



## Limitations of human capital theory

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The dominance of human capital theory in the economics of education is matched by its authority in the public and policy domains. Nevertheless, as discussed immediately below, there is a gap between the world imagined in the theory and the real economic and social world in which it is applied, and this gap may be growing. This article will argue that human capital theory's failure to meet the test of realism derives not from lack of sophistication – since its foundation, there have been various innovations designed to increase its empirical purchase and utility – but from its meta-method. The limitations in meta-method, which are discussed below, have led in turn to a flawed and narrow understanding of education/work – and the first mover authority of human capital theory has stymied alternative conceptions.

### ***The theory and its policy contexts***

Founding modern human capital theory was the product of a particular historical moment that favoured its genesis and spread. It evolved amid the building of mass higher education in the US (Kerr 2001). The theory provided a rationale for the government-sponsored expansion of higher education, while also promising to efficiently regulate the pace and cost of expansion on the basis of the measured economic returns to graduates. The main ideas were propagated internationally by the United Nations Educational, Social and Cultural Organisation (UNESCO 1968) and later the Organisation for Economic Cooperation and Development (OECD). They became general to economic policy at the same time as another policy discourse, social rather than economic, that of equality of opportunity through education. In the conjuncture, the two policy ideas were necessary to each other (Marginson 2016a). The policy goal of equality of opportunity promised to optimise the economics of education by ensuring that all available productive talent would become educated. Human capital theory provided an economic justification for investment in expanding educational opportunity. In *Capital in the Twenty-First Century* (2014), Thomas Piketty shows that between the 1950s and the 1970s, conditions in the US were unusually favourable for the reception of these ideas (Marginson 2016a, 3–4). The potential for upward social mobility via higher education was high. Professional jobs were growing rapidly; income from inherited capital was at historically low levels; and to an extent not seen before or since, income from work was the main source of wealth (Piketty 2014, 241). Amid excess demand for educated labour, all graduates could obtain good jobs. This appeared to confirm human capital theory in practice and also underpinned contemporary optimism about the potential of higher education to create a fairer and more efficient society, in which educated merit and hard work would determine success, rather than prior family position. Piketty notes that Becker's (1964) mathematisation of human capital theory is permeated by the belief that all forms of capital other than human capital (that is, financial, social and cultural capital) have lost their determining importance (Piketty 2014, 385). The 1960s' expansion of opportunity and social mobility enabled human capital economists to imagine that the theory was not just necessary in explaining the relationship between higher education and work, it was sufficient.

Half a century later, the context is different from that in which Becker published *Human Capital*. In the 55 countries in which the higher education system includes 50% or more of the youth cohort (Marginson 2016b), in variant and often fluctuating economies, not all graduates enter professional jobs; while income inequality has dramatically increased in the US (Saez 2013; Piketty 2014, 265), inheritance is more potent (393) and income from capital now outweighs income from labour as a source of wealth (402). The power of family income, social and cultural capital in determining access to both elite higher education and elite professional employment is attested repeatedly in research (e.g. Soares 2007; Rivera 2015; Social Mobility Commission 2016). American social mobility is at a lower ebb than in the 1960s/1970s (Corak 2012; Stiglitz 2013). Regardless, human capital theory continues to shape understandings of relations between higher education and work. One reason is that although equality of opportunity has faltered in societies becoming more unequal, the idea of merit as learned and portable ability retains legitimating power. The notion of human capital, floating free of other forms of capital, implies that those with social advantages succeed not because of their

individuals in the labour market and to serve as job requirements throughout the occupational structure' (Baker 2011, 62). That intellectual formation constitutes a mode of economic capital (Hodgson 2014); that in the first instance higher education can be primarily understood as preparation for work and career; and that education itself, not family income or cultural attributes or social networks, is the starting point for an explanation of career outcomes and earnings: all these notions have (arguably, unduly) elevated education as a social and economic arbiter. For example, in the UK and Australia, higher education institutions (HEIs) and their disciplines are held to account by government and public on the basis of graduate earnings and/or employment rates in the early years of work, regardless of other elements that affect employment and earnings. Correspondingly, the idea of education as self-investment in one's own capital positions graduates (or their portable human capital) as responsible for individual success/failure and weakens the obligation of government to steer a more equal income distribution.

