Paper to be presented at the 5th 'History of Economics as History of Science' Spring Workshop - 20th June 2008 - Paris X

Of Metaphors, Tribes and Territories:

The Dissemination of Human Capital in Economics

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Draft Version (Comments and Suggestions are most welcome)

"In youth acquire that which may restore the damage of old age; and if you are mindful that old age has wisdom for its food, you will so exert yourself in youth, that your old age will not lack sustenance"
Leonardo da Vinci, Reflections on Life

"A new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die, and a new generation grows up that is familiar with it"
Max Planck, Scientific Autobiography

1. Introduction

The process for the dissemination of scientific ideas is a complex one. Scientific Peers, as many others, tend initially to overlook and hesitate about new contributions by their colleagues, and often resist to their eventual integration in the basic disciplinary framework (Kuhn, 1970). Economics is not unlike other sciences in this respect, though this process of diffusion of ideas remains scarcely studied. The importance of institutional visibility is often omitted when studying the development

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of contemporary economic thought. Theoretical developments apparently endure without an institutional support, within a disciplinary community that nevertheless seems to float on a vacuum of institutional existence.

Human capital research is an interesting candidate to analyse the diffusion of economic ideas, because it went from initial strong resistance to widespread acceptance. The initial resistances ranged from the expression human capital itself to its main assumptions, reaching its height with what it represented in economic research. For those familiar with the initial reactions to human capital research in the early sixties, it is therefore astonishing how human capital managed to convince so many of its virtues, permeating the jargon of economists, policy-makers and even other social scientists, to become one of the most popular contemporary economic theories.

This text tries to analyse these communication and supporting networks and the role they played in the development of human capital research, suggesting that these played a major role in the popularisation of human capital theory. In the next section we analyse the work of the main pioneers in the field and the way their approach to human capital shaped subsequent developments. In the third section we discuss some of the main resistances faced by this novel approach. In the fourth section we analyse the various instruments of dissemination of ideas used by human capital researchers. In the final section we present some of the main conclusions about the development and dissemination of human capital research in economics.

2. Human Capital's Early Research – Convergence and Multiplicity

Until the mid-twentieth century many economists paid little attention to the economic analysis of education and even more hesitated in using human capital as a good analogy for skilled labour (see Teixeira, 2005). Underpinning these resistances was a belief that education gave access to nice and well-paid jobs without really enhancing people's productivity, and because it seemed problematic and not very realistic to regard qualified labour as a type of capital. Moreover, these two strands, the economic analysis of education and analysis of education in the labour market were hardly connected, accounting for the lack of relevance of education.

Accordingly, the first 150 years or so of economics as (an autonomous) subject of scientific inquiry did not contribute much to the development of human capital research.

In the aftermath of World War II this situation changed. This was prompted by several developments, initially unrelated, that converged to give increasing prominence to the economic effects of education. One of those changes was the changing possibilities and interests in the research on personal income, namely the belief that it was possible to provide causal explanations for the distribution of income, and that education was a good candidate to be included among those potential explanatory factors. The second aspect was the postwar revival of growth debates that, alongside the expansion of educational systems in most Western countries, led to an increasing emphasis on the qualification of the labour forces as a key factor in explaining differentiated growth performances. Last, and certainly not least, there was the neoclassical ascendancy in economics in general and labour in particular, that played down the specificity of the labour market, and paved the way to the systematic application of neoclassical economics to this area of research.

The emergence of human capital theory and its popular dissemination is normally assimilated to a group of researchers led by Jacob Mincer, Gary Becker, and Theodore W. Schultz (Teixeira, 2005). Each of these authors had a particular and common interest in the development of human capital research, and they converged in their efforts. Coming from different backgrounds, and analysing different issues they converged in realising the potential of human capital as a useful tool to explain a variety of economic behaviour. The various strands that converged and coalesced in human capital research and the idiosyncrasies of the leading researchers in the area had an important impact during the early development of human capital research.

Schultz (1961) was the one emphasising a broader concept, and specifically the role of nutrition, health and migration, which was understandable due to his attention to modernising economies where the problems of malnutrition and health care shortages were much more significant and his concern with the maldistribution of resources (especially labour). Moreover, and although he certainly regarded human capital as something that made people more productive, he saw it especially as an activity that made people aware of new and better opportunities and capable of seizing them.

For Mincer (1993a) human capital was mostly pursued in terms of schooling and especially on-the-job training and their effects on the labour market. Hence, a large part of his work was on the returns to these two sources of human capital. Mincer was mostly interested in turning human capital into an organizing principle for labour research, a field he resisted for long to join, due to its prior strong institutionalist tradition. In fact, his research made human capital a centrepiece of contemporary labour research (Teixeira, 2007).

For Becker, human capital started as an analysis of lifetime patterns of income and decisions concerning investment on these activities (schooling and on-the-job training). However, already in the sixties it became increasingly a framework for understanding several aspects of lifetime human behaviour, providing an effective and powerful example of the ability of economics to deal with social issues. With time, Becker used human capital more and more as a building block for his "economic approach" to social behaviour, and human capital became less important per se. To a certain extent human capital was an illustration that what distinguished economics from other social sciences was not so much the object as the approach. The approach gave to economics the capacity to provide a unified perspective on human behaviour in many different contexts, through the basic assumptions of maximizing behaviour, market equilibrium, and stable preferences.

Despite the fact that most of the discipline became aware of the concept of human capital through Schultz, especially with his Presidential Address to the AEA (1960), and that he had an extremely prominent role in disseminating the concept in its early years among economists and policy-makers, Schultz' work tended to be much less cited than Becker's or Mincer's. Although his presidential address collected a reasonable number of citations, the impact of his work on human capital was far less that the other pioneers in the field. After the sixties, and especially following the publication of Becker's *Human Capital* (1964) the concept became progressively associated with Becker, and the visibility of T.W. Schultz diminished clearly. The elements provided by the citation data are eloquent about it.

TABLE 1 – CITATIONS OF PIONEERING AUTHORS IN HUMAN CAPITAL RESEARCH

	T. W. Schultz - citations - SSCI				Gary Becker - citations - SSCI			Jacob Mincer - citations - SSCI				
	JPE	AER	Ec Val Ed	Inv H Cap	JPE - S	Hum Cap	HC - W	Thesis	JPE	JPE - S	JEL	SchExpEr
	1960	1961a	1963	1971	1962	1964/75	1967	1957	1958	1962	1970	1974
Total	70	222	123	102	194	1389	120	3	90	132	220	815
Average	3,5	11,1	6,15	5,1	9,7	69,45	6	0,15	4,5	6,6	11	45,27778
1972	8	13	11	11	9	51	11	0	3	6	10	
1973	8	7	12	9	9	54	8	1	3	11	11	
1974	4	7	7	10	5	47	9	0	6	16	16	14
1975	4	15	10	4	10	58	7	0	5	14	17	19
1976	3	11	9	9	7	83	8	0	9	13	25	45
1977	4	7	8	3	9	63	10	1	6	7	16	46
1978	4	16	9	3	8	77	11	0	9	6	19	38
1979	2	4	5	3	10	63	8	0	1	4	19	52
1980	7	10	5	11	11	64	9	0	4	6	7	57
1981	5	10	5	12	9	83	7	0	12	11	18	47
1982	3	13	8	5	10	96	4	0	4	6	9	56
1983	0	12	5	2	10	69	2	0	7	5	6	46
1984	2	11	3	3	9	68	2	0	4	5	7	49
1985	4	15	4	3	12	77	1	0	2	5	7	55
1986	5	14	5	1	7	60	4	0	2	2	6	42
1987	1	12	1	2	11	75	2	1	2	2	6	51
1988	2	16	4	6	12	68	8	0	5	1	6	47
1989	1	12	5	1	15	69	4	0	4	3	7	50
1990	3	9	4	3	10	67	2	0	1	2	3	49
1991	0	8	3	1	11	97	3	0	1	7	5	52

The data on citation confirm the increasing identification between human capital and Becker. The amount of citations of Becker's book is impressive and hardly comparable to the publications of the other two authors. This aspect is even more interesting given the fact that, despite three editions, Becker hardly changed anything. Notably, the empirical data and analysis used in the first edition have remained the same until the present, and the only differences were in added appendixes or new chapters developing specific aspects of the human capital framework.

In contrast, Mincer's pioneering work on human capital is hardly cited. His original paper in the JPE (1958) and his dissertation (1957), arguably the founding moment for modern human capital theory, collect a reasonably small amount of citations.[2] The only work that presents a comparable impact to that of Becker's work is Mincer's book of 1974, whose impact has lasted until the present in terms of citations, despite its strong empirical focus. Mincer seems to be far more recognised by his role in emphasising post-schooling investment in human capital, notably OJT.

[2] The fact that the citations are only available for a period where much more advanced work was already widely diffused can bear part of the explanation. Moreover, the difficulty in accessing his doctoral work is also probably responsible for an almost insignificant citation record.

The smaller number of citations collected by Mincer can also be explained by the fact that he was very much concerned in developing applied work, which normally has less impact in the discipline. Although he had a strong attachment to analytical work in labour issues, and to the leading role of theoretical developments, his impact was somehow limited by the absence of a theoretical concentration. Mincer was increasingly regarded as a labour economist, and although the field gained increasing respectability among the discipline with its *neoclassicization* (to which Mincer gave a major contribution), his visibility and impact in the discipline was more limited.

3. Multiple Resistances to Human Capital Research

Despite the fact that human capital researchers were capable of drawing significant attention to this novel topic, the first decade after the publication of the first contributions on this topic was characterised by vivid controversy about the relevance of human capital to the economic analysis of education. We will now review some of the fundamental criticisms raised at that time.

A controversial expression

The label "human capital" was always regarded as potentially problematic. In fact, even the pioneers in the area had hesitated before deciding to use this label. T. W. Schultz (1959) sometimes used Human Wealth instead of Human Capital in his earliest writings, and Becker considered an alternative title for his book, though he eventually decided to face the foreseeable criticisms and run the risk (and apparently it paid off…). Their hesitation was confirmed by some of the initial reactions to this approach. For a start, and despite his prestige, the reactions to Schultz' presidential address were ones of scepticism, opposition or even derision. Alice Rivlin noted that "if you attended the 1960 meetings you will recall that most members looked blank when they hear this title. Investment in what? Professor Schultz spent a large part of his address establishing his right to talk about the subject at all." (1966: 395). And although Schultz was used to facing a tough audience in his efforts to apply economic theory to less conventional subjects, especially his emphasis on the role of incentives in understanding human behaviour, in this case the reactions came straightaway.

In a comment on Schultz' address, H. Shaffer (1961) expressed his disagreement with an approach that likened education to a type of capital, since capital meant for most economists physical capital, certainly since Marshall's clarifications. For Shaffer this was the case not because of any convention, but because physical and human capital were actually very different things, acquired due to different motivations. Human types of capital presented a mixture of investment and consumption motivations, including factors such as social prestige or fads, that could not be easily isolated (see Eckaus, 1962). This was particularly relevant in terms of measurement, preventing an accurate appraisal of this type of investment.

