Does Human Capital Theory Explain The Value Of Higher Education? A South African Case Study

Alex van der Merwe, Durban University of Technology, South Africa

ABSTRACT

A perennial debate in the economics of education is whether human capital or screening/signalling theories best explain the value of schooling and hence the private demand for, in particular, higher education. Human capital theory proposes that formal training such as that offered by higher education institutions improves the productive capacity of individuals. Screening theory, on the other hand, posits that the value of higher education credentials flows primarily from their value as signals to potential employers of the abilities of the holders of such qualifications. Following the application of Wiles' (1974) test and regression analysis this case study finds that it is probable that both human capital and screening theories account for the economic value of higher education in the perceptions and experiences of a local cohort of recent Durban University of Technology graduates. This finding, in spite of its empirical support, relies on a certain amount of intuition necessitated by technical and analytical constraints that are discussed in the paper.

1. INTRODUCTION

A core thesis of human capital theory is that education renders people more productive, that is, it raises the marginal product of an educated worker relative to one not so educated. This implies, firstly, a long-held human capital theory notion that each job entails a certain complement of cognitive skills which can only be acquired by formal schooling (Blaug, 1992). Secondly, it also assumes that the marginal product of an individual worker can be exactly identified. The realism of both assumptions is questionable. This possibility undermines traditional human capital theory's theoretical explanation of the value of education. Furthermore human capital theory's neoclassical economic paradigm renders it all but impossible to demonstrate that education increases individuals' productivity.

Orthodox economists of education have been accused of grossly misunderstanding the economic value of education in attributing the observed association between earnings and schooling to the influence of education on cognitive knowledge (Blaug, 1992). Proponents of the so-called "socialization function of schooling", on the contrary, attribute effective performance in most jobs primarily to certain non-cognitive personality skills. These personality traits, the argument goes, are rewarded in the classroom and systematically encouraged by the educational system. Blaug agrees that, even at the level of many professional studies, cognitive knowledge frequently consists of general communication skills and problem solving abilities rather than occupation-specific competencies. As evidence of this fact he points to the dispersion of arts graduates over a wide range of occupations in both the public and private sectors.

Hansen (1970, cited in Blaug 1987a) similarly contended that it is not certain what elements or ingredients of schooling make people more productive. It appears that our knowledge in this respect, nearly forty years on, is less than perfect. Intuition would suggest, however, that schooling does contribute to productive capacity. Bowman (1992), evidently on this basis, made the same appeal. This paper argues that the proposition that education renders individuals more productive must ultimately rely on intuition, a currency that is suited to a qualitative epistemological and ontological framework.

It is important to examine aspects of human capital theory, including the perceived value of education, upon the open ground of human experiences, beliefs, perceptions and motivations. There should be greater acknowledgement that individuals often act on the basis of limited knowledge or variable mental capacities so that, after the fact, their behaviour cannot be regarded as "rational" in the neoclassical economic sense. Instead, the behaviour of economic agents becomes comprehensible in the context of bounded rationality (Rothschild, 2002). Such a philosophical approach, if it is to add value to what is already known, should not arbitrarily constrain how people interpret their realities or views of the world. Its purpose should not be prediction if such prediction is to be fashioned by contortions of logic. Rather, a philosophical approach is required whose purpose will be to contextualize, interpret and understand actors' perspectives.

This paper, by comparing the employment and earnings expectations and experiences of recent graduates, offers a measured opinion of how convincingly human capital theory can account for the perceived economic value of higher education. The findings of this single-case study are based on a longitudinal survey of Durban University of Technology (DUT) students and graduates. Section 2 briefly reviews some of the relevant literature; Section 3 explains the research method; Section 4 discusses the analysis and findings and Section 5 concludes.

