

The Economics of Education: is it Profitable to be Ignorant?

Michael Quigley

Salford Business School CORAS

Room 714 Maxwell Building, University of Salford, UK, M5 4WT

+44 161 295 2000

michael@michael-quigley.com

Abstract

In the UK, formal tertiary education comes at monetary cost to those who choose to participate. Currently 43% of young people enter universities in the belief that they will recoup the expense in higher salaries, later in life. Whilst this is a historically true model for the majority of graduates, many analysts believe that the Government's push for 50% participation, coupled with rising costs to attend universities, could alter the profitability of higher education and instead lead to a situation where ignorance is not only bliss but also an economically sound decision.

This paper explores the current situation concerning the economic benefit of higher education: building a model to represent this situation. Key variables and values are then highlighted and discussed, in this current research project, to test whether they could take the current situation over the tipping-point.

1. Introduction

The United Kingdom (UK) has undergone radical changes to its economy over the last 4 decades, from a predominantly manufacturing economy to one based on the service sector. As the UK's knowledge economy grows so does the requirement for a skilled, higher educated, workforce. Higher education institutions (HEIs) are tasked with providing the skilled labour that the economy requires, at the correct output rate. The changes in the economy have, through this direct interaction, led to changes occurring in the composition and capacity of HEIs.

The UK Government's policy for higher education is to reach a [higher education initial] participation rate (HEIPR) of 50% for 18 to 30 year olds by 2010 (Clarke, 2003). This increase is from the current 42% (Cook, 2006), an increase in real-terms of 16%. The rationale behind the policy is embedded in the perceived changes to the economy of the UK. In the White Paper the Government quotes "that 80 per cent of the 1.7 million new jobs which are expected to be created by the end of the decade [2010] will be in occupations which normally recruit those with higher educated qualifications" (Wilson and Green, 2001).

More worryingly, for the UK economy and universities, is the expected fall in the number of UK students, due to population dynamics. The universities will need to recruit larger numbers of European (EU) and overseas students to maintain their current workload (Fazackerley, 2006), whilst this adds little direct benefit to the UK economy after these students have completed their study.

The annual budget speech often contains statements echoing the need for more skilled workers (Treasury, 1998-2008), only 2000 and 2005 not containing a similar statement. The budget statement of 2007 announced 4 million new skilled jobs would be created by 2020. Although critics argue that the numbers stated are misrepresentative; being derived from supply-side models rather than demand-side models. Critics state that the 4 million jobs are actually the up-skilling of previously unskilled jobs, due to an over-supply of skilled labour (Kingston, 2008).

Despite, positive reception for and criticism against this objective, there has been limited modelling carried out to examine the resulting outcomes for this and other higher education policies. A human resource management (HRM) tool that could produce time-based, dynamic, analysis would allow greater understanding of this problem and lead to better policy decisions.

Criticisms of the policy focus on the current number of students graduating but not using their degree, asking whether the knowledge economy is as large as reported (Brown and Hesketh, 2004).

The debate on skilled human resources is not a recent phenomenon. In 1995, Robinson, stated:

The attainment of qualifications threatens to run ahead of the economy's ability to absorb those qualifications.

- (Robinson, 1995)

Robinson argued that if the targets for training were met there would flood the economy with skills that are not required, as the employment market was already over-educated. This view was later backed up by a research showing that any perceived gaps in the labour market are filled by existing skilled employees rather than graduates (Alpin et al., 1998). Earlier research on the highly skilled doctoral students showed an over-saturation in certain research subjects (Pearson et al., 1993). However, the long-term economic benefits for HE students indicate that overall demand for skilled labour is greater than the supply, though this varies dependent on subject area (Machin and Vignoles, 2005).

This paper explores the economics of education, examining the costs of obtaining a degree weighed against the potential monetary returns. Highlighting how forces such as demographics and later retirement age may affect graduates entering the employment market as skilled employees.

1.1 Over-educated Workforce View

A number of case studies compare the qualifications obtained by a population compared with the qualifications required to complete a job. One of the most influential studies was the Job-Completion Model, found in Economics of Overeducation (Thurow, 1972).

Using Thurow's model, Alpin et al (1998), identified particular employment sectors that had supply/demand gaps. Over- and Undereducation in the UK Graduate Labour Market [sic] (Alpin et al., 1998) cites that many of the perceived gaps in the labour

market's knowledge are filled by existing employees rather than graduates, who lack the experience.

Concern over the throughput of students, in HEI, has been recorded in case studies for over a decade. In 1995, Robinson, examined the characteristics of employees in the job market and concluded that the employment market is already over-educated and that "the attainment of qualifications threatens to run ahead of the economy's ability to absorb those qualifications".