Far more problematic was the fact that education and other types of human capital omitted the impact of very important differences in terms of personal traits, such as ability and socio-economic factors (Shaffer, 1961). In particular, and since the limitations in terms of data would necessarily lead to a focus on the returns to schooling, some argued that there would be an overestimation of the returns to this type of human capital, which would capture the effect of factors such as experience, natural ability, social class, and family connections (Renshaw, 1960). Moreover, and because these were hard to specify and measure, one would find oneself dealing with average benefits instead of specific returns to each individual investment. The returns ascribed to schooling could in fact be the result of problems of limited information in the labour market or the scarcity of certain types of skills, rather than a return to a more productive worker due to better qualifications (Eckaus, 1962)

On the other hand the empirical limitations created important problems. The analysis was putting aside the important issue of the differences in terms of quality of schooling (Renshaw, 1960; Arrow, 1962). The data limitations would also probably lead to an overestimation of the returns since the analysis would be done with cross-section samples and not following lifetime earnings of the same age-cohort (see the previous chapter). These problems, which affected to a greater or lesser extent all types of human capital, pointed out the limited usefulness of this approach in terms of policy-making and individual investment decisions (Shaffer, 1961). Furthermore, this approach, by placing the emphasis on the economic arguments, which did not seem to provide a very robust argumentation, was contributing to debase the public support for education. Summing up, and portraying a lot of initial reactions, for Shaffer

human capital was not only a problematic concept but also an unhelpful one, creating serious problems and not helping to solve those it intended to tackle.[3]

Shaffer's initial comments to Schultz' presidential address illustrated the scepticism shared by much of the economics establishment towards "human capital", and the fact that the opinions expressed on its problematic nature from a methodological and conceptual point of view came from places such as MIT, Stanford, or Harvard. If the reactions to Schultz' address were not harsher, that was because his work always received a more tolerant reception than for instance Becker's one.[4] In fact, prompted by Becker's visibility, human capital research became very much identified with Becker's economic approach to social issues. And if the concept was already a problematic one and not immediately well accepted, the fact that this approach tended to be associated with Gary Becker created additional problems.

The reviews of Becker's book were very suggestive about this mixed response.[5] The most positive came from Albert Rees and Melvin Reder, both associated with the Chicago Economics Department. Rees, in the AER, considered that Becker's book was the most sophisticated theoretical and empirical analysis of investment in people thus far. Reder, in the *Journal of Human Resources*, thought that it was a major work of applied economics, and that the hypothesis performed rather well in empirical terms. Whereas Rees and Reder praised his work, Robert Solow considered that the overall approach was unhelpful and awkward. Despite praising Becker for his theoretical ingenuity and empirical resourcefulness, Solow was not very much convinced. In terms of private returns he pointed out that the ability bias could be far more significant than Becker had indicated, and that an educational certificate could be regarded as indicator of persistence and stability, hence making

[3] Schultz (1961b) would reply to these criticisms pointing out the correlation between education and earnings, and the on-going research efforts by Becker and others to separate the contribution of education from other factors, especially ability. Schultz also disagreed that the specificity of human capital having consumption and investment motivations prevented it from being considered as a type of capital. On the other hand, he regarded the economic rationale supporting education as an additional argument, and not a competing one, to those other important reasons supporting the value of education.

[4] For instance John Vaizey, one of the most influential pioneers in educational economics, despite disagreeing with the human capital approach as a whole due to its reliance on the neoclassical capital theory, considered that much could be learned from works such as Schultz' *The Economic Value of Education* (1963).

[5] The negative reactions to Becker's work started when he presented his preliminary results at the AEA 1960 meeting. In his comments Henry Villard criticised the reliance on earnings to measure the full economic effect of education, and the poor attention given to the indirect returns. These should prevent a full reliance on the market to assess the optimal quantity of education to be provided.

the educational system, at least in part, a kind of screening mechanism.[6] As for social returns and externalities, he criticised Becker for not discussing them more completely, let alone measuring them extensively. Becker was also criticised by Graham Pyatt in the *Economic Journal* for his thin empirical support to his hypothesis and for rushing to conclusions about the explanatory power of the whole approach. Hence, if for Rees Becker's human capital represented a type of work very different from traditional labour economics that would become classic in the field, Solow considered that the results were interesting despite the fact that he considered Becker's approach being originated by messy questions.

Old and new debates about labour economics

The initial criticisms of human capital research also echoed previous debates about the best approach to labour economics, notably the applicability of the market metaphor to labour issues and the potential for measurement and quantification (McNulty, 1986). This was particularly noted in circles critical of neoclassical labour economics, such as in industrial relations research. This is exemplified by the presentation by one of the most distinguished industrial relations scholars to one of the annual meetings of the IRRA. In his communication, Neil Chamberlain (1967) considered that although human resources were widely accepted as a factor critical to economic growth, human capital had taken the analogy too far, by turning education into a business-like activity and placing too much emphasis on the economic-rational motivations underlying education decisions. This was a self-defeating approach since it limited the credibility of human capital and weakened the value of education. For Chamberlain human capital illustrated the limitations of mainstream economics, namely its disregard of the role of tastes and uncertainty, and its restrictive assumptions (especially in terms of the purposiveness of human actions).

[6] This view echoed earlier remarks on the economic value of education at the 1959 Seminar on the Economics of Education (published in the *Review of Economics and Statistics*), where it was argued that the income differential might reflect the marketing advantage of the college graduate. In that seminar people such as Dael Wolfle (1960) would suggest that the basic trend associating higher earnings with higher levels of education did not take into account unmeasured differences, and D. S. Bridgman (1960) insisted on the potential role of ability among those unmeasured factors.

These resistances started to gain momentum in the turn to the seventies. The economic situation at the time played no small role. Whereas human capital research had emerged in a period of great confidence in the growth potential of the main western economies, and intense hopes of a catch-up by most developing countries, by the end of the decade the picture started to change. The sluggish performance of most western economies during the late sixties and most of the seventies, especially at the productivity level, contributed to cool down the expectations from training and technological progress (cf. Jorgenson, 1990). The question that was raised by some was that if education was suppose to enhance productivity, hence growth, how come that in a period of great educational expansion the levels of productivity were showing such a poor performance (Thurow, 1982). Furthermore, whereas the early sixties were characterised by great hopes in terms of the potential role of education in promoting social mobility, notably in improving the lot of traditionally disadvantaged groups such as women or ethnical minorities, by the end of the decade these hopes had given way to serious scepticism. The view among an increasing number of researchers was that education had a role in terms of personal income but this was neither as significant as human capital theory postulated, nor the result of individual maximising and intrinsically rational behaviour. To make things worse, the situation in the labour market as a whole was not very good, since with the arrival of the first groups of baby-boomers on the labour market the private returns to education were falling rapidly. It was argued that, because earlier estimates of returns to education had been based in cross-section data, they had overestimated the returns to education, and with the progressive expansion of educated labour the returns would diminish steadily. The arrival of the college-educated baby boomers of the post World War II on the labour market seemed to fulfil this prophecy (see Freeman, 1976).

Human capital theory was also seriously challenged in the seventies by the appearance of alternative theories, frequently nurtured by divergences from the neoclassical view of the world, whose assumptions were crucial for most of human capital research. One of the assumptions over which criticisms revived was that the remuneration of the labour factor was made at the marginal level, something that followed previous debates in postwar labour research (Kaufman, 1993). Some argued that the labour market could be persistently in disequilibrium, and that the remuneration of labour was different from its marginal productivity (Thurow, 1968).

This would have a significant impact for human capital analysis, especially in terms of the reliability of its return calculus.

One of the main criticisms of the neoclassical view of the labour market came via the emergent theory of dual/segmented labour markets. This approach was also affiliated with the postwar debates on labour research, namely the theoretical and methodological specificities of labour markets, which some considered not be taken into account by neoclassical labour economics, and thus not by human capital research. This view embodied in a full-fledged theory a long tradition of critical remarks about the role of education and training in the labour markets, including notably, the view that these educational credentials were mostly important mechanisms of access to well-paid jobs. Although most critics recognised some productivity value to education, they thought that the main determinant to educational demand was credentialism. Because education was costly, either directly or in terms of foregone earnings, only a small fraction of the population would make it into these jobs. The role of educational qualifications, namely higher education, was to segment the labour market in various layers, according to the different levels of qualification. Hence, these highly qualified workers would face less competition from the rest of the labourers, which had been prevented from competing for these jobs, regardless of their intrinsic intellectual or professional ability.[7]

These authors claimed a need to move away from the neoclassical view of the labour market and explicitly to avoid the human capital framework, because it was unhelpful and misleading. Instead, they proposed to explore a view of the labour market that attended to the sociological forces underlying it (Piore, 1973). These views reflected a more or less disaffected view of the portrait of the labour market presented by neoclassical labour economics. On a milder view, the criticisms emphasised the imperfections in the labour market, or the role played by forces largely eccentric to the neoclassical framework such as power, class, or status (see

[7] This view was explored in various models of labour market analysis by authors such as Michael Piore, Peter Doeringer, David Gordon, and Michael Reich. Many of these had been influenced by the work of Clark Kerr and other postwar labour researchers on the *balkanisation* of the labour markets. In their view the labour market was basically divided between qualified and nonqualified workers. The former group was able to get access to the primary labour market, characterised by well-paid jobs, frequent opportunities of training, stable and attractive careers. To the latter group were reserved the poorly paid and precarious jobs of the secondary market, with high turnover and lack of opportunities of progress and training. Moreover, because the opportunities of on-the-job training were scarce or altogether absent, the possibility that these less qualified would manage to move to better jobs was almost negligible. In fact, there seemed to be no redemption for the lack of initial qualifications.

Cain, 1976 and Sloane, 1985). On a more dissenting note, radical economists reaffirmed the view that the labour market was a centre-stage for the class struggle, and therefore rejected the benevolent view of the economic system that portrayed each individual as a type of capitalist able to attain a much better economic condition by improving their intellectual skills through education and training. These were very different views about the economic opportunities, path-dependence, and fairness in a market-capitalist system, reflected in one of society's cornerstones – the educational system.