2. REVIEW OF THE LITERATURE

a) Human capital's theoretical framework

It is ironic that the difficulty of proving human capital theory's posited direct link between formal education and productivity is at least partly a consequence of what some would identify as structural flaws in neoclassical economic philosophy. Neoclassical economic orthodoxy has endured a long tradition of opposition on the basis that it is founded on an ontology that is not easily recognisable in the real world (Rothschild, 2002). Piore (2006), for example, alleges that the vulnerability of economics (presumably he means mainstream neoclassical theory) is that it is addressing problems in the world. A common complaint is that neoclassical economics sacrifices realism (and hence relevance) in its relentless pursuit of scientific rigour (Thompson, 1997). The general argument here is that, in order to preserve the coveted scientific status that neoclassical economics evidently craves (Lazear, 2000) the real world must necessarily be sterilized by means of various assumptions about the behaviour of economic agents. This sanitization, according to critics, allows the development of efficient and elegant theories (Rothschild, 2002) however far removed they may be from imperfect day-to-day life.

Human capital theory, as a product of neoclassical economics, inherits its metaphysical assumptions of the "hard core" of the orthodox economics research programme (Zamora, 2006). These basic assumptions include *individualism, perfect knowledge, rationality, private property rights* and *market economy (competition)*. The issue of the "realism" of assumptions in economic theory has been much debated (Friedman 1953, Nagel 1963). Many economists reject Friedman's (1953) view that the adequacy of theory must be judged, not by the realism of its assumptions, but by examining the concordance of the theory's logical consequences with the phenomena the theory is designed to explain. With respect to Friedman's gauge of what constitutes adequate theory one might reasonably expect that accurate prediction (and hence adequate theory) is in fact necessarily founded on correct assumptions. Blaug (1980) notes that *Verstehen* doctrine requires realism of assumptions in respect of human motivation in the social sciences.

Certainly, in Blaug's (1987a) estimation, human capital theory's central proposition that education produces a net positive marginal product of labour can be tested only with difficulty, that is to say, under improbable conditions. This is partly because it evidently entails "leaps of logic" to apportion marginal product due to education to labour, as distinct from other factors, while also gratuitously assuming that marginal product can be matched to individuals. Furthermore, the notion that higher earnings of more-educated workers signifies their superior marginal product relative to less-educated workers ironically founders on the neoclassical assumption of labour market competition. Thus it is only under conditions of perfect labour market competition that the higher earnings of more-educated workers can be said to exactly match their higher marginal product relative to less-educated workers. Even in the unlikely circumstance of competitive labour markets, Blaug asserts that the competitive labour market model lacks predictive power and fails to indicate a timeframe within which to produce a response in situations of disequilibrium. He notes, in addition, that it is also silent about the nature of this response. The net effect of these

deficiencies is that one is tempted to regard the idea that more education makes people more productive as evidenced in their higher earnings as merely an assumption whose veracity, in turn, depends on still other assumptions.

b) A note on labour market expectations and experiences

If it is true that formal education makes people more productive and that this is a significant reason that they invest in this commodity then one might, at least, expect the labour market expectations and labour market experiences of higher education graduates to be reasonably close. Thus graduates should generally secure suitable employment more readily than those who do not have higher education credentials while also earning more, on average, than non-graduates. This is their expectation and motive for investing in higher education which is implicitly founded, to some degree, on a belief that potential employers also believe that formal education has productivity enhancing properties.

There appears to be a dearth of South African academic research on students' and graduates' workplace expectations and experiences. The literature describing the employment experiences of graduates, even at an international level, seems to be limited (Polach, 2004). Even so, the impression seems to be that students and graduates often have grossly inflated expectations (Graham and Mckenzie 1995, Cosser and Du Toit 2002, La Bella 2008).

Smith and Kruger (2005) identify several factors that could influence a graduate's workplace expectations. These include reward and benefit expectations which have both monetary and non-monetary components. They classify remunerative benefits into three main categories, namely: financial security (e.g. pensions, life assurance etc.); financial assistance (e.g. subsidised mortgages, company loans etc.) and personal benefits (e.g. compassionate leave, long service awards etc.).

South African surveys have, at least since the 1950s, yielded empirical data on the scale of graduate employment, unemployment, skills and competencies. Despite considerable social change over the past 50 years, the literature consistently reports that the main graduate employment problems relate to the demographics of graduates, mismatches between graduate skills and labour market needs, graduate shortages in key fields, bias in terms of institution attended, and significant differences in time-to-employment across economic sectors (Koen, 2006).