Most of the above studies do not refute the idea of attaining higher educational qualifications as over-qualified workers tend to be more productive and offer additional skills, which may help them throughout their career (Mason, 1996).

2. The UK Higher Education System

To meet the Governments (50% HEIPR) target the universities are going to have to encourage more people to enter higher education. One population that has historically been under-represented in HEIs is people from lower socio-economic backgrounds.

The Government passed legislation that allowed HEIs to charge fees to students (Great Britain, 2004). To make sure students from lower socio-economic backgrounds are not discouraged from attending university they are exempt from the fees. All students are entitled to a tuition loan to cover the course cost and a maintenance loan to cover living expenses, where the first 75 per cent of the maintenance loan is available to all and the remaining 25 per cent means-tested. These loans are repaid at 9% of earnings when students finish study and earn above £15,000. Additional to the loans students can apply for grants, which are provided by the Government, and bursaries are provided by the Universities on a case-by-case basis. Grants and bursaries are means-tested.

Despite the exemption and maintenance loans, the number of students enrolling at universities from lower socio-economic backgrounds fell from 90,000 to 87,900 (a 1.25 per cent reduction) immediately following 2005 introduction (Qureshi, 2008).

2.1 Demographics

The inflow of students into universities can be divided by age. The largest percentage belongs to 18-year olds; the age at which the majority of students complete further education (FE).

In the UK, after the Second World War (1945), there was a period of approximately 20 years of above average births (Skidmore and Huber, 2003). This generation, known as the "baby boomers" (figure 1) caused a second wave of births between 1972 and 1992.

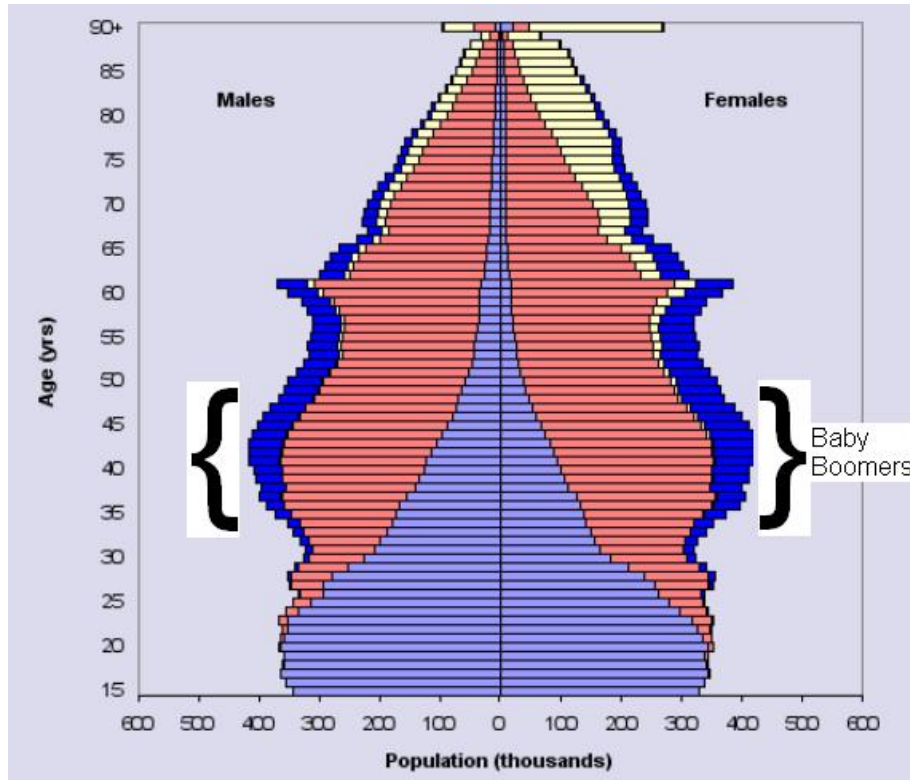


Figure 1: Baby Boomers in Population Pyramid

The higher number of young people (18-30 year olds) in the 1990's and early 21st Century, combined with a growing number of HEI's led to unprecedented rises in the number of university participants (figure 2).