Different views on the purpose and nature of education

It was not only the view of the labour market underpinning human capital theory that was being scrutinised, but also the role of education and its economic effects. Authors such as Herbert Gintis, Samuel Bowles, and Martin Carnoy challenged the view that the major role performed by education was a cognitive one, and that earnings were compensating for the enhancement of the cognitive capacities.[8] These authors believed even if education had also a role in transmitting knowledge and developing vocational skills, this was neither the only nor the primary role of education (see Carnoy, 1974: 8ff). Instead they emphasised the role of noncognitive personality characteristics as the key factor in terms of labour market success (Gintis, 1971). Education was important as a socialising force that instilled values of discipline, obedience, and motivation that were rewarded by the labour market. The educational system as embedded in the social and political system, thus, its reward system had to be consistent with the values of the social system and reflected the structure of social relations in that historical context (Gintis, 1971). In this sense education was a type of "cultural imperialism" and its major function was as an instrument of social reproduction transmitting the social and economic structure from one generation to another, through mechanisms of selection, reward, and working practices (Carnoy, 1974). This perspective rejected the neoclassical assumption that saw tastes and preferences as a given in terms of educational demand. According to the former, the demand for education was endogenously determined, i.e., at least

[8] The impact of the work of these authors is suggested by the numerous reviews to the book by Bowles and Gintis *Schooling in Capitalist America* (1975), often very positive.

partly determined by the level of education attained and by the values transmitted by the educational system (Gintis, 1971). These radical economists were extremely critical of the human capital theory, especially for its omission of issues such as class, power, and conflict and the way these shaped the development of the educational system (Bowles and Gintis, 1975).

However, the major challenge to human capital theory came in terms of the role of education against that of ability. Since its early years human capital faced the criticism that it was overplaying the role of schooling, particularly vis-à-vis the selecting role of the educational system. According to these authors education basically identified students with particular attributes, acquired either at birth or by virtue of family background, but did not produce or improve those attributes, thus reducing education's social role to its ability to select more productive individuals and provide that information to employers. This weakened the support for education based on arguments other than private economic ones, since social benefits seemed not only to be difficult to measure but also much less important than was previously thought.

The most well-known of these early credentialist attacks was authored by Ivar Berg, a Professor at Columbia Business School at the time, with his *Education and the Jobs: The Great Training Robbery* (1970). According to Berg, the enormous growth of the educational sector had embedded in public opinion a naïve and unsubstantiated belief on the potential benefits of education, especially in terms of better job and income opportunities. This had become a kind of new orthodoxy in both economic and political discourse on education. Berg considered that human capital research presented several problems, namely an impression of a mechanistic impact of education on income. This was partly because it overlooked the impact of ability and socio-economic background factors on individual professional achievement. Human capital theory was also accused of disregarding the heterogeneity of jobs and workers, by assuming that a certain level of education would be enough to assure a certain type of job. Berg believed that this corresponded to an overstatement of the benefits of higher education and could rapidly lead to significant problems of graduate unemployment (1970: 68).

These claims would start making significant inroads within the economics establishment, notably among authors sharing most of its neoclassical assumptions, but nevertheless proposing a different explanation for education demand. According to these authors individuals demanded education because this was a way of indicating

their intrinsic abilities. This type of explanation became known as the so-called screening theory, and by giving theoretical economic consistency to older claims on the credentialist effect of educational degrees became the most serious threat to human capital theory, because it came from within some of the top departments in the field. This was initially developed by young graduate economist from Harvard, Michael Spence, working on his doctoral dissertation on market signalling, which was accepted with praise in 1972[9]. According to Spence the main locus for applying this framework was the labour market, due to the lack of information on prospective employees (1973: 357). The signals were used for observable characteristics that could be manipulated by the individual (as it was the case of education), and had costs (signalling costs) that were assumed to be negatively correlated with productivity (Spence, 1973: 358). In general, and despite being productive to the individual, education would not increase the real marginal product at all (if ignoring the external benefits).[10]

This perspective was also being developed by Spence's mentor, Kenneth Arrow (then at Harvard), who also wanted to challenge "the current human capital orthodoxy" (Arrow, 1973: 193). (Arrow's terms even more than his dissenting purposes, portray the rapid success of the human capital approach.) Arrow intended to "formalise views expressed by some sociologists" (Arrow, 1973: 193) that had suggested that education had mainly a credentialist effect (he referred to the work of Berg). This filtering role of higher education was due to the fact that economic agents had imperfect information, which remained after the hiring process since the individual estimation of worker's productivity was not only difficult, but also costly (Arrow, 1973: 195 and 215). In fact, the social value of education was mostly in its ability to select more productive individuals, providing an important information to employers. Although Arrow insisted that education had more than a screening purpose, this effect led him to conclude that there was not only a difference between

[9] Spence's dissertation was awarded the *David Wells Prize* for the year 1971-2. This promising start was confirmed throughout his career, since he would win the *John Bates Clark Medal* of the AEA in 1981, becoming in the late eighties one of the youngest executive members of the AEA, and was co-awarded the 2001 *Nobel Memorial Prize in Economics* with Joseph Stiglitz and George Akerlof.

[10] However, this should not be interpreted, according to him, as the social value of education being zero, since it helped in solving an important informational problem of allocation in the job market (Spence, 1973: 364). Moreover, education could not be too profitable, otherwise everyone would invest heavily on it, thus reducing its signalling effect (Spence, 1973: 368).

private and social returns, but also an overestimation of both, especially on the social perspective,

The screening role of education was in a sense part and parcel of increasing attention to the topic of imperfect information in the theory of markets, which gained momentum in the early seventies. Accordingly, one of its main proponents, Joseph Stiglitz (1975), argued that a world of imperfect information turned the spotlight on education's role as a screening device, since there was an incentive for individuals to signal special abilities. Stiglitz' view of education as a filter led him to suggest the possibility of over-expenditure in education, especially in highly subsidised public systems, where the individual did not pay much of the cost of the signal. Accordingly, the challenge raised by screening to human capital had significant implications for policy-making in general and development policy in particular. On a general basis it questioned the existence of significant productivity effects of education, let alone the externalities normally associated with education. If the productive behaviour was hardly influenced by education, it was even less obvious that other secondary effects were significant. Thus the main reason advanced for public funding of education was severely weakened.

These criticisms suggest that the early researchers in human capital faced significant resistances to this type of work and that the popularisation of human capital research was neither immediate nor without controversy. Moreover, the context faced by human capital research at the end of the seventies was even far less promising than in the sixties and some predicted its demise (Blaug, 1976). Its capacity to dominate the research agenda of labour economics, virtually becoming its dominant paradigm, was severely damaged. There were also some specific criticisms coming from those sympathetic to the human capital framework, which nevertheless challenged what they considered to be fruits of dogmatism. The critical tone had also certainly to do with its identification with Becker and with Chicago. Human capital was identified as an example of economic imperialism and a product of a very orthodox approach to neoclassical economics that over-stressed rationality, methodological individualism, and the role of choice in individual socio-economic fortunes. Human capital also lost some of the converted, either because they became interested in other areas, or because they turned increasingly critical of it. One of them, Blaug (1976), in a much-quoted survey declared that human capital was in a critical condition that did not show signs of recovering.

4. Building the Community of Human Capital Researchers

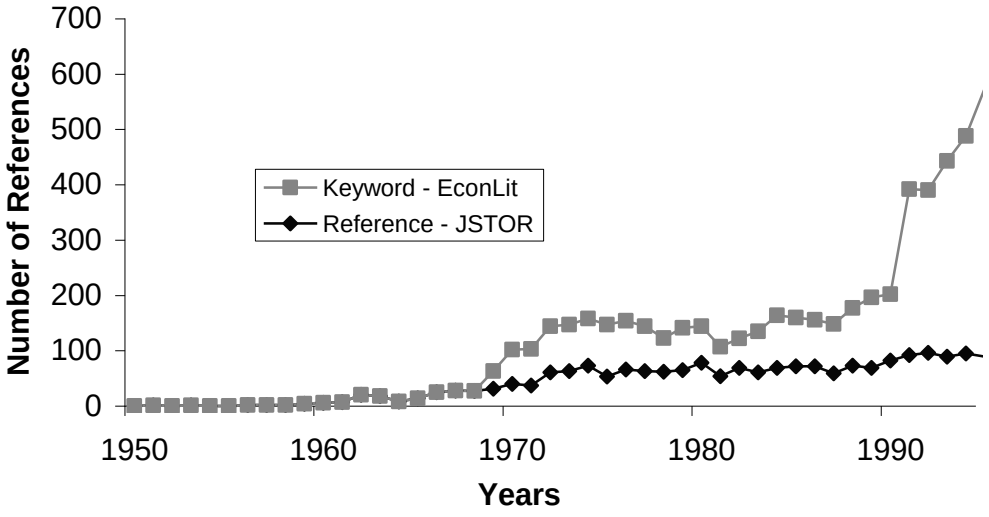
Facing troubled times during the late seventies and eighties, human capital's researchers were placed under significant pressure in order to find a renewed vitality. The analysis of the debates during the seventies and eighties suggests that human capital research managed to resist the several types of criticisms raised. Moreover, in recent years it appears that human capital researchers managed to reverse the situation and to give enhanced visibility to this area of research within the economic discipline and beyond (Teixeira, 2000). This section explores some factors that have contributed to the resilience of human capital research, namely the effectiveness of human capital researchers in disseminating their work among their peers.

Dissemination among Peers

One of the major objectives of any scientific development is to be disseminated and accepted by in the discipline, which is primarily achieved via publication of research results in general and specialised journals. An important part of this process of dissemination is through discussion at professional meetings, which can provide feedback on preliminary results. The role of dissemination of research results has been increasingly taken by scientific journals, since monographs seem to have lost ground in economics as in many other disciplines. The main scientific journals in each field play a double role within the scientific communities they serve. On the one hand, they act as a mechanism of certification of an addition to its body of accepted knowledge. On the other hand, they become an instrument through which individual scientists compete for priority and (peer) recognition (Hargens, 1988). In fact, by publishing in the main journals researchers are not only disseminating and achieving recognition, but also promoting the development of their research programme by stimulating further research on the topic by others (Stephan, 1996). For

these reasons it becomes important, and difficult, to get access to the core journals of the discipline.[11]

GRAPH 1 – NUMBER OF ARTICLES ANALYSING HUMAN CAPITAL IN MAJOR ECONOMIC JOURNALS



In terms of economic journals, human capital research seems to be a case of success. The trend in terms of visibility of "human capital" is quite similar in core journals (*JSTOR*) and in economic journals as a whole (*EconLit*). Before the late fifties the references to "human capital" are very scarce.[12] Then, things change, and from 1956 onwards there is not a year without references, and the values increase significantly and rapidly throughout the sixties and the seventies. The values somewhat stabilise in the late seventies and eighties, only to show again a strong upward trend in the nineties. The emergence of human capital theory not only made human capital an important topic of research, establishing itself with comparable

[11] The difficulty of access to publication in the main journals of each field seems to vary among fields, as indicated by the differences in rejection rates, suggesting differences in space shortages. However, space constraints resulting from increased submission seem to have more impact on publication backlogs than on rejection rates (Hargens, 1988). The reasons for rejection might also differ, and in the social sciences are much more likely to be on methodological and theoretical grounds than in hard sciences.

[12] Until the forties there is basically one or two references per decade, and, despite some increase, until the late fifties the values remain very low. Besides, the references are hardly related, and the only strong connection is a group of references linked with the (human capital) cost of war, especially during World War II.

importance to many applied fields, and becoming one of the most important topics within the speciality with was it more directly associated – Labour economics. Since it emphasised the economic value of education, human capital was crucial in bringing attention to the related applied field of the economics of education. With the emergence of human capital, educational matters moved from an almost negligible interest to a small but visible place within the discipline.