By no means all economists would endorse those conclusions. Few would agree with the simplified version of the relations between higher education and work current in much policy rhetoric and public debate. Most professors of economics would firmly reject notions that the value of education can be reduced to its measured effects in earnings or jobs. However, such positions are consistent with the intellectual strategy of human capital theory, which is to protect the original ideas by rendering them more complex and nuanced rather than call them into question. The founding paradigm has not been declared obsolete – and like most social scientists, human capital economists are not known for talking down their core idea. In this manner, human capital theory (buttressed by human-capital-as-metaphor) tends to block from view alternative ideas, theories and measures about relations between education and work.

### ***Critiques of human capital theory***

Since its inception, human capital theory has been subject to repeated and often devastating critiques. Few scholars from outside mainstream economics with a close research knowledge of education have endorsed human capital theory. Many scholars in the political economy of education and labour have challenged the core narrative, from Bowles and Gintis (1976) to Spring (2015). On the economics/sociology border, screening theory sees higher education not as a site of self-investment in cognitive formation that delivers economic returns, but a system for signalling a competitive position that delivers economic returns – an alternative narrative to human capital theory using much the same evidence (e.g. the early study by Berg 1971). Sociologists including Trow (1973), Collins (1979), Teichler (2009) and Baker (2011) provide very different accounts of work and education. In his work on social reproduction in education, Pierre Bourdieu (1984, 1988) highlights positional competition and status, which human capital theory cannot encompass, and introduces family cultural capital and social capital networks as central to the explanation, rather than dispensable add-ons. The OECD (2014a) treats social background effects on vocational outcomes, and human capital effects, as intermeshed, without giving priority to one over the other. A large literature explains socially differentiated educational outcomes more as a function of prior inequalities and institutional stratification in education, than individual choices about self-investment in education, pointing to ways in which social inequalities affect aspirations (e.g. Hoxby and Avery 2013) and are reproductive (Boliver 2011, 2013). In *The Global Auction* (2012), Philip Brown, Hugh Lauder and David Ashton describe declining private returns and dispersion of graduate outcomes amid unequal and exploitative societies, again a different world from that suggested by human capital theory.

However, most critical scholars are at cross-purposes with those they criticise. After all, any theory can be criticised from the standpoint of a different theory; and any discipline can be interrogated from the perspective of another in several ways. But sociological critiques have limited potential to persuade economists or change the minds of economic policy-makers for whom economics is the master social science. Rather than posing an alternate theory or discipline as the basis of critique, it is more fruitful to go the roots of human capital theory – to interrogate the default narrative in

force of a fixed and permanent law, as with human capital theory. This creates conditions for fallacies. Tony Lawson critiques neoclassical economics on the grounds that it imagines the economy as a closed system operating by deductive logic. 'Deductivism' is 'the thesis that closed systems are essential to social scientific explanation (whether the event regularities, correlations, uniformities, laws, etc. are either a prior constructions or a posterior observations)' (Lawson 2012, 3–4).

By deductivism I mean a type of explanation in which regularities of the form 'whenever event x than event y (or stochastic near equivalents) are a necessary condition. Such regularities are held to persist, and are often treated, in effect, as laws, allowing the deductive generation of consequences, or predictions, when accompanied with the specification of initial conditions. Systems in which such regularities occur are said to be *closed* ... If mathematical methods of the sort economists mostly fall back on are to be employed, closures are required (or presupposed). (Lawson 2003, 5, emphasis in original)