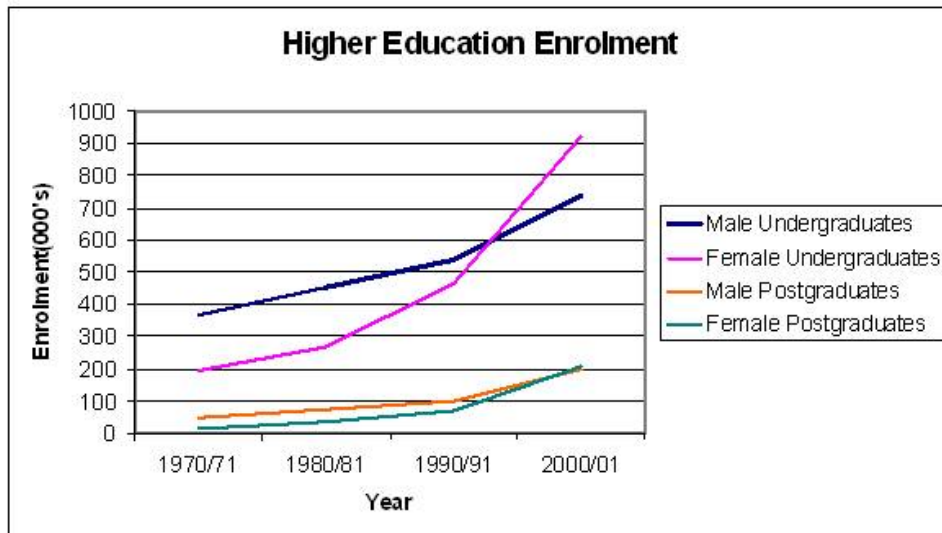


Figure 2: University Enrolment Boom in the 1990's

The boom from the 1990's was down to both a higher number of young people and a higher percentage of you people choosing to go to university. However, the academic

years 2006/7-2008/9 have seen the growth sustained almost entirely off population dynamics, as participation rates levelled off at 42%.

From 2011, the population dynamics change again as the overall number of young people begins to decrease. This decrease in real terms is 60.000 students between 2011 and 2014, which equates to approximately six universities closing. This situation can be avoided if the participation rates were to increase and counterattack the fall in the demographic cohort.

2.2 Higher Education Institutions

There are 168 active universities, colleges of higher education and other HEIs in the UK, in 2006-2007 (HESA, 2007). HEIs are predominantly places of study for levels 5 and 6 of the international standard classification of education (ISCE) (table 1).

Table 1: International Standard Classification of Education

Level	Description
Level 0	Pre-Primary Education
Level 1	Primary Education or First Stage of Basic Education
Level 2	Lower Secondary or Second Stage of Basic Education
Level 3	(Upper) Secondary Education
Level 4	Post-Secondary Non-Tertiary Education
Level 5	First Stage of Tertiary Education (Not leading directly to an advanced research qualification)
Level 6	Second Stage of Tertiary Education (Leading to an advanced research qualification)

3. Current Policy and Background – Under-educated Workforce View

The United Kingdom's Department for Education and Skills (DfES) published a White Paper in January 2003 entitled *The Future of Higher Education* (Clarke, 2003), which explains the Government's higher education policies. The background reports and investigations, that lead up to the White Paper's publication, began almost 7 years earlier with *The Dearing Report* (Dearing, 1997b). It is therefore beneficial to understand the background to the White Paper and the political climate at that time, before examining the policies contained in the White Paper.

A timeline from the NCIHE appointment, which produced the Dearing Report, to the publication of *The Future of Higher Education* is produced below (figure 3).