Human capital research has to be considered not only in terms of quantity of publications, but also in terms of the prestige of the publication outlets. Often it is assumed that there is a kind of passive editorship, where the editor has no capacity to influence the interests and preferences of researchers (Coats, 1971). However, editorial acceptance can have a powerful effect, especially in the case of top-journals, in setting the publication agenda (thus to a large extent the research one). This requires an analysis of its importance in the main journals. The results suggest that the discipline was giving it a much bigger priority. Human capital was clearly more visible in the core journals than in the literature as a whole, and in some periods the articles related to human capital represented one-tenth of the total articles published in the core journals. After the slowdown in the late seventies and most of the eighties, human capital shows its resilience with a revival of interest throughout the nineties. The impact of this topic was much increased by its publication in journals with much wider readership and much more cited than the average ones.[13]

TABLE 2 - ARTICLES ON HUMAN CAPITAL IN MAJOR JOURNALS[14]

[13] Several studies confirm the idea that there is an implicit ranking of journals in economics, and consistently at the top are the journals used, which tend to fare higher than applied or specialised ones in terms of notoriety and prestige (Hawkins et al., 1972).

[14] TA – Total number of articles; AY – Average number of articles per year; PQ – Percentage of articles relative to the total number of articles published in that Journal.

		AER			QJE	
period	TA	AY	PA	TA	AY	PA
1969 - 70	4	2	0.9	1	0.5	0.9
1971 - 80	51	5.1	2.5	12	1.2	2
1981 - 90	38	3.8	2.2	4	0.4	0.8
1991 - 96	45	7.5	4.2	22	3.75	7.5
		JPE			ECJ	
period	TA	AY	PA	TA	AY	PA
1969 - 70	4	2	2.2	3	1.5	3.9
1971 - 80	94	9.4	9.7	4	0.4	0.7
1981 - 90	12	1.2	1.8	2	0.2	0.4
1991 - 96	31	5.2	9.5	27	4.5	8.3
		JEL				
	TA	AY	PA			
1969 - 70	1	0.5	3.8			
1971 - 80	5	0.5	2.9			
1981 - 90	1	0.1	0.9			
1991 - 96	2	0.3	1.9			

In economics, as in many other disciplines, the increase in terms of sub-fields and applied fields was paralleled by an increase in terms of economics journals. Each growing field has a need to find a specialised outlet that will promote communication between those at the research frontier in the topic (cf. Eagly, 1975). In fact, a new journal is not simply a response to a certain unfulfilled demand for publishing space, but also a powerful incentive to new and increased research on a certain field/topic (Coats, 1971). The importance of specialised journals is confirmed by small studies that show that they are more cited than leading general ones in proportion to their circulation (with the exception of the AER) (cf. Bush et al, 1974).[15]

This expansion of specialised journals was also felt in labour research, where there was a certain void at the time of the development of human capital theory. On the one hand, the two oldest publications in the area were not very much research-oriented: the *International Labour Review* (published by the ILO since 1921) and the *Monthly Labour Review* (published since 1915 by the US Department of Labor). On the other hand, specialised publications in labour economics were dominated at the time by those focused on Industrial Relations. Industrial Relations was actually booming throughout the sixties in terms of journals with seven new journals established between 1959 and 1974 (see above). Compared to this the activity on

[15] In the sixties/seventies there were indications of potential economies of scope in the publishing markets, stimulating an expansion of the number of economic journals (if successful) (Baumol and Braunstein, 1977).

more economics-oriented titles was almost nil. In 1958 there was launched the Indian Journal of Labour Economics (by the Lucknow Department of Economics), but this was not followed by any major community of scholars, and the main journal in the area was only established in 1983 (the *Journal of Labor Economics*, by the Chicago Economics Department).[16]

The IR publications were not the most favourable ones for human capital research due to various reasons. The type of research produced by human capital researchers was methodologically and programmatically different from those traditional in IR. Whereas IR had been characterised by its multidisciplinarity and its emphasis on political, historical and sociological motivations in order to explain labour markets and labour agents' behaviour, human capital research tended to be much more quantitative and to emphasise the autonomy, even self-sufficiency, of economics and economic theory as regards labour issues. Moreover, human capital research was focused on individual behaviour, while IR was focused on group behaviour, particularly that of unions.[17] Accordingly, IR outlets were not easy to permeate. Furthermore, the increasing epistemological and sociological separation between IR and Labour Economics did not contribute to promote debate between researchers in each field. The purposes and the identity of researchers in each field were increasingly different, and the former overlap was disappearing quickly.

Therefore, the new community of researchers on human capital had to create a new specialised outlet mostly devoted to human capital research – the *Journal of Human Resources*, though at the same time the area remained strong in general economics journals. The JHR was established in 1966 with the explicit purpose of publishing material on the role of education and training in enhancing productive skills, employment opportunities and income. In order to be faithful to the original broad formulation of human capital, it was meant to include papers dealing with improvements in the health and welfare of economic agents that improved their

[16] In 1980 had been launched the *Journal of Labor Research* by the Department of Economics of George Mason University, in 1987 the European based *Review of Labour Economics and IR*, and in 1994 *Labour Economics – An international journal*.

[17] For instance, the first session on human capital at an IRRA meeting only took place in 1973 (at the 26th annual meeting). It aimed to assess the importance of human capital theory to labour economics, and beyond its circles, the tone was not too enthusiastic, even critical. It included a contribution by Daniel Hamermesh on its potential problems, one text by Finis Welch on labour supply and demand over business and life cycles, one by Sherwin Rosen on human capital and the internal rate of return, and finally a dissenting view on human capital by Michael Piore.

productivity and their wealth potential.[18] The JHR became clearly the human capital journal *par excellence*, and the material published from its first issue confirms this.[19] Moreover, it rapidly gathered the support and recognition of human capital researchers, and also of labour economists in general. In the analysis of specialised journals in the area, the JHR tended to fare better in prestige than the much older ILLR and IR. Although initially less known that the IR counterparts, the JHR emerged and remained as one of the most prestigious specialised journals in economics (see Liebowitz and Palmer, 1984; Laband and Piette, 1994).[20]

It was also important that these human capital researchers met to discuss their ideas with other economists in specialised and general disciplinary meetings, since the lack of interpersonal communication can seriously weaken the intellectual development of the field (see Crane, 1973). Moreover, these general meetings confirm the acceptance of this approach in the wider context of the discipline. The presence of human capital research at professional meetings confirms the predominance of American-based researchers and the better receptivity by American-based institutions.

In the case of the AEA, the largest and most important economics professional association, references to human capital emerge in the late fifties, though the first use of the expression dates back to the 1939 meeting and the contribution of Bruce Knight on the (human capital) costs of war. In the 1955 meeting Joseph Spengler referred to human capital in his analysis of "The Population Problem". In 1958 human capital starts to get some serious attention, and in the session on underdeveloping countries

[18] The journal was published by the University of Wisconsin-Madison, which already at the time was showing an interest in becoming an important centre in the area, and included people from economics, education, and sociology departments, and from government agencies, especially in educational areas. The purpose of being inclusive was present even in terms of economics and therefore we had the names of T.W. Schultz and Victor Fuchs, and also John Dunlop and Eli Ginzberg, in the editorial board of the journal.

[19] This opened with an article by Burton Weisbrod on the role of education and health as investment in Human Capital and their impact for public policy. In the same issue there was a review article by Robert Lampman on the "Economics of Health, Education and Welfare" in which he avowed the need for more research on the area due to its relevance. The first volume (1966) included a review article of Becker's *Human Capital* by en enthusiastic Melvin Reder, whom, despite some (minor) criticisms, considered it a first-rate work of major importance and scientific courage. The second volume (1967) included a symposium on rates of return to education, edited by Lee Hansen and with articles by T. W. Schultz, Blaug (for the UK), Nalla Gordon (for India), and the two recent Chicago graduates Giora Hanoch (US) and Martin Carnoy (Latin America).

[20] Other attempts to establish a journal specialising in the economics of education in the late sixties by Blaug (in the UK) and Thomas G. Fox and Jacob Kaufman (in the US) failed and were revived only by Bill Kiker and Elchanan Cohn in the late seventies, leading eventually to the establishment of the *Economics of Education Review* in 1980. The journal had a difficult beginning, had to find a new publisher after two years, but with the help of the influential George Psacharopoulos managed to be put back on track in 1984 (see Cohn, 1988).

both Arnold Harberger and Richard Goode emphasise its potentially important role in the economic improvement of those countries, putting less emphasis on physical capital. Then in the following year (1959), Gary Becker presented his "Underinvestment in college education?" in the session on "Investing in Education and Research", with a quite critical reaction from the discussants and the audience.[21]

A big push came with the 1960 meeting and the Presidential Address by T. W. Schultz, which would become a turning point for research and the visibility of human capital within the discipline. During the first half of the sixties the references to human capital increase notably due to the growing attention to matters of growth and development. Human capital was frequently mentioned as an important differentiating factor in terms of national performance, and its started also to receive significant attention in the context of labour market.[22] In the meetings of the late sixties several papers referred to it frequently, and the contributions tended to be very varied in the facets they explore.[23]

However, this was not supposed to be 'a bed of roses', and in the turn to the seventies human capital research faces tougher times in the AEA meetings. There was a growing questioning of the impact of education in income distribution, with discussions about the precise effects of education, social background, and ability on earning capacity. The moment of truth seemed to come with the 1974 meeting with several attempts to assess the validity of this approach, which suggested that human capital had come of age. Apparently human capital passed the test and the meetings during the second half of the seventies confirmed its growing acceptance, despite the presence of authors more critical to it.[24] The visibility of human capital research also

[21] In the same year there are references to human capital in the context of labour movements out of agriculture (James Maddox) and in the discussion on economic growth and the role of government in supplying human capital (Rostow).

[22] The growing influence of human capital is visible in the meeting of 1965, where human capital features in a large and diverse number of sessions, and played an important role in the session on the Economics of Education and the one on Labour Economics. In the former, Becker and Chiswick presented their work on education and the distribution of earnings, and Finis Welch presented a part of his doctoral research. In the labour session, William Bowen and Aldrich Finnegan present part of their work on labour participation, and Robert Rice presents material from his doctoral research.

[23] Human capital is referred to in discussions as different as the cost of military draft, economic history, environmental economics, entrepeneurship, and pricing in non-profit organisations. Then in the meetings of 1968, 1969, and 1970 human capital featured again more prominently, in sessions devoted to Development Economics and to the Economics of Education.

[24] One session is entitled "The human capital approach: an appraisal", and was composed by a sympathetic assessment by Finis Welch by a marxian critique by Bowles and Gintis. The tone of appraisal is also somewhat present in the 1974 session on Labour Economics

benefited from synergies with the work on the household economics and the economics of population and the family.