The findings, according to Koen (2006) of institutional graduate labour market research can be summarised as follows: A generally high and variable rate of graduate unemployment at graduation (ranging from 3% to 25%), many graduates (up to one third in commerce) enter the labour market via temporary jobs and most graduates (75%-90%) consider that their studies prepare them adequately for their current jobs. Profession related research appears to support the results of national studies in confirming the broad trend that humanities students, females and black students take longer to find employment.

Moleke (2005) reports that 60% of graduates found jobs immediately, a further 28% found employment 1-6 months after graduating, 6% were employed within 7-12 months after graduating and a further 6% were still unemployed more than a year after obtaining their qualifications. Most graduates' (66%) jobs were permanent, 19% were temporary and 15% were contract engagements. A minimum of 73.9% of graduates by field of study reported that their jobs were related to their studies. Graduates in fields with greater professional focus - such as medical sciences and engineering - found employment more rapidly than those who qualified in fields of a more general nature. In respect of the generalist fields, fewer humanities and arts than commerce and natural sciences graduates found immediate employment. Moleke speculates that this might be explained by a perception that commerce and natural sciences graduates offer capabilities in respect of skills and performances that employers require. If this interpretation is correct then it hints at the possibility that employers, in certain circumstances, adopt a screening or sorting approach to employing graduates.

Moleke observes that the employment prospects and outcomes of graduates are evidently also affected by race, gender and institution attended (historically white or historically black). More than 50% of White graduates found immediate employment in all study fields whereas the only fields in which more than 50% of Black graduates

found jobs immediately were engineering, medical sciences and agriculture. Slightly more males (62.3%) than females (57%) gained immediate employment. Moleke finds that graduates from historically white universities had better job prospects than those from historically black institutions. Only about 40% of those who found immediate employment were from historically black institutions (HBU's) while 69% from historically white universities (HWU's) found jobs immediately after graduation. Moleke considers that this may be due partly to the fact that HBU's historically tend to have more students graduating in fields with lower employment prospects, that is, humanities, arts and education. She also argues, however, that it is likely that tertiary institutions (and hence their qualifications/credentials) serve as a signal in the labour market whereby graduates from HWU's are assumed to have characteristics that are better correlated with higher performance in the labour market.

The graduate labour market literature reports some conflicting findings. Some studies, for example, have reported a dearth of graduate labour market opportunities while others, for the same period, point to labour market successes for graduates. Many recent studies (Casale, Muller and Posel 2004, Van der Berg and Louw 2004, Naidoo 2006b, Anon. 2006d, Bhorat 2007), for instance, all report significant and growing graduate unemployment in South Africa. Indeed it has been estimated that graduate unemployment increased by almost 50% over the period 1995-2005 (Anon., 2007e). This is at odds with the findings of many of the graduate studies reviewed by Koen (2006) and also Moleke's (2003, 2005) survey results.

Notwithstanding some conflicting research findings, however, the international experience of generally lower rates of unemployment for holders of higher educational qualifications relative to those without such credentials – as postulated in human capital theory – is apparently shared by South Africa. Moleke (2003, 2005), in various surveys of South African university graduates, finds that the rate of unemployment of graduates is low compared to the overall rate. Furthermore, when graduates are unemployed this tends to be of a short duration.

c) How to make sense of graduates labour market experiences?

New graduates' labour market experiences appear, generally, to be a function of a broad array of variables ranging from study field, labour market conditions, personal characteristics, demographics and so forth. A sizeable literature offers evidence in support of human capital theory as a generally plausible explanation of the labour market outcomes (experiences) of higher education graduates. Thus these studies generally report that graduates tend to earn more than non-graduates and also appear to suffer a lower incidence of unemployment. The former observation is, however, not particularly helpful in Dore's (1976) view given that the existence of some correlation between education and subsequent lifetime earnings may have various explanations. In this vein, Hamalainen and Uusitalo (2006) note that the two main rival theories in the economics of education, human capital and sorting/screening theories, in most cases offer identical predictions, that is, the better educated tend to earn more.