If mathematical sets in economics are universally relevant, strict 'event regularities' must be ubiquitous in the real world. However, when deductivism is used in real-life contexts, 'social event regularities of the requisite kind are hard to come by' (Lawson 2003, 13). The alternative is to imagine the economy/education as a partly open system without strict 'event regularities', to acknowledge the partial character of the truth about that system obtained through any one lens, and to open up 'the possibility of a range of approaches' (Dow 2012, 82). Theories 'can vary according to changed times and circumstances' (Carabelli and Cedrini 2014, 44). This is also true of the policy applications of theory. Hence, human capital theory is closer to realism under full employment than high unemployment, and more explanatory of investment in financial management education than investment in a music or drama programme with negative rates of return. If no single discipline, theory or methodology has universal reach, by the same token, no one explanation excludes, cancels out or invalidates all other explanations. This means that in each research site and problem, it is necessary to identify the appropriate theoretical lens or combine and match the appropriate lenses.

### ***Problems of multivariate modelling***

The high standing of mathematical modelling in much of social science reflects a society-wide belief that mathematics is fundamental to science, a conviction (or ideology) that derives not just from the elegant simplification permitted by mathematics, but also from the success of mathematical precision in many domains (Lawson 2012, 16). However, the subject matter of the 'social disciplines' is often inappropriate for mathematical treatment (Carabelli and Cedrini 2014, 31), especially when complex, holistic, synthetic accounts are required. 'The fundamental problem of modern economics is that methods are repeatedly applied in conditions for which they are not appropriate' (Lawson 2012, 1) – mathematical methods are often applied to phenomena they cannot adequately comprehend and problems they are not competent to solve. Mathematical methods have potential in research on education and work, as auxiliary tools in studying relations and comparisons. They can be used to map proportions and changes in bounded sub-systems. But in themselves, these methods do not explain, they illustrate. Sayer (2000, 22) states: 'Statistical explanations are not explanations in terms of mechanisms at all, merely quantitative descriptions of formal (not substantial) associations'.

One heterodox line of thought in economics rejects the main path taken by methods of mathematization and statistical modelling in human capital theory and parallel domains, particularly multivariate analyses that impose arbitrary definitions on indeterminate social variables in complex sites in which many variables are at play. Multivariate statistical analyses use probabilistic methods to distinguish nominal degrees of causality for each one of a set of variables. However, Alfred Marshall argued that when the subject matter becomes more complex, rather than devising ways of reducing that complexity, the economist should diminish the use of abstract reasoning and mathematics (Marshall 1898, 39). Marshall argued that the problem with much of the use of mathematics in economics is that the econometrician 'takes no technical responsibility for the material, and is often unaware

factors that affect earnings, additional to higher education *per se*. Graduate earnings vary by the differential status and resources of HEIs ('college quality' in the US literature); family income (Wolniak et al. 2008, 131); family life not mediated by education (Triventi 2013, 45) including support for child development such as whether children are read to at a young age (Corak 2012, 6); measured 'ability'; type of secondary school; and social and family networks at entry to higher education, entry to work and later careers (Bingley, Corak, and Westergård-Nielsen 2011; Hallsten 2014, 20; Arum and Roksa 2014b, 14; Borgen 2015.). Earnings are affected by varying customs and hierarchies in professions and workplaces; by the wage determination system and the industrial balance of power (Piketty 2014, 305); and the configurations and fluctuations of economies. Given these factors – which are all constantly changing – it is delusional to seek to measure or compare the quantity, quality or productivity of education programmes, institutions or systems, on the basis of the private rates of return to, or the rate of employment of, those graduates.

Statistical methods design to eliminate the effects of factors other than higher education flounder given the number of variables, their interdependency, and the impossibility of isolating each causal factor from all the others. This in turn leads to problems of selection effects. The economist struggles to find causality in the face of multicollinearity problems but the comparisons are contaminated by hidden factors. It must be said the problem of selection effects is a non-problem grounded in the assumption that elements are atomistically separable. Nevertheless, in research premised on the assumption of atomism, the problem must be solved. Attempts to account for selection effects generate diverse results. Reviewing research on graduate earnings in China, Hongbin Li and colleagues note that while some researchers identify returns to college selectivity after selection effects are accounted for, others find these returns disappear. Much of the variation in findings is due to arbitrary assumptions about selection effects, not variations in the real world (Li et al. 2012, 78–79).