Beyond the American networks the situation was more difficult. For instance, in terms of the International Economic Association, the first large conference devoted to related topics was a conference on the economics of education organised in 1965 with proceedings edited by John Vaizey and E. A. G. Robinson. Participants included familiar names (e.g. Edward Denison) and several European economists with some interest in the topic, namely those associated with the OECD Study Group on the Economics of Education, such as Ingvar Svennilson, Friederich Edding, and Vaizey himself. These authors agreed on the existence of important economic benefits of education and training, but they regarded it from a macro perspective. Education played an important role via economic growth, though they were less sure about its role in improving individuals' conditions. They were sceptical about the human capital approach, and in terms of labour qualification they would line up on the manpower planning side. Education was regarded more as a social investment than as an individual one and should be taken in charge by governments.

Several later conferences of the IEA confirmed some mixed feelings on human capital theory. There was interest in its conceptual content, the idea that education, training, health care, and migration were relevant from an economic point of view and beneficial in terms of overall productivity.[25] Nevertheless, there was much less enthusiasm for human capital theory itself. There were signs of clear resistance to the expression 'human capital', which was hardly used even as late as the eighties. Moreover, these investments were regarded as not as effective from an individual perspective as the human capital theorists considered they were, especially in terms of occupational mobility and in reducing income inequality.

Becoming Part of the Canon

The process of acceptance of a certain theoretical approach is frequently epitomised by its inclusion in standard texts of the discipline. This is an implicit

[25] Accordingly, the IEA supported conferences on the economics of health and medical care (1973), on personal income distribution (1976), and the 6th world congress (1980) was devoted to the topic of human resources, employment and development.

recognition that the discipline recognises it as a valuable and important part of the canon. Moreover, it is important that the discipline makes it part of the intellectual bequest to be transmitted to new generations of economists, either at the general or specialised level. With the post-fifties explosion of higher education enrolments in Western countries in general, and in the US in particular, textbooks became a crucial instrument in perpetuating a certain view/paradigm in which scientific research and teaching occurs. It is particularly important to underline the changes from the fifties (where the textbook industry was very small) to the sixties, in which it became a highly competitive field. The explosion of college enrolment created a market opportunity that publishers did not fail to seize. This increase in relevance for their business made much more professional their approach, with requests for editorial counselling (which contributed to reduce the gap between the research frontier and the core-textbook view). Although in the social sciences textbooks seem to pay more attention to the research frontier findings than those in the hard sciences (Cole, 1983), the vision purported still tends to change very slowly, especially in the cases of texts published prior to the paradigm shift (a kind of structural inertia).

General Textbooks

The explicit references to the economic value of education seem to be non-existent in the textbooks published prior to the sixties and the full development of human capital theory. Some texts, such as Samuelson' and Lipsey's, mentioned the importance of education and training (and also health) to the quality of human resources and its positive impact on individual and national economic performance and wealth, without being explicit about human capital. Part of the rationale was there, but the term was not necessarily used.

TABLE 3 - REFERENCES TO HUMAN CAPITAL IN ECONOMICS' TEXTBOOKS

Textbook	1st Ed.	Number of Editions	First reference to HC	Education Return	Dist of Y	Wage ≠	Growth and Develop.	Changes in further editions	Criticisms
Samuelson	1948	17	1964 (6th)	X	X	X	X	Increase	
Lipsey	1963	7	1966 (2nd)			X	X	Minor; some increase	X
Bach	1954	11	1966 (5th)		X	X	X	Increase	
McKenzie / Tullock	1978	2	1st	X		X			
Alchian, Allen	1964	3	1967 (2nd)	X		X			
Becker	1971	1	1st	X	X	X	X		
Wonacott/ Wonacott	1979	2	1st	X		X	X		X

Due to its importance, especially in the 1960s and 1970s, Samuelson's text (arguably the most influential introduction to economics in the postwar era) deserves particular attention. In the first edition of the text to mention human capital (6th, 1964), Samuelson, following T. W. Schultz, considered that education and training were "one of the society's most profitable investments. Human capital yields a return as great as or greater than capital in the form of tools and buildings" (120). This was reflected in lifetime income, besides the important externalities associated with it. Furthermore, education contributed significantly to the reduction of inequality, increasing the opportunities for social mobility.[26] In the context of development, Samuelson considered that if each country by "investing in people, by providing more in the way of education, can step up their economic productivity greatly" (781), more resources should be spent on education (and health). Education therefore became a synonym of investment in people (1976, 10th). Another major text of the post-sixties period is the one by Richard Lipsey. Lipsey, initially analysed the role of education and training in the context of growth, and as a necessary complement to capital and technical progress, due to its contribution to raising labour productivity. Despite its preliminary character, human capital research suggested that it had an important effect

[26] Samuelson played down the issue of noncompeting groups in terms of wage differences and in a later edition (8th, 1970) he would even consider that "the single most important factor aiming for reduced inequality in the last centuries has been the provision of public education" (769).

in raising skills and, thus, in speeding growth (1st, 1963: 512-13). In the next edition, these investments were already referred to as human capital and the confidence in the growth-enhancing effects is clearly strengthened (2nd, 1966: 806).[27]

The major role given to human capital was in Becker's textbook Economic Theory (1971). It gave an unusual prominence to innovative applications of price theory to human behaviour, and particularly to the role of human capital in explaining labour behaviour and outcomes. Human capital was allocated a significant proportion of the text, exploring notably its explanatory role for differential wage rates, earnings streams, and income inequality.

However, one does not find a detailed treatment of these matters in general economics textbooks. The focus was normally on the effect of human capital (education, training, and health) on growth and development, and, to a lesser extent on wage differentials, supported by the empirical evidence of growth-accounting and data on distribution of income. Sometimes there is a separate section on the topic (suggesting the importance given to it), often in texts that initially devoted only a couple of paragraphs to it.[28]

3.2.2. Labour Economics' Textbooks

If it was important for human capital researchers to get through to the general audience, it was even more important to influence those specialising in related areas, i.e., the economic analysis of labour markets and educational decisions. The former had been undergoing since the fifties a process of *neoclassicisation*, accelerated during the late years of that decade, and with increasing separation between the

[27] Lipsey was initially sceptical on the effect of human capital on individual earnings differentials, since he seems to give some priority to nonpecuniary advantages and non-competing groups, by considering that the better earnings of skilled workers were basically a product of scarcity of skills (1963, 1st, 292). However, in the next edition of the text he started to play down his reservations and later, in the eighties, he considered that the fact that skills could be acquired (through human capital investment) challenged the relevance of non-competing groups analysis, and clearly stated the link between more skills, higher productivity, and higher earning power (cf. 7th, 1989: 299ff).

[28] Wonacotts' text (1979) introduced a whole section on the subject of human capital, with reference to the work of Schultz, Becker and Mincer, which is understandable due to its later publication date. This text is also innovative for giving a more complex image of wage determination, where human capital mixes with other forces, mirroring the more cautious tone of the period. It mentions some more sceptical evidence on the returns to college education (by Richard Freeman) and the divergence between private and social returns (as in Paul Taubman and Terence Wales' work on screening).

economic analysis of labour and industrial relations. The economics of education, as we have seen, hardly existed in terms of research. Therefore the challenges were large and clearly different. In the first case the challenge was to shape the economic perspective on labour market behaviour in order to influence the type of research done. In the case of education it was to bring attention into the topic and possibly to make it grow as an area of research within economics. Besides Chicago and Columbia, until the turn to the seventies there were no other top departments interested in the topic. The few exceptions were mainly due to personal and professional links with Chicago.[29] If human capital research were to have any significant impact in the teaching of future generation of economists it had to permeate its specialised texts. This was necessary in order to move beyond the close circles of Chicago and Columbia.

In labour economics the situation was more complex since this was already an established field with several these books, and the resistances to human capital theory were transmitted to the structure and content of the textbooks. Although education and training were mentioned, human capital was hardly so, and the emphasis was on non-competing groups in the labour market perpetuating the social differences reflected already in the inequality of educational opportunity. Education was important through the effect that rising levels of educational opportunity had on reducing the restricted access to high-paid jobs. However, it does not seem to play any significant role in explaining wage differences within occupations.[30] The efforts to give more visibility to human capital came only with the turn to the seventies. Two textbooks published at the time, by Richard Perlman (*Labor Theory*, 1969) and Belton

[29] This was the case at Princeton, to which Albert Rees moved in the mid-sixties after being a member of the Chicago faculty and Head of the Department in the first half of the sixties replacing T. W. Schultz. Rees had contributed, jointly with H. Gregg Lewis, to a significant change in the theoretical and methodological focus of labour research and teaching and would continue to do this.

[30] For instance E. H Phelps Brown's text (1962) completely overlooked human capital research. This did not come as a surprise if we bear in mind that he belonged to the so-called group of middle-ground neoclassicals which included Lloyd Reynolds, Richard Lester and others. In fact, the book presented the customary view among the group of the labour market as a complex and imperfect type of market, to whose problems the contribution of economics gave general answers, "possibilities rather than actualities" (1962: 4). This resistance to human capital theory is underlined by the new editions of best-sellers by Richard Lester (1964) and Lloyd Reynolds (1964). Due probably to a textbook inertia, their structure still presented significant traces of mid-century labour research, with a lot of attention to unions, and contextual factors affecting the labour market, rather than a straightforward application of price theory to the labour market. Lester had a few references to human capital, but in the context of manpower planning (571). Reynolds did refer to the work of Mincer on the impact of the rising educational level of women on their employability, though there was no reference at all in the textbook to either Schultz or Becker.

Fleisher (*Labor Economics - Theory and Evidence*, 1970), indicate a more favourable context to human capital research, and both titles emphasising *theory* is suggestive in that respect. In both textbooks the move away from traditional labour economics and industrial relations is clear. The core position of the analysis of supply and demand in labour economics, and its interaction with the contribution of human capital researchers, was unmistakable. According to these textbooks the structure of labour economics had changed alongside the development of human capital research.[31]

This process would be reinforced with the publication of some textbooks that would become classics in the field by Albert Rees *The Economics of Work and Pay* (1973) and Richard Freeman *Labor Economics* (1972). Rees had been playing an important role in the neoclassical re-shaping of labour economics, and the textbook was another important step in that respect. His book presented a structure much closer to the actual labour economics textbooks, and acknowledged a new generation/tradition of work in the field led by Gregg Lewis, Melvin Reder, William Bowen, Becker and Mincer, whose work wanted to treat labour as a specialised field, but to distinguish it as well from industrial relations. Freeman's book structure presented many similarities with Rees' book, emphasising the microeconomics of the labour market, rather than the industrial relations type issues. The visibility of human capital research and the authors associated with it was significant. Education and training gained autonomy as a topic in itself, and played a major role in terms of labour supply and the allocation of time, occupational mobility, wage determination and wage differences, personal income distribution and lifetime income patterns. The subsequent editions of each of these works in the late seventies would confirm and extend the importance of human capital in a redefined labour economics. The same is largely applicable to the next generation of texts coming out in the turn to the eighties.[32]

[31] The mark of human capital research is visible in the analysis of wage differentials and in a much greater emphasis on labour supply and its determinants, where the process of decision making within the families and the qualification of the economic agents played a major role. The references to Becker, Schultz, Mincer, Gregg Lewis, Aba Schwartz, Margaret Reid, and Robert Fearn were frequent.