A further broad trend observed in the labour market experiences of new graduates is the growing incidence of graduate unemployment possibly as a direct result of the significant increase in the number of higher education enrolments and graduates in the 20th century. Other consequences of rising graduate numbers include graduate underemployment, graduates displacing non-graduates in non-graduate jobs (Wielers and Glebbeek, 1995) and lower commencing wages for graduates. On the face of it, these developments would appear to strike at the heart of human capital theory.

If human capital theory is held out as the primary foundation upon which private higher education demand is based, then it seems appropriate to examine whether the post-schooling labour market experiences of higher education graduates match their pre-enrolment expectations expressed in their demand for such training. Specifically, are higher education graduates' expectations of better jobs and a premium for their labour relative to those not so qualified realised in the real world of work? Human capital theory posits that this should be so since training raises the marginal product of labour and hence the wage rate according to the firm's employment equilibrium, MP = W (Becker, 1993). Of course this logic is produced by relying on the implicit assumption of competitive labour markets (Section 2a). A long held assumption of human capital theory, then, is that higher productivity is achieved by investments in education and training. This raises the quality of labour which factor is duly remunerated (Mincer, 1992).

Screening (signalling) theory, in its weak (and more credible) interpretation, attributes the correlation between education level and earnings to "statistical discrimination" (Blaug, 1992). Thus, faced with considerable information costs in deciding on whether to hire an employer, firms resort to stereotypes such as sex, colour, ethnic background, educational credentials, age and previous work experience all of which have been shown to be relatively good predictors of job performance. For most jobs it is cheaper to target group characteristics and to run the risk of occasional recruitment errors. Blaug notes that educational credentialism, as a species of a larger genus of "statistical discrimination", is widely and thus conveniently regarded as both meritocratic and legitimate. Signalling or screening theory, generally, does thus not accept that higher education necessarily has a meaningful productivity dividend. It is, however, as capable as human capital theory of explaining the widely observed correlation between educational attainment and earnings in its position that educational credentials are indicative of otherwise unobserved ability. Thus job candidates with higher education credentials – irrespective of the knowledge content of their training - are regarded, not without risk, as more able than those without such qualifications. Of course, the result is that those with better educational credentials are at an advantage in terms of employment and earnings.

Various tests have been performed to assess the explanatory power of human capital versus screening theories in respect of the correlation between educational attainment and earnings. One of the earlier such tests was that suggested by Wiles (1974). His recommended technique was to analyse the incomes of those employed in the field of their training which approach would control for the motivation factor. Thus one could more safely assume that such individuals have chosen to work in a field where they feel they have a genuine interest in the work (not only pecuniary). In such a circumstance, Wiles posited, the higher the correlation of income with degree class, and the lower its correlation with the relevance of subject matter, the truer is screening/signalling theory and the less true is human capital theory.

Miller and Volker (1984) applied the Wiles test to a census of then recent economics and science graduates from Australian universities. In their approach, they regressed graduates' starting salaries against a number of explanatory variables including a "test" variable. The test variable was a dummy variable indicating whether the individual was working in an occupation related to their field. Separate equations were estimated for male and female economics and science graduates. For male science graduates, only, was evidence found in favour of human capital theory. Miller and Volker concluded, thus, that there was strong evidence of screening in Australia. The Wiles technique was also used by Arabsheibani (1989) to analyse the commencing salaries of Egyptian university graduates. He similarly included a key dummy test variable reflecting whether the graduate reported that their education was "useful" in their current jobs. The coefficient was positive and significant for medical and science graduates and it was found to be almost significant for science graduates. Arabsheibani concluded that his results supported the human capital thesis. His finding that graduates with an additional teaching qualification (that is, another credential or "signal") received no premium for it, was further evidence for him against screening theory and in favour of human capital theory.

Other tests of the economic value of education include, for example, those employed by Lang and Kropp (1986) and Hamalainen and Uusitalo (2006). The former examined the effect of compulsory attendance laws (CALS) on educational attainment. They argued that the effects of a CAL under the human capital hypothesis contrast significantly with the predictions of the screening/sorting/signalling model. The effect of education on wages under the former hypothesis reflects only its effect on productivity. Thus individuals invest in an education up to the point that the present value of increased productivity just equals the cost of education. If the circumstances of the individual contemplating such an investment are such that the CAL is non-binding, then its introduction does not alter educational investment decisions under human capital theory. However, Lang and Kropp (1986) were able to prove that the introduction of a CAL will also increase the educational attainment of individuals not directly affected by it, a result that supports the sorting hypothesis. They concede, however, that with some reformulation it would be possible for human capital theory to account for the possibility that a CAL might in some instances affect those not bound by it.