### ***Non-homogenous and non-linear material***

Human capital theory also fails to deal effectively with real-world sites in which patterns are non-linear and non-homogeneous. Nicolai Borgen remarks in relation to studies of graduate outcomes that while averages create order from diversity, they do so 'by masking important heterogeneity across the wage distribution' (Borgen 2015, 43). He also identifies non-linear economic returns associated with higher education. Family background effects seem greatest at the top end of the wage distribution. 'The returns to college quality are five times larger at the 90th quantile compared to the 10th quantile' (42). Gregory Wolniak and colleagues find that after graduation, education is associated with a growing impact on earnings, in non-linear fashion (Wolniak et al. 2008, 131). Paul Bingley, Miles Corak, and Niels Westergård-Nielsen researched the 'intergenerational transmission of employers' between fathers and sons. In both Canada and Denmark, 30–40% of young adults at some time work for a firm that has employed their fathers. In both countries, the transmission of employers was positively associated with paternal earnings, 'rising distinctly and sharply at the very top of the father's earnings distribution' (Bingley, Corak, and Westergård-Nielsen 2011, 3, 7 and 12.). Again at the top end on incomes, Iftikhar Hussain and colleagues find the apparent income effects of selective institutions inflate, and returns associated with degrees are increasing (Hussain, McNally, and Telhaj 2009, 12). Lemieux (2006) finds that in the US, over 30 years, 'within-group inequality grew substantially among college-educated workers, but changed little for most other groups' (195). 'The median, the tenth and the ninetieth percentiles are remarkably stable for up to 12 years of education'. However, 'above 12 years of education ... the return to education at the ninetieth percentile increases much more than the return to education at the tenth percentile, leading to a large increase in the 90-10 gap' (196). Lemieux concludes that 'changes in wage inequality are increasingly concentrated in the very top end of the wage distribution ...' [and] 'postsecondary education plays a crucial role in explaining this phenomenon' (199). The empirical data are consistent with Bingley, Corak, and Westergård-Nielsen (2011) and Borgen (2015), but Lemieux's

that reflects the relationship (or lack thereof) between the educational system and the labour market. (Roksa and Levey 2010, 391)

Schneider and Stevenson (1999, 79–85) find that only 44% of students had 'aligned' educational ambitions, meaning that they planned to complete the amount of education required by their intended occupations (Arum and Roksa 2014a, 34). Many students keep their vocational options open. Often, they enrol for more reasons than vocational planning, studying subjects they are good at, or they enjoy, while hoping that the future will work out. Though this strategy embodies uncertainty, because all graduates have a positional advantage in the labour market *vis-à-vis* non-graduates, such confidence is not wholly misplaced. Robst (2007, 398) notes 'the eventual match between degree field and occupation is uncertain when selecting a major'. He finds that 55% of respondents report a close relation between their work and field of study, 25% state that they are 'somewhat related', and 20% that they are not related (402), though Robst has difficulty defining the work-relatedness of general degrees.

Even among specifically trained graduates, many enter occupations that are outside their fields of training, often not always with income penalties (van de Werfhorst 2002, 301; Robst 2007, 403–404; Melguizo and Wolniak 2012, 383). This lack of fit between formal training and work reflects the messy way that labour markets operate. Many professional jobs are generic. They can be filled by graduates from any field, and level of education and possibly institution attended are more significant than field of study. Many graduates take jobs that provide the best pay and career prospects at the time of selection. At this career point, some will depart from their qualifications and a proportion never return. Some specialised positions are filled by persons trained in specialist fields other than that of the position. For their part, employers select the 'best' person from the available pool. Specific training and qualifications are only two of the factors in play. Studies of graduate selection indicate that the attributes of potential employees that influence selection also include institution attended, extra-curricular activities as students, subjective perceptions of 'fit' between graduate and workplace, and personal ties (e.g. Bingley, Corak, and Westergård-Nielsen 2011; Tholen et al. 2013; Borgen 2015; Rivera 2015).