[32] Among these it is worth mentioning the texts by Robert Fearn (himself one of the early graduates in human capital research) (1981), Ronald Ehrenberg and Robert Smith (1982), and Don Bellante and Mark Jackson (1979). Human capital research would get at least one or two separate chapters, besides emerging within other topics such as (male and female) labour supply, migration of workers, employment/unemployment, and discrimination in the labour market. The imprint of human capital researchers, notably Becker, was unmistakable and confirmed by the frequent references to his/their work.

3.2.3. Textbooks on the Economics of Education

Research on the economics of education developed rapidly during the sixties, and largely on the wake of human capital research. The visibility of human capital within the economics of education would increase with T. W. Schultz' *The Economic Value of Education* (1963), which was a systematic exploration of many of the themes suggested in his AEA Presidential Address.[33] More than anything, Schultz' book performed two main tasks. On the one hand it was a vehicle for the enormous amount of on-going and largely unpublished research among human capital groups (especially in Chicago). On the other hand, it attempted to convince the most sceptical of the effectiveness and reasonableness of using economic analysis to study education. The fact that the title does not mention 'human capital' is not innocent, especially if one has in mind that semantics mattered particularly in this case and at the time.[34]

However, the few existing specialists in economics of education were not necessarily focused on human capital, and financial issues and manpower planning dominated an important part of the economic research on education at the time.[35] In the finance research the economic value of education was scarcely discussed, either at the social or at the individual level. The reasoning was close to Marshall's argument of significant individuals' under-investment needing to be complemented by government support. This government intervention was preferably analysed within the framework of the manpower planning approach, another area that was developing rapidly at the time.[36] These manpower planners did not challenge the link between

[33] As the title suggests, the focus of the economic research on education is now much less interested in the educational system for its own sake, but much more on its interaction with the social-economic context in which it is embedded. The book analyses the benefits and costs of education from an individual and social point of view and attempts to show that education is a profitable way of allocating society's resources.

[34] Indeed, and for instance, T. W. Schultz had used human wealth instead of human capital in his initial writings, and even Becker hesitated about the title of *Human Capital*. And the device seemed to have some effect since the foreword was written by an apologetic Henry Villard (one of the Directors of the Ford Foundation that supported the book), the same that just a few years earlier had been so critical of Becker's first paper coming out of the NBER project at the 1959 AEA meeting.

[35] In the case of the former two representative examples are Charles Benson' s *The Economics of Public Education* (1961) and Alice Rivlin's *The Role of the Federal Government in financing HE* (1961). These two books confirm Mark Blaug's dictum that "the finance of education is perhaps the oldest and most developed branch of the economics of education" (1969).

[36] Two of the most influential works were Frederick Harbison and Charles Myers' (1964) project on the role of manpower formation and planning for development and Samuel Bowles' (1969) study on manpower planning applied to Nigeria (based on his PhD Dissertation for Harvard), both somehow

higher schooling and higher productivity, though they tended to avoid the expression 'human capital', using instead 'human resource development'. In fact, they considered that the most important effect of education was through socialisation practices (discipline, communication, etc…) rather than through transmission of skills. The main example among general texts in the field at the time was John Vaizey's *Economics of Education* (1962).[37]

Alongside the expansion of human capital research throughout the sixties there was an increase in the visibility of the economic value of education. A testimony to this growing interest was the publication of bibliographic support either in collections of readings or in annotated bibliographies during the late sixties.[38] This increasing activity led eventually to a growing number of textbooks on the economics of education. In the early seventies these were published eight textbooks in the field and seven anthologies of major articles in which human capital research featured prominently. Among these it is worth mentioning Blaug's textbook (1970), a best-seller at the time published in a popular edition by Penguin, and Elchanan Cohn's (1972) which would become the doyen of economics of education texts (with three editions so far, the last one in 1990). The textbooks on economics of education of the period tended to focus on the economic value of education, which became a synonym for human capital but *friendlier* to many audiences. They would normally devote significant attention to the analysis of the costs and benefits of education, including long explanations about the use of a cost-benefit framework and the main results of

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connected with Chicago. Harbison had been a Professor in Chicago until he moved to Princeton in the late forties, though his interest in education developed later and in connection with development issues. Bowles was actually lured by Chicago (especially by T. W. Schultz) which offered him a post-doctoral placement but he rejected it.

[37] Vaizey, like many of the pre-human capital economists of education, was focused on financial issues (Vaizey, 1958) and very sceptical of the human capital approach. Vaizey believed that education was highly beneficial, though it was virtually impossible to disentangle the consumption aspect from the investment one. In terms of educational development he preferred the manpower planning ton the pro-individualistic and market oriented human capital approach. A decade later (1973) he remained uncompromising about the flawed nature of human capital theory as a viable way of explaining the economic value of education.

[38] In that respect the major role was played by Mark Blaug, then one of the most enthusiastic supporters of human capital among the economics of education. Blaug published his bibliography in the economics of education in 1966, updating it in 1970 and 1976. In the first edition the volume contained roughly 800 items, in the second 1,350, and in the third and last one just below 2,000. In terms of readings, Blaug edited two volumes in 1969, both featuring prominently the human capital approach, though including other more traditional types of economics of education research such as educational finance. Another influential collection of readings was edited by Mary Jean Bowman (Chicago) with three other researchers in the field (John Vaizey, V. Komarov and Michel Debeuvais) and published by UNESCO in 1968. It had the curiosity that it included texts from Russian economists reflecting on the economic value of education, published for the first time in English and in some cases dating back to the 1920's.

the rates-of-return analysis. Another characteristic of this period's texts is the discussion of education as an investment good or as a consumption one. Particular attention was given to the role of education and training in promoting economic growth. These topics would easily occupy more than two-thirds of the textbooks.[39]

Textbooks also normally give a truncated view of the subject's history and antecedents, tending to present the new developments as a sort of inevitable/logical development (Kuhn, 1970: 137ff). The economics of education is no exception, and followed human capital research attempts to provide a disciplinary pedigree for the theory. It attempted to show that the idea of human capital had been prominent in the discipline at least until Alfred Marshall. This view was shared by most of the pioneers in the field, who frequently used the words of the founding fathers as vehicle to give credibility to the new theory, though some recognised that these did not have a proper theory of human capital.[40]

The support to human capital theory given by the textbooks on the economics of education and labour of the late sixties onwards came also via the treatment of alternative and critical theories. Among those aforementioned, the only one of the labour texts to discuss critical views on human capital theory is Ehrenberg and Smith's (1982). The authors nevertheless dismiss screening or segmented labour market theories as major alternatives to human capital. Screening effects of education are acknowledged but considered as minor ones (and based on some of the empirical tests developed till date). Moreover, their existence is considered to be a positive element, and education signalling thought to enhance rather than reduce the economic value of education. Among the texts on the economics of education one has also to wait long to get some discussion of critical views. For instance, Cohn's text only discusses them in its third edition (1990), at a time when the screening view had lost

[39] In Blaug's *Economics of Education* (1970), of the ten chapters, 2 were devoted to education as an investment, 3 to cost benefit analysis of education, and 3 to economic growth and educational planning matters. Elchanan Cohn's text (1972) presented a similar picture. The issues of the internal working of the educational system and its finance would not get more than 2 or 3 chapters. The difference from later textbooks is clear. For instance G. B. Atkinson (1983) already devotes just under half of the text to the so-called microeconomics of education, and in Geraint Johnes' more recent one (1993) the role of human capital research is even less prominent, becoming a sort of historical-theoretical background that prepared the center-stage for the current economic research on education. This process is visible even in the case of the new editions of older textbooks such as Cohn's one, where human capital research loses prominence in favour of more recent research in the field.

[40] The major effort in this respect was by Bernard Kiker, whose dissertation (1966) was mainly a retrospective study of the history of the discipline, searching for attention to the economic role of education and training. Despite many interesting insights, calling the attention of the disciplinary peers to many overlooked or forgotten passages by the founding fathers, the book has a clearly whiggish flavour (his book was curiously entitled *Human Capital in Retrospect*, 1968).

its momentum and clearly did not represent any more a major threat to human capital dominance. The major exception is Blaug's (1970) text, which despite its early date, prior to the blossom of alternative theories, anticipated several of the issues at stake.[41]

This absence of references to critical views can be explained by several reasons. In terms of segmented labour markets or radical/marxian criticisms the absence is hardly surprising bearing in mind that the textbooks we were dealing were all mainstream neoclassical ones in their background and in their target audience. So one could never expect much attention, let alone receptivity, to very different ways of seeing labour markets and doing economics. In terms of the screening view, the main reason is the fact that it represented a shift in the view most of these labour economists and economists of education had of the role of educational decisions in the labour market. However, screening did not provide an alternative paradigm for labour economics, since it addressed basically the problem of the social value of education. Human capital research and labour economics had mingled so much during the sixties and the seventies that it would be difficult to influence one without the other. Moreover, for many of these economists, especially in terms of economics of education, it would be self-defeating to abandon or weaken a theoretical structure that had brought so much attention into those fields and in many instances had laid the foundations of the field (education) or had given it a new identity (labour).[42]

Besides there are some specificities concerning the textbook product itself that made it difficult to permeate by alternative views of education. The fact that textbooks are supposed to synthesise the state of the art in the field within a high level of consensus prevents them including any new development straight away, and by definition a textbook will follow the disciplinary debates with a clear lag. Moreover, the new editions are not published as frequently as all that, so timing is also important. Besides a kind of inertia limits rapid and severe changes in the structure of each textbook. By the late seventies, the period when most of these textbooks were

[41] In particular, Blaug discussed how much of the effect on earnings was due to education and how much to other factors (screening, ability, and social origin). In his discussion, and despite concluding that the role of education seemed clear and important, he points out several problems in terms of the cost-benefit analysis: type of samples available, the size of consumption and non-pecuniary benefits, the impact of spillovers, and the debates on the marginal pricing of labour.

[42] As Cohn puts it: "some self-criticism is certainly in order, the objective being to improve both the theoretical and empirical foundations of our framework. Some of the critics, however, do not stop here. They contend that the entire framework is extremely troublesome. They conclude that no more effort should be expended in this area of study. "(1975, 2nd edition; 230-1).

published, screening had certainly lost some of its initial appeal of the early seventies, and human capital counter-replies were already making their way.