In an alternative test of human capital versus signalling theories, Hamalainen and Uusitalo (2006) use data from Finnish polytechnic reform during the 1990s to establish the relative significance of these theories in explaining the link between educational attainment and earnings. All Finnish vocational colleges were gradually upgraded over the 1990s to the status of polytechnics with the aim of improving the quality of vocational education.

The authors find evidence of lower earnings for graduates of schools that had not yet been upgraded to the status of polytechnics. They accept this result as indicative of the signalling role of education. On the other hand they find also – in support of human capital theory - that the increase in the population of new polytechnic (post reform) graduates raises the average earnings of both reformed (polytechnics) and not yet reformed (vocational) schools. Hamalainen and Uusitalo conclude that approximately 56% of the return to education reflects the effect of education on productivity (human capital value) and the remaining 44% its signalling or screening value.

In spite of various innovative analyses, it remains difficult to demonstrate – within a neoclassical economic framework - that education makes people more productive at least for the technical reasons briefly discussed in Section 2 a). Thus earnings can be believed to approach the marginal revenue product of labour only if labour markets are competitive. In spite of this Hamalainen and Uusitalo's (2006) study, like Lang and Kropp's (1986), implicitly assumes that higher earnings reflect a higher marginal product of labour. Wiles (1974), Miller and Volker (1984) and Arabsheibani (1989), among others, apparently all make the same leap of logic. Admittedly it is hard to think of a better measure of labour productivity than earnings although its shortcomings are evidently not commonly acknowledged. Perhaps the most that studies of the economic value of formal education can ultimately hope for is evidence of the *belief* that such education enhances individual productivity. The implication of this observation is that human capital theory's core notion that education improves the marginal product of labour should properly be interrogated in an epistemological milieu that gives due credence to qualitative data such as unconstrained expectations and beliefs. This study is based on such an approach.

3. METHOD

This case study is based on a postal survey of the cohort of 2006 final year students roughly one year after graduation across all 3-4 year programmes (mainly national diplomas) offered at DUT's Pietermaritzburg campuses. Table 1 details the Survey's sampling frame.

The survey instrument employed in this study solicited primarily the perceptions, expectations, attitudes, intentions and experiences of respondents in respect of higher education and the local labour market. Studies that employ such data fall within the interpretive paradigm. In the interpretive approach descriptions of individuals' intentions, beliefs, values and reasons, together with observable phenomena, strongly influence knowledge construction (Henning, Van Rensburg and Smit, 2004). Interpretive studies strive to understand phenomena through the meanings that people ascribe to them (Myers, 1997). Myers notes that the philosophical base of interpretive research is hermeneutics and phenomenology. Research that is based on such relativistic, constructivist ontology is classified as qualitative in nature (Krauss, 2005). Piore (1983) notes that qualitative economic research seeks to construct knowledge from the behaviour of economic agents, if necessary, outside the basic maximizing framework that directs much of mainstream economic research. Thus this study, although it employs regression analysis, offers a qualitative interpretation of findings based on qualitative data.

Of those respondents registered for the first time in 2003/4, 81.2% graduated in 2007. Following data cleaning the sample comprised slightly more females (50.5%) than males and constitutes 18% of the population of 2006 final year students who would have registered for the first time in 2003/2004.

Since the credibility of purposive sampling depends on the degree to which it more or less accurately represents aspects of the population, it was necessary to consider not only the population proportions of graduates by programme but also the mean age and gender ratios of the target population. The mean age of the target population of graduates is 23.32 years with females making up most of this number (56%). By comparison, the sample mean age is 23.51 years with slightly more females (50.5%). While the sample was thus sufficiently representative of the mean age of the population of 2007 DUT (Pmb) graduates, it was necessary to weight it so that it would be more representative of the population characteristics in respect of gender ratio and proportions per study programme.

