technology as the means to reduce this 'cost', rather than the route through which people unfold and develop their capacities. Basic income merely tries to compensate 'after the fact' some of the loss in income caused by this attitude rather than prevent technological un(der)employment.

Solving the problem of technological un(der)employment requires acknowledgement of the three types of capital – intangible, tangible, and freed. One dimension of capital is to serve the production of goods (as *tangible* capital). But another, arguably more important, dimension is to enable capacities to flourish and have effect. And since the source of all capital is human ingenuity, creative intelligence or spirit – *intangible* capital – it is to the latter, surely, that capital freed from production should be devoted.

Technological un(der)employment will occur unless finance switches from using capital as a means whereby people serve only narrow material ends, to becoming the promoter of further human development in general – by using the resources freed by productivity growth to enable individuals to use their *present* capacities (by working as doctors, teachers, judges, nurses, social workers, artists etc.) and to develop *future* human capacities and creativity (through education, better health care etc.). This, however, requires us to acknowledge that capital, as indeed economic life as a whole, has two dimensions, material and non-material, tangible and intangible, calling in turn on *homo economicus* to learn, as regards economic life, to circulate rather than accumulate capital.

Notes

1. See section Humanity's 'permanent problem' for a brief explanation and references regarding technological unemployment and underemployment.
2. Understood as the non-material part of the human being, the seat of the intellect, will, and feelings, which are capable of further development but also vulnerable to distortions of their healthy evolution (e.g. Jung (1921 [1990], 1957), Steiner (1909/10 [1984]), Fromm (1941 [2001]), Maslow (1943, 1954), Erikson (1963, 1968, 1974); for an application in the sphere of economics, see, for example, Sen (1996)'s plea for 'commitment' in economics).
3. This of course raises the question: 'But how much is enough?' (Skidelsky 2010, 142). Today many household incomes, even in the rich countries of the world, are not sufficient to cover material necessities. Obviously, therefore, 'solving the economic problem' includes solving distributional problems.
4. See, for example, Smith (1776 [1976], Book I, Ch. 1, p. 13–14); Marx (1858 [1993], fragment on machines, p. 690–712), Steiner (1922 [2014], Lecture 2); Baetjer and Lewin (2007); and further explanation given in this paper.
5. Houghton Budd (2016a).
6. Labour-saving technological change (also known as labour-enhancing or labour-augmenting technological change) typically derives from process innovations (adding capital to labour) which increase *effective labour* (Jones 1981).
7. A single word that incorporates all these and related qualities is hard to find in English. 'Mind' and 'intellect' do not fully cover it, while a literal translation as 'spirit' of such words as *Geist* in German or *geest* in Dutch has connotations of vagueness which are not intended here. We use the term 'spirit' in the sense of knowledge, imagination, creative intelligence, consciousness, inspiration.
8. Naastepad and Houghton Budd (2015); Wilken (1982).
9. Marshall (1890 [2013]), Appendix E: Definitions of capital.
10. The liberating effect of capital becomes obvious once one disassociates it from a particular 'class' ('labourers' or 'capitalists') and sees it as a means of agency for every human being, not only some. That said, to remove all physical labour from human life is to remove an important instrument of human dignity.
11. Effective demand: demand supported by money or purchasing power.
12. In current socio-economic constellations, a decline in effective demand is often prevented by unemployment benefits and similar income and wealth transfer measures whereby the unemployed receive an income but have no work.
13. See also section Capital and capacities.
14. In today's economic, institutional and cultural circumstances, it sits in the cash balances of the Apple Inc's of this world, or is transferred to shareholders.
15. And hence the likelihood of financial bubbles and crises (Mazzucato and Perez 2015).
16. A phenomenon called 'economic imperialism' in academia, where economic concepts are now used everywhere, including law, psychology, sociology, and medicine. See, for instance, Landes (1961), Frey (1993), Lazear (2000), Fine (2002).
17. Not only teachers and doctors are replaced by software and robots to 'save costs', also judges; when jurisprudence is first reduced to the application of existing law to a particular 'case', the step towards standardisation and automation appears not that big.
18. The profit-maximisation function is: $\text{Max } \Pi = TR - TC = p * Q - TC$, where p is price and Q is quantity.
19. The philosophical foundation of neoclassical microeconomics (Bentham 1789).
20. E.g. Russell (1935), Berlin (1958, 1959, 2008), MacIntyre (1981, 2009).
21. An expression due to Christopher Houghton Budd (see, for example, Naastepad and Houghton Budd 2015).
22. Which, according to Jung, includes and does not exclude the world (see, for example, *Individuation* (in Jung 1977, Book II, Part Two); *Von den Wurzeln des Bewußtseins* (English translation in Jung 1981); Stein 2006).

23. Namely, the claim by neoclassical economics that the pursuit of self-interest is self-equilibrating and socially optimal.
24. Distributional problems to one side once more.
25. Per Aristotle (*Metaphysics*): 'By nature, all men long to know'.
26. Conventionally, non-marketised copyright reflects the social wisdom and fairness of commensurate 'rewarding' of the author of an idea rather than crediting all benefit to him or her in the spirit of today's approach to so-called 'intellectual property rights'. (Interestingly, these were brought into the sphere of goods when the GATT was replaced by the WTO in January 1996).
27. As they are in economics, as distinguished from 'stock' in the accounting sense (of the total of finished goods and raw materials kept on the premises of a shop or business) and from 'stock' in the sense of the equity raised by a business through the issue of shares.
28. Lending to the entrepreneur by a bank is not 'the transfer of existing purchasing power' but 'the creation of new purchasing power out of nothing ... which is added to the existing circulation' (Schumpeter 1934, 106; quoted in Keen 2014).
29. According to Keynes (1937), investment can exceed savings *ex ante* and may be financed 'before the corresponding saving has taken place'.
30. In a modern monetary economy, 'investment finances itself', explained Kalecki (1954). Investment is financed *ex ante* by bank credit and the savings required to finance investment (i.e. to repay the loan) are generated *ex post*, after the investment has taken place: 'investment as it is carried out creates its counterpart in saving' (Kalecki 1993, 25).
31. Commercial banks with a permission to create money.
32. Today, banks also create money for all sorts of things they, arguably, should *not* be creating money for, such as mortgages, consumption credit, and speculative transactions.
33. Of course, the bank creating the loan will need to be recompensed for the hours spent in judging the project, administering the loan, etc.; but is the money itself the bank's property?
34. The term originates with Keynes (1941).
35. Houghton Budd and Naastepad (2016).
36. In neoclassical theory, utility or value is derived from the goods that are consumed. So it is said, because so it seems. In reality, the values that are created today are much more related to the value of the collateral against which funds have been borrowed (i.e. the value of the collateral rather than the value for consumers determines which goods are produced).
37. So that we have three kinds of capital: intangible, tangible, and freed.
38. Aristotle 2000.
39. Quotes from a passage in Ray Kurzweil's book *The Age of Spiritual Machines*, cited and discussed by Joy (2000).

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This work was funded in part through the European Commission FP-7 research project 'Creating Economic Space for Social Innovation' (CrESSI) [grant number 613261].

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