Training New Research Cohorts

The success of human capital was certainly linked with its ability in attracting graduate trainees, feeding the area with new and able researchers, notably in what concerns labour research.[43] Several studies confirm that the years of doctoral training and the period just after is a crucial one in setting the pattern of research productivity of new (successful) researchers (see Clemente, 1973).[44] It also emphasises the importance of learning by doing in terms of scientific activity, both in graduate training and in early career research (post-doctoral fellowships, initial appointments, etc) (see Kuhn, 1970: 46-47). In the case of economics, during the fifties and sixties, doctoral training was still very much concentrated in a handful of departments. This contributed to these departments' dominance in research and publication activity, enhanced by the differences in research funds and facilities that favoured leading departments. Whereas the current affiliation of the authors present in major economic journals was frequently dispersed (exceptions were the prominence of Chicago in the *JPE* and Harvard in the *QJE*), in terms of graduation the three main ones (Harvard, Columbia and Chicago) represented almost half of the contributors (Cleary and Edwards, 1960). Hence, the type of training in top departments had potentially a major reproduction effect at the time.

TABLE 4 – DOCTORAL DISSERTATION IN LABOUR ECONOMICS AWARDED BY AMERICAN UNIVERSITIES, BY TOPIC (1961-1970)

[43] In social science, it seems that the social factors are more important than the cognitive ones, in attracting new researchers, i.e., the fashion factors seems to be stronger than the research potential (Crane, 1972: 90-93). The term of fashion as used in the sense rapid growth is very much the result of social interaction, not really as an emotional response to certain activity/aspect as pure fashion.

[44] The decade after graduation seems to be the period of highest productivity in terms of publication (Soldofsky, 1984). The importance of the department is sometimes also argued due to its effects in productivity, by creating an organisational context more favourable to the productivity of its members through better facilities, an intellectually stimulating working environment, and strong motivation to publication and research (Allison and Long, 1990). Students and faculty tend to collaborate more often in better departments, which in turn increases the potential for publication of young researchers (possibly in co-authorship). The potential of opportunities for collaboration also seems to be much higher in prestigious departments. Nonetheless, the role of the department of training will certainly vanish if the young researcher doe not manages to launch his/her professional career.

	Total	Training/Manpower	Wages	Supply/Migration	Legislation	Ind Relat	Unions/CollBarg	Emp/Unemp	Firm/Indust	Other
1961	35	2	5	1	5	3	11	1	1	6
1962	27	2	4	2	1	7	8	1	1	1
1963	25	0	2	3	2	1	6	3	2	6
1964	50	7	9	8	1	6	4	9	3	3
1965	46	3	3	3	1	4	13	4	7	8
1966	47	5	6	6	3	4	11	4	5	3
1967	52	8	5	11	3	1	10	5	5	4
1968	52	7	7	8	6	4	8	5	3	4
1969	77	15	7	16	4	10	10	7	3	5
1970	90	19	11	18	3	5	13	8	2	11

Source: List of Doctoral Dissertations of the AEA, as published in the December issues of the AER

The data indicate important changes in the training of labour economists. There is a significant increase in the number of dissertations, in part supported by the growth of number of institutions awarding PhD's in general, and in this area in particular, reducing a bit the dominance of the traditional elite departments.[45] The content of the dissertations was also changing rapidly. Much more attention was given to training and manpower issues, supply and migration of labour, wage differentials, and employment/unemployment matters. Other aspects that used to be prominent, such as unionism, collective bargaining, industrial relations, and analysis of labour legislation resisted in absolute number, but lost in terms of relative importance. The approach was also different, with the titles of the dissertations, even in this latter group of topics, increasingly adopting econometric techniques, and moving away from the institutional study of specific markets (industry, region, and firm studies).

The changes were particularly important in some of the leading departments, and especially in those more associated with pioneering research on human capital, such as Columbia and Chicago. The type of research produced by PhD's specialising in labour economics in Chicago during the sixties is enlightening about the course of things. Their research would focus on explaining wage differences by occupations, sex, race, and behaviour in terms of hours of work and labour participation, with particular attention to the economic value of education. Traditional labour research resisted longer in Columbia, until the early sixties, but during the mid-years of the

[45] The data confirm that in labour economics there was a surge of interest in the early sixties, shown by the increasing percentage of papers devoted to that subfield (Brofenbrenner, 1966), despite the move to IR journals, and confirmed by the evolution of PhD graduates in American Departments (consistently as one of the most popular subjects). It also confirms the findings that short term waves of interest are largely determined by factors endogenous to the discipline.

decade a change is visible with a clear emphasis on the analysis of wage differences, unemployment, income distribution, and migration (all of them in the context of the human capital research program).

TABLE 5 - DOCTORAL DISSERTATIONS RELATED TO HUMAN CAPITAL RESEARCH AWARDED BY AMERICAN UNIVERSITIES 1950-1970

Department	*1950's*	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*	*1969*	*1970*
Chicago	*4*	*2*	*1*	*2*	*-*	*2*	*1*	*3*	*-*	*3*	*2*	*-*
Columbia	*1*	*-*	*-*	*-*	*1*	*1*	*-*	*3*	*2*	*5*	*3*	*3*
Other	*-*	*-*	*-*	*2*	*2*	*-*	*6*	*9*	*15*	*5*	*15*	*11*
Total	*5*	*2*	*1*	*4*	*3*	*3*	*7*	*15*	*17*	*13*	*20*	*14*

Source: List of Doctoral Dissertations of the AEA, as published in the December issues of the AER

In terms of the PhD's related to human capital issues, the data confirm the link between the change in labour economics and the development of human capital research. The data also confirm the prominent role taken by the Chicago and Columbia departments of economics, the latter later on and after Becker and Mincer joined the department. Until the early sixties human capital research is almost exclusively confined to Chicago (the exception was Mincer's 1957 Columbia dissertation). These PhD's would research on occupational differentials (Morton Zeman and Becker in 1955, Mincer in 1957, Robert Polkinghorn in 1958, Paul Keat in 1959, and Henry Sanborn in 1960) and on the role of education in economic growth (Zvi Griliches in 1957). In the mid-sixties the situation started to change with the first PhD's coming from other departments (Harvard and Washington in 1962; Yale and Virginia in 1963). These works would analyse the economic value of education within a cost-benefit framework and the contribution of education to economic growth. Chicago remained playing an important role at the time with the graduation of people such as Micha Giesser (migration, 1962), Martin Carnoy (cost-benefit, 1964), Glen Cain (labour participation, 1964), Giora Hanoch (rates of return, 1965), Sherwin Rosen (stock of human capital, 1966), Finis Welch (education and income, 1966), and Marvin Kosters (schooling and labour participation, 1966). Columbia started to be more in evidence with the work of students supervised by Becker and Mincer: Gonan Smith (occupational differentials, 1963), Dave O'Neill (unemployment and human capital, 1966), Robert Rice (wage differences, 1966), and Barry Chiswick (income distribution, 1967).

By the late sixties the doctoral research on human capital presented a significant expansion in terms of the number of graduates and in the number of departments where these have graduated. Besides Columbia and Chicago, two obviously prestigious departments, there were graduates from every top department (e.g. Harvard, Yale, Princeton, MIT, Stanford), many of which had been somewhat resistant to this type of approach. This is important because we know that graduates from elite departments have normally a higher research productivity, supervise more graduate students, and have a higher probability in becoming Department Chairs in their careers, thus they normally have a higher potential for influence in the discipline (cf. Pieper and Willis, 1999; Allison and Long, 1990, and Clemente, 1973). The expansion moved as well to less known departments, altogether suggesting an increasing acceptance of human capital as a topic of research, notably among young researchers.

However, in order that this research potential becomes a reality and provides vitality to the area it is essential that those newly trained professionals join the academic profession and become successful academics. This is not easy to define but it is certainly proxied by their scientific productivity and a teaching placement at a prestigious university. Some raw data on those young researchers who have pioneered the field or even done their doctoral work on human capital provides some information on that. First, there is a high retention on academic life of these young researchers, though some have not followed academic life and have hardly done any research after their graduation (e.g. Morton Zeman and Paul Keat, whose work was frequently cited in the early days of human capital). Second, many of those that continued in academic life kept a high research productivity, frequently publishing more than 40 articles in professional journals during their subsequent careers. Finally, and somehow related to previous one (see Allison and Long, 1990), many in this generation managed to get positions in some of the top departments in economics in the US (e.g. Chicago, Columbia, UCLA, Yale) and abroad (Tel-Aviv and Hebrew University of Jerusalem in Israel; LSE and University College London in the UK), and in major research institutions (NBER, Brookings, RAND, National Academy of Sciences, American Enterprise Institute). Several held important public office positions (CEA, World Bank). Altogether, this suggests that these young researchers

attracted to human capital were in many cases highly gifted and excellent professionals, which magnified the academic impact of human capital research.[46]

5. Reasons of a disciplinary success

When in the early sixties human capital theory started to develop many hailed it as a revolution in economic thought. This was mainly due to the fact that thus far economists had mostly ignored education or when analysed it was regarded as a consumption good. By acknowledging the economic value of education as a powerful investment many regarded it as a turning point in terms of economic thought about economic growth, labour markets, and many other aspects of human behaviour.

In this text we have analysed some aspects of the dissemination of human capital research in economics. Human Capital theory is frequently pointed out as a success story in contemporary economics, and the aspects surveyed in this analysis seem to confirm it. Research on human capital increased throughout the second half of the twentieth century to become a very popular topic. The growth in the number of researchers and publications was impressive and in both absolute and relative terms. This importance was rapidly recognised by the AEA in including 'human capital' in its index of economic research (1968). Moreover, the expression human capital became part of the jargon of the discipline, and beyond, and came to epitomise education and training.

However, these ideas also faced significant resistance among fellow economists. It took a good decade for human capital topics to permeate the major reference textbooks in economics. This process was apparently even more difficult in specialised fields, suggesting that it is more difficult to change standard views at the expert level than at the general level of economic knowledge. The delay in permeating the texts, particularly in the labour field, was enhanced by the fact that none of the human capital researchers took up the task of writing a textbook that would give the group's view of the labour market.

[46] It should be noted that many did not remain researching exclusively on human capital topics, though a large number did. However, even when not pursuing human capital topics their academic visibility gave more prominence to their past work in the area.

The visibility and acceptance of human capital research by professional economists has benefited from the progressive institutionalisation of applied fields which since their inception were linked with human capital theory, such as the economics of education and health economics. Although the subsequent institutionalisation of these applied fields tended to give less importance to the seminal insights coming from human capital research and led them to pursue a wider research agenda, these fields kept giving important visibility to human capital research.

Nevertheless, the revolutionary character of human capital was even more in convincing economists about the potential of neoclassical economics in explaining many facets of social and human behaviour. Despite the importance of earlier attempts, human capital would remain as the first major foray into this realm of applications. There is hardly any other aspect more characteristic of contemporary economics than this one, and hardly any other that stimulated more controversy than this one in the relationship between economics and other social sciences. It had a major significance as an area of research that promoted so many applications of neoclassical economics to aspects as diverse as health, education, fertility, family, and migration. Its endurance was a major stimulus that paved the way for this massive expansion of the discipline's boundaries.