Table 1: Survey sample frame (% may not add up to 100 or otherwise tally due to rounding)

Programme	Total number of 2007 Pmb graduates who first enrolled in 2003/4	Total 2007 graduates by programme first enrolled in 2003/4 as a percent of total graduations first enrolled in 2003/4 (%)	Total number of students surveyed by post (2006)	Students surveyed by mail in 2006 as a percent of total third/final year (2006) registrations enrolled for the first time in 2003/4 (%)	Total number of respondents who completed and returned the postal questionnaire (sample size)	Postal returns as a percent of total sample (%)
Accounting/ Finance	63	25.5	59	10.5	28	27.7
Human Resources Management	20	8.1	11	2	6	5.9
Public Relations	12	4.9	8	1.4	3	3.0
Management	7	2.8	15	2.1	6	5.9
Tourism	43	17.4	38	6.8	22	21.8
Office Management and Technology	15	6.1	14	2.5	8	7.9
Engineering	5	2	14	2.5	4	4.0
*Education	36	14.6	21	3.8	7	6.9
Public Management and Governance	46	18.6	37	6.6	17	16.8
Total	247	100	217	38.8	101	100

4. ANALYSIS AND RESULTS

a) Descriptive analysis of respondents' early labour market experiences

Most respondents (63.4%) reported that they were employed in full-time positions. The great majority of employed respondents (83.9%) also indicated that their employment was related to their DUT training.

Respondents had been surveyed a year earlier in 2006 to establish what their commencing earnings expectations would be in 2007. This information, together with relevant cost data was used to estimate respondents' expected returns to their higher education investments. Using Menon's (1997) approach and Hung, Chung and Sui-Chu Ho's (2000) "discrete" formulation of the short-cut method, expected and actual short-cut rates of return were computed. Table 2 displays respondents' mean commencing inflation-adjusted (2006 = base year) earnings and Table 3 compares their mean inflation-adjusted short-cut ex post (actual) and ex ante (expected) rates of return.

Table 2: DUT (Pmb) graduates' overall gross mean commencing earnings (2006 prices, Survey 3)

Mean income (R/month)	N	Minimum (R/month)	Maximum (R/month)	Mean (R/month)	Std. Deviation (R/month)
Overall	60	1392.86	12226.19	4430.06	2211.66
Males	28	2321.43	8280.30	4955.82	2046.06
Females	32	1392.86	12226.19	3970.02	2279.29

Table 3: New DUT graduates' overall ex post and ex ante short-cut rates of return

Short-cut rate of return	N	Minimum (%)	Maximum (%)	Mean (%)	Std. Deviation (%)
Ex post	55	-16	79	15.94	20.67
Ex ante	55	00	140	35.84	24.94

It is notable that graduates' overall mean ex post short-cut rate of return is less than half of that anticipated as senior undergraduates roughly a year prior to labour market entry. Notwithstanding this, the overall mean ex post rate of return of 15.94% approaches the yields offered by some conventional South African investments such as direct or portfolio investment. This fact lends credence to the suggestion that individuals, acting with limited information about their future prospects, generally act rationally by choosing higher education as an investment that must hold its own against other conventional investments that might be pursued. However, the mere observation that individuals tend to regard the higher education transaction as an investment is not sufficient to validate the human capital proposition that such education makes people more productive. Similarly, the widely observed correlation between earnings and educational attainment is not a definitive test of human capital theory's explanation of the economic value of higher education. What is required is an analysis of graduates' and/or employers' labour experiences to sift for evidence of the posited productivity enhancing effect of formal higher education.

b) Does human capital theory explain the labour market experiences of DUT graduates?

A relatively simple test of human capital theory and one which is suited to the survey data is that described by Wiles (1974) and subsequently applied by others. He posited that the greater the correlation of earnings with academic performance and the lower the correlation between earnings and subject content (as in whether graduates' jobs are related to their training/field of study), the truer is screening theory and the less true is the human capital interpretation of the economic value of schooling.