There is more vocational specificity in education and predictable pathways to work in countries such as Germany than in the US. In Germany, this is achieved not by market coordination in education and work as Becker imagined, but by 'tight linkages between occupational groups, education and training practices, and certification boards'. German practice appears to conform 'nicely to human capital models' but 'these completely fail to capture the importance of the elaborate institutional framework that enables the German certification regime to operate as they predict' (Hansen 2011, 32). Nor does human capital theory explain how education enhances productivity (43) which remains a black box. One constraint is its methodological individualism (Lukes 1973). It is impossible to accurately attribute enhanced value to individuals working in a combined workplace, as are most employees (Piketty 2014, 330–331).

### **Other explanations of education and work**

Human capital theory understands only some students/graduates, those who consider the lifetime earnings attached to different choices and weigh them against the costs of study. Many students/graduate fail at being a choice-making self-investing *homo economicus*. Jens Thomsen and colleagues report that at enrolment some students ignore forgone earnings during study (Thomsen et al. 2013, 471). Others know graduate earnings only in their chosen occupation, not related fields (Robst 2007, 399). Borgen (2015, 34) states that many students do not 'self-select into colleges based on expected gain'. Students have many interests in addition to credentials, future earnings and careers, including network building (Armstrong and Hamilton 2013); the accumulation of knowledge, generic skills and cultural capital; intellectual formation as an end in itself; cultural activities; and social or political activism. They mix their goals, practices and modes of reflexivity.

of study, type of institution, financing of education, occupation, industry, employment site and over time. For example, both Goodman (2014) and Zhao (2012) note that status drivers are especially important in China, arguably playing a larger role in comparison with income drivers than in the US. The task of a realist study of education/work is to combine sensitivity to context with an account of larger patterns, including aspects of social relations not directly observable (Sayer 2000). These patterns are both internal and external. Like all semi-bounded systems, the dyad of higher education and work is connected to other systems or 'fields' (Bourdieu 1993; Fligstein and McAdam 2015), including income determination and wealth creation, labour markets, state and politics, taxation, public spending and programmes, global flows.

Given that education/work relations entail complex and multiple phenomena – and no theorisation can contain all phenomena, while retaining a bounded coherence – it is axiomatic that more than one description of education/work relations can provide useful insights. Gerber and Cheung (2008, 301) canvass four possible reasons for the higher earnings of graduates of elite institutions: elite HEIs impart more valuable human capital, elite graduates signal their status to employers, students in elite HEIs garner more valuable social capital, graduates from elite HEIs have enjoyed advantages such as family affluence or ability that generate more favourable outcomes. However, in this paper, they do not consider the possibility that all four factors are in play, with the mix varying over time and between countries and between fields of study. In orthodox sociology, as in orthodox economics, theoretical multiplicity is mostly a bridge too far. The drive for universal explanation, that elusive talisman of social science, overrides real-world complexity. Hansen (2011) rightly argues that all major theories of education/work relations, such as human capital, signalling and 'credentialist' certification' are 'to some degree wanting' (31). The obverse is also true. Differing research-based explanations of education and work contribute to knowledge. Some are more explanatory than others. Confronting the complexity of education/work, the task of research is to determine which explanation(s) is (are) primary, not to impose an exclusive straightjacket on the material.

It is not the purpose here to outline an alternative theorisation to human capital economics. However, an alternative approach would be grounded in a meta-method that would use a semi-open analytical system or model, admit multiple theories rather than one exclusive theory, and draw on both quantitative and qualitative research and combine their insights. Statistical reasoning would have a modest role. In slicing into parts of the empirical terrain, statistical studies can be suggestive. For example, in research on top-end graduate incomes, the findings become interesting where the linear patterns break down. The limits of statistical analysis show not when it is used for specific inquiry but where it purports to provide a holistic picture, when it is substituted for an historicised synthesis, and multi-variate modelling and calculation are used as a substitute for more difficult processes of complex judgement. The use of multi-variate analysis should be limited to instances when the variables *are* independent.

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