Prompted by Becker's visibility in the discipline and by the impressive impact of his *Human Capital*, the fate of human capital research in the discipline, and beyond its borders, became very much linked with that of Becker's economic approach to social issues. And if the concept was already a problematic one for sounding like exploitation, the fact that this approach tended to be associated with Gary Becker and his innovative applications to a large array of social topics frequently raised even less sympathetic reactions. Furthermore, the academic tribes and territories (Becher and Trowler, 2001) had become very much consolidated in the twentieth century and the attempts from economists to apply its theoretical tools to less traditional problems were frequently labelled as intellectual imperialism, and not very well accepted by other scholars (cf. Swedberg, 1990). The unenthusiastic reactions of the other scientific fields to this approach, and specifically to human capital theory were clear on that (see Becker's interview in Swedberg, 1990). If human capital moved from being an odd metaphor to a popular one it was also because of the increasing dominance of neoclassical economics and the increasing confidence of economists to

tackle an increasing number of socio-economic topics with their neoclassical tools (see Tommasi and Ierulli, 1995).

Linked with the multiple contexts in which human capital was explored is also the increasing vagueness of its conceptual content. It has been noted that for Becker human capital became increasingly a framework to understand several aspects of human behaviour, providing an effective and powerful example of the ability of economics to deal with social issues. With time, Becker used human capital more and more as a building block for his "economic approach" to social behaviour, and human capital became less important per se. It became part of a theory of social behaviour rather than a self-contained theory, and the more Becker advanced in his research, the less he seemed to be worried about exploring the initial links of human capital with income and labour performance. By giving to human capital a broader and more vague content, Becker contributed in way to promote its circulation, notably in other areas.[47]

The human capital revolution promoted a metamorphosis of the identity of contemporary economics that will contribute to the endurance of the former, and even when not sharing the theory's analytical framework, economists do not look like receding from the economic analysis of education in particular, and social behaviour in general. One of the aspects that most contributed to the resilience of human capital research was its ability to permeate the standard views of the discipline in a way that continued to be reproduced via the teaching of new generations. Human capital seems therefore to confirm Max Planck's dictum that a theory is more certain to endure when it is able to convince the new generations and trust they will take up the torch.

[47] The rapid success of the concept of social capital can also be credited to a certain extent to the common usage of its predecessor human capital. However, much of the use of these variants of capital, notably human capital, did not correspond to the absorption of its theoretical structure, and most of Becker's theoretical approach was lost in-between (Baron and Hannan, 1994). It nevertheless shows the major impact that Becker has had beyond economics, being the most cited economist not only in economics, but also in many social sciences (notably sociology).

References

- Alchian, Armen and William R. Allen (1964) *University Economics*, Belmont: Wadsworth, 1st ed. (2nd ed., 1967)
- Allison, Paul and J. Scott Long (1990) "Departmental Effects on Scientific Productivity", 55, August, 469-478
- American Economic Association (1956-1983) *Index of Economic Articles*, Homewood (IL): Richard D. Irwin
- Arrow, Kenneth (1972) "Higher Education as a Filter", *Journal of Public Economics* 7: 193-216
- Atkinson, G. B. J. (1983) *The Economics of Education*, London: Hodder and Stoughton
- Bach, George L. (1966) *Economics: an introduction to analysis and policy*, Englewood Cliffs: Prentice-Hall, 5th ed.
- Bairam, Erkin (1994) "Institutional Affiliation of Contributors to Top Economic Journals 1985-1990", *Journal of Economic Literature*, XXXII, June, 674-679
- Baron, James and Michael Hannan (1994) "The Impact of Economics on Contemporary Sociology", *Journal of Economic Literature*, 32 (3), 1111-1146
- Becker, Gary (1964) *Human Capital*, New York: Columbia University Press, 2nd Ed. 1975 and 3rd 1994
- Becker, Gary (1971) *Economic Theory*, A. Knopf
- Becker, Gary (1996) *Accounting for Tastes*, Harvard Univ. Press
- Bellante, Don and Mark Jackson (1979) *Labor Economics*, McGraw-Hill
- Benson, Charles (1961) *The Economics of Public Education*, Houghton Mifflin Co
- Berg, Ivar (1970) *Education and the Jobs: The Great Training Robbery*, NY: Praeger Publishers
- Blaug, Mark (1970) *An introduction to the Economics of Education*, London: Penguin
- Blaug, Mark (1976) "The Empirical Status of Human Capital Theory: A Slightly Jaundiced Survey" *Journal of Economic Literature,* 14.3: 827-55
- Bowles, Samuel and Herbert Gintis (1975) "The Problem with Human Capital Theory – A Marxian Critique", *American Economic Review*, 65 (2), 74-82
- Brown, E. H. Phelps (1962) *The Economics of Labour*, New Haven: Yale University Press
- Cain, Glen (1976) "The Challenge of Segmented Labor Market Theories to Orthodox Theory: A Survey", *Journal of Economic Literature*, 14 (4), 1215-57
- Carnoy, Martin (1974) *Education as Cultural Imperialism*, NY: Longman
- Chamberlain, Neil W. (1967) "Some Second Thoughts on the Concept of Human Capital", rep. In Wysktra (1977), 205 - 215
- Clemente, Frank (1973) "Early Career Determinants of Research Productivity", *AJS*, 79 (2), 409-19
- Coats, A. W (1971) "The Role of Scholarly Journals in the History of Economics: An Essay", *Journal of Economic Literature*, March, 29-44
- Cohn, Elchanan (1972) *The Economics of Education*, 2nd 1975

- Cohn, Elchanan (1988) "History and Prospects of the Economics of Education Review", *Economics of Education Review*, Vol. 7, N. 2, 165-6
- Cohn, Elchanan and Terry Geske (1990) *The Economics of Education*, 3rd edition. Oxford: Pergamon
- Crane, Diane (1972) *Invisible Colleges*, Chicago: University of Chicago Press
- Eagly, Robert (1975) "Economics Journals as Communications Networks", *Journal of Economic Literature*, 13(3), 878-888
- Eckhaus, Richard (1962) "Investment in Human Capital: A Comment", *Journal of Political Economy*, 70 (5), 501-4
- Econlit – A bibliographic index of economic literature
- Ehrenberg, Ronald and Robert Smith (1982) *Modern Labour Economics*, Scott, Foresman and Co.
- Fearn, Robert (1981) *Labour Economics*, Winthrop Publishers
- Fleisher, Belton (1970) *Labor Economics – Theory and evidence*, Prentice Hall
- Freeman, Richard B (1972) *Labor Economics*, Prentice Hall, 2nd edition 1979
- Gaster, Barak (1990) "Assimilation of Scientific Change: the Introduction of Molecular Genetics into Biology Textbooks", *Social Studies of Science*, 20, 431-454
- Grossman, Michael (2000) "The Human Capital Model", in Anthony Culyer and Joseph Newhouse (ed.), Handbok of Health Economics, Amsterdam: Elsevier
- Hamermesh, Daniel (1973) "Potential Problems in Human Capital Theory", *Proceedings of the Annual Meeting of the IRRA*, 225-242
- Johnes, Geraint (1993) *The Economics of Education*, London: Macmillan
- JSTOR
- Kaufman, Bruce E. (1993) *The Origins and Evolution of the Field of Industrial Relations in the United States*, Ithaca (NY): Cornell University Press
- Laband, David and Michael Piette (1994) "The Relative Impact of economic Journals: 1970 – 1990", *Journal of Economic Literature*. 32.2: 640-66
- Lester, Richard (1941) *Economics of Labor*, NY: MacMillan, 1st ed. (2nd ed., 1964)
- Lipsey, Richard (1963) *An introduction to positive economics*, London: Weidenfeld & Nicolson, 1st ed. [2nd 1966; 7th 1989]
- McKenzie, Richard C. and Gordon Tullock (1978) *Modern political economy: an introduction to economics*, New York: McGraw-Hill,
- McNulty, Paul J. (1986) *The Origins and Development of Labor Economics*, Cambridge (MA): MIT Press
- Perlman, Richard (1969*) Labor Theory*, NY, John Wiley
- Perlman, Richard (1973) *The Economics of Education*, NY, McGraw-Hill
- Piore, Michael (1973) "Fragments of a "Sociological" Theory of Wages", *American Economic Review*, 63 (2), 377-84
- Rees, Albert (1965) Review of Gary Becker's Human Capital, *American Economic Review*, Vol 55
- Rees, Albert (1973) *The Economics of Work and Pay*, Harper and Row

- Reynolds, Lloyd (1949) *Labor Economics and Labor Relations*, NY, Prentice-Hall, 1st Ed. (2nd ed. 1954, 4th ed. 1964)
- Rivlin, Alice (1961*) The Role of the Federal Government in financing Higher Education*, New York: Brookings
- Rivlin, Alice (1966) Discussion, *The American Economic Review*, Vol. 56, No. 1/2. (Mar), pp. 395-8
- Samuelson, Paul (1961) *Economics : an introductory analysis*, 5th ed., New York: McGraw Hill [6th 1964; 8th 1970; 10th 1976]
- Shackleton, J. R. (1981) "Gary Becker: The Economist as Empire-Builder", in *Twelve Contemporary Economists*, Ed. By J. R. Shackleton and Gareth Cocksley, MacMillan, London
- Shaffer, Harry G. (1961) "Investment in Human Capital: Comment", *The American Economic Review*, Vol. 51, No. 5, pp. 1026-1035.
- Solow, Robert (1965) Review of Gary Becker's Human Capital, *Journal of Political Economy*, Vol 73
- Spence, Michael (1973) "Job Market Signaling", *The Quarterly Journal of Economics*, Vol. 87, No. 3. (Aug.), pp. 355-374.
- Stiglitz, Joseph (1975) "The Theory of. "Screening", Education, and the Distribution of Income", *American Economic Review*. 65.3:283-300
- Storer, Norman (1966) *The Social System of Science*, NY: Holt, Rinehart and Winston
- Swedberg, Richard (1990) *Economics and Sociology*, Princeton (NJ), Princeton University Press
- Teixeira, Pedro (2000) "Economics of Education: An Exploratory Portrait", *History of Political Economy*, Vol. 31, Annual Supp.
- Teixeira, Pedro (2005) "The Human Capital Revolution in Economic Thought", *History of Economic Ideas*, Pisa-Roma, XIII, 2, pp. 129-148
- Teixeira, Pedro (2007) *Jacob Mincer – Founding Father of Labour Economics*, Oxford University Press and IZA
- Thurow, Lester (1968) "Disequilibrium and the Marginal Productivity of Capital and Labor", *The Review of Economics and Statistics*, 50 (1), 23-31
- Tommasi, Mariano and Kathryn Ierulli (1995) *The New Economics of Human Behaviour*, Cambridge: Cambridge University Press
- Vaizey, John (1962) *The Economics of Education*, London: Faber and Faber
- Vaizey, John et al (1972) *The Political Economy of Education*, London, Duckworth
- Wonacott, Paul and Ronald Wonacott (1979) *Economics*, New York: McGraw-Hill, 1st ed.