Table 4: Descriptive statistics – model variables

	Mean	Std. Deviation	N
Grosse	56459.4760	23592.30614	35
Age1	23.3408	2.01168	35
HEP1	.1450	.35726	35
HEP2	.5561	.50413	35
HEP3	.2710	.45101	35
HEP4	.0278	.16696	35
HEP5	.0000	.00000	35
SF1	.3256	.47547	35
SF2	.0672	.25401	35
SF3	.0000	.00000	35
SF5	.0603	.24152	35
SF6	.0861	.28468	35
SF7	.2013	.40683	35
SF8	.0609	.24259	35
SF10	.1151	.32386	35
SF11	.0835	.28077	35
JRbin	.8630	.34884	35
Genderbin	.5125	.50718	35
paempbin	.6425	.48628	35
Paedbin0	.1622	.37406	35
Paedbin1	.1668	.37828	35
Paedbin2	.4037	.49783	35
Maedbin0	.0502	.22165	35
Maedbin1	.1832	.39249	35
Maedbin2	.4166	.50023	35
Maedbin3	.3500	.48396	35
Paedbin3	.2673	.44904	35

In this study's application of the Wiles test, graduates' gross commencing earnings (Grosse) were specified as a linear function of their field of study (SF), self-reported higher education performance (HEP), whether their jobs were related to their training (JRbin, the human capital test variable), gender (Genderbin), age (Age1) and parents' educational attainment (Paedbin and Maedbin). Given the relatively small number of cases, it was not possible to specify separate equations for males and females and by different fields of study. This study's version of the Wiles' test, as in the case of Miller and Volker (1984), also did not account for graduates' individual preferences in terms of job characteristics. This flaw, the argument goes, might obscure latent human capital mechanisms in instances where graduates take jobs that are, on the whole, not related to their training but which may offer them special scope to use some facet of their training. Of course, their training renders such individuals productive and their personal gratification must be the reward for this achievement since, because they are nominally working outside their field of study, they are not duly remunerated. Although 84% of respondents indicated that their jobs were related to their training, the assumption that these graduates were employed in their first-choice available jobs where they would have scope to bring their full training to bear may be incorrect. Table 4 sets out the descriptive statistics of the variables employed in the OLS model.

Table 5 details the model's variables and their coefficients.

Table 5: Model variables and coefficients

Variables		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta	B	Std. Error
1	(Constant)	-3045.326	47526.098		-.064	.950
	Age1	3098.401	2202.650	.264	1.407	.182
	HEP1	8129.011	9053.618	.123	.898	.385
	HEP3	-16330.705	10176.402	-.312	-1.605	.131
	HEP4	58297.736	23173.950	.413	2.516	*.025
	SF2	13458.944	12445.692	.145	1.081	.298
	SF5	-6225.570	12599.628	-.064	-.494	.629
	SF6	36450.284	12242.684	.440	2.977	*.010
	SF7	-4470.845	12284.439	-.077	-.364	.721
	SF8	53687.840	11776.937	.552	4.559	***.000
	SF10	23929.416	13251.518	.328	1.806	.093
	SF11	-20811.836	13432.783	-.248	-1.549	.144
	JRbin	-23696.873	10673.084	-.350	-2.220	*.044
	Genderbin	-9546.026	8284.865	-.205	-1.152	.269
	paempbin	18065.114	10635.810	.372	1.699	.112
	Paedbin0	-24304.427	16994.554	-.385	-1.430	.175
	Paedbin2	2583.293	13020.917	.055	.198	.846
	Maedbin0	43890.584	16995.907	.412	2.582	*.022
	Maedbin1	607.274	11021.083	.010	.055	.957
	Maedbin3	-22204.088	10898.143	-.455	-2.037	.061
	Paedbin3	14393.763	15309.374	.274	.940	.363

a. Dependent Variable: Grosse. b. *p<0.05, ***p<0.001

The enter method produced a significant model ($F_{20,14}$ = 4.326, p = 0.004 < 0.01 and adjusted R square = 0.663). As one would expect, earnings are predicted to increase with increasing performance relative to the performance reference category (i.e. HEP4 relative to HEP2). This result supports a screening interpretation of the value of higher education. In a surprising result, gross earnings (Grosse) are inversely related to the extent to which graduates' jobs are related to their training (JRbin). This apparently perverse result may be a consequence of many graduates entering their first jobs on the basis of internships during which period salaries are relatively low but which then escalate dramatically once the internship/probationary period is completed. It must, however, be accepted that the regression model not only supports a screening/signalling theory of the economic value of education but it also rather specifically fails to shore up the human capital proposition that formal education raises individuals' productivity as evidenced by their higher earnings.

In order to conclude that the model offers support to the human capital interpretation of the educational attainment-earnings link, the sign of the JRbin coefficient should be positive. That is, if graduates' jobs are related to their training, then the skills and knowledge acquired during higher education should manifest in higher productivity and hence higher gross earnings. This reasoning relies on the intuition that, if employers *believe* that graduates' education is generally relevant to their job descriptions then this *belief* is likely to be acknowledged in appropriate remuneration. It seems that, however, that, at least at the outset of DUT graduates' careers, the evidence produced by the model leans more to a screening interpretation of the value of schooling. Not only are the signs of the various levels of the HEP dummy variable what one would expect, but it is also has greater statistical significance than the JRbin variable.

Other significant predictor variables include study field with education (SF = 8) and public relations (SF = 11) graduates, in particular, likely to enjoy higher commencing earnings than those in the reference category of accounting/finance (SF = 11). This result is probably a consequence of many accounting/finance graduates entering the labour market on the basis of internships. Another unexpected result is that of graduates who reported having no mother (Maedbin0) likely to enjoy higher gross earnings than those in the reference category whose mothers have a secondary education (Maedbin2). Graduates' paternal education status and parents' employment status were not significant predictors of earnings. Similarly graduates' age and gender were not indicated as significant determinants of graduates' commencing earnings.

5. CONCLUSION

This paper considered the question of whether human capital theory, constrained as it is by its neoclassical economic epistemology, is capable of offering a sound explanation of the economic value of higher education. Most studies claiming support for a human capital interpretation of formal education's economic value do so on the basis of the widely reported link between earnings and educational attainment. Such studies are based on the intuition that the superior earnings of holders of higher education credentials reflect their higher marginal products relative to less qualified individuals. This is a gratuitous assumption evidently borne of analytical frustration which appeals to popular expectations and beliefs, variables that have greater credence in qualitative analysis.

An OLS model was employed to test the human capital thesis that relevant education raises the productivity of labour with the consequence that educated workers receive higher earnings. The human capital test variable (JRbin) employed in this regression displayed a negative and statistically significant coefficient. Thus graduates earnings, in this instance, are inversely related to the job relevance of their training. This unexpected causality may be a consequence of many graduates entering their first jobs on the basis of internships during which time their earnings are initially suppressed. It is possible that the relationship between earnings and graduates' job relevance of their training will turn positive after their probationary term. If this is the case one could, with the benefit of hindsight, speculate that the human capital mechanism is, albeit imperfectly and possibly latently, evident in the labour market outcomes experienced by DUT Pietermaritzburg new graduates. The evidence produced by the model suggests, however, that employers of new DUT graduates do not *believe* – as evidenced by the negative association between earnings and job relevance of training - that their formal training is immediately useful and therefore productive. On the contrary, it suggests that it is a liability.

Respondents' earnings were indicated to be significantly influenced by their higher education performance. This relationship was indicated as both more robust than the relationship between earnings and the human capital test variable as well as having the expected direct causality, a result that supports a screening interpretation of the economic value of higher education. Although the study finds evidence of screening this does not rule out the possible presence of the human capital mechanism. Indeed, future studies of the economic value of higher education could profitably compare graduates first and later labour market expectations and experiences.

The conclusion that suggests itself is that it is likely that some combination of both human capital and screening theories in fact accounts for the economic value of education (as deduced from the labour market experiences of graduates). Although Bowman (1992) does not qualify this sentiment thus, it is a possibility that can more readily be anticipated in qualitative analysis which grants greater latitude and credence to the variables that inspire human action. These include individuals' expectations, beliefs, attitudes, intentions and so forth. At any rate

it is a qualified view that finds some resonance in the position well argued in the literature that no one theory can adequately explain the economic value of schooling (Bowman 1992, Hamalainen and Uusitalo 2006).

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