Timeline

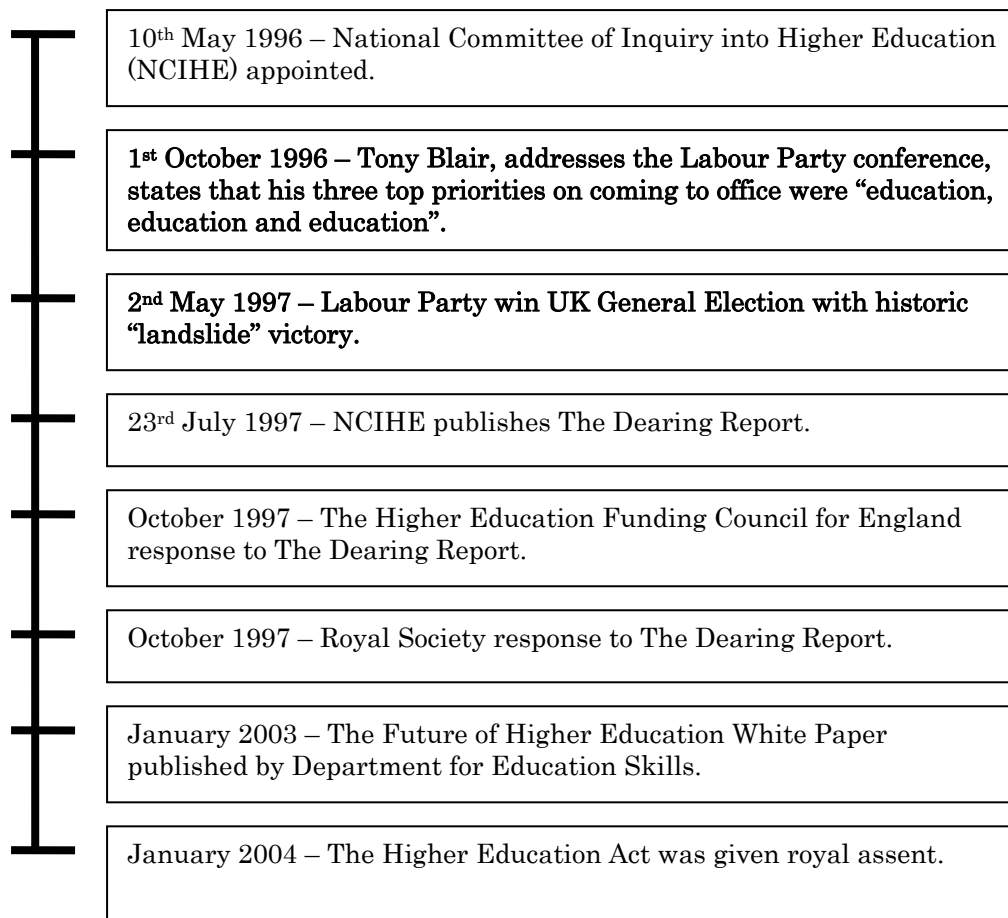


Figure 3 – Timeline Showing Significant Political and Educational Events from May 1996 to January 2004.

3.1 The Dearing Report

On 10 May 1996 the National Committee of Inquiry into Higher Education (NCIHE) was “appointed with bipartisan support by the Secretaries of State for Education and Employment, Wales, Scotland, and Northern Ireland” (Dearing, 1997a). The NCIHE was assigned with producing a report by the summer of 1997. The report was to make recommendations on how the purposes, shape, structure, size and funding of higher education, including support for students, should develop to meet the needs of the United Kingdom over the next 20 years. The full terms of reference (Dearing, 1997c) can be found in “Appendix B – Public, Private and Government Reports”. The terms of reference that are of interest here are:

- there should be maximum participation in initial higher education by young and mature students and in lifetime learning by adults, having regard to the needs of individuals, the nation and the future labour market;
- learning should be increasingly responsive to employment needs and include the development of general skills, widely valued in employment.

The NCIHE had support from both of the major political parties, so although the investigation began under the Conservative Party and was completed under the

Labour Party there was no perceived motive to bias the findings. As such it can be said that the NCIHE had no political agenda. The NCIHE aims for this report were to aim for long-term over short-term goals, though immediate concerns about research must be addressed.

The Dearing report made nearly 90 recommendations, including an increase in the number of people attending HEI and the use conclusion that graduates should contribute to the cost of their university education.

4. SD Modelling in Higher Education

SD models are simulations built to improve policy (Forrester, 1961, Sterman, 2000), rather than make forecasts, which has led to SD modelling of higher education to lend itself to several stand alone human resource management (HRM) models (Rodrigues and Martis, 2004). There are also numerous occasions where HE has made up a smaller section of a much larger model, usually one examining economic policy decisions (Dangerfield, 2005).

Galbraith, 1984, believes that models should be able to monitor both the level of employment requiring tertiary education and the level of its use, for any given subject area. This HRM approach has been used to examine engineers (Rodrigues and Martis, 2004).

Rodrigues and Martis, 2004, argued that human resources (HR) and knowledge management (KM) – the propagation of knowledge – can be viewed as a supply/demand model. They believe that effective control of the supply of engineers, to match demand, can be achieved through controlling the KM, i.e. varying the length of engineering university courses.

5. Model Process and Construction

It is not within the remit of this paper to go into detail about the model building process. A brief description and is produced below, due to this research being an ongoing piece of work.

It is not usually possible to build a simulation that contains all of the variables and relationships present in the system, one is attempting to replicate. Models, by definition, are a representation of the key variables and significant relationships present in that system. The modeller must make decisions on the scope of the simulation by setting model boundaries. The model boundary is dependent on the model objective, key variables and time horizon. For this reason, it is often preferred to follow a systemic modelling process.

5.1 Systemic Building Processes

HRM planning involves five stages; analysis of the system, deciding the time horizon of the model, forecasting the demand for or supply of the human resources, reconciliation and preparation of the action plans (Tripathi, 2002). This research does not aim to forecast but produce behavioural patterns one would expect to see under a

given set of circumstances. For this reason, SD planning is geared more towards the building and validation of any model, thus producing a robust policy model.

In Industrial Dynamics (Forrester, 1961) a framework for designing a policy model was produced and later adapted for a HRM model (Rodrigues and Martis, 2004), depicted in figure 4. This methodological framework includes a step for policy and scenario building. At this step, a number of scenarios should be examined, to enable contingency planning, rather than a restricted number of forecasts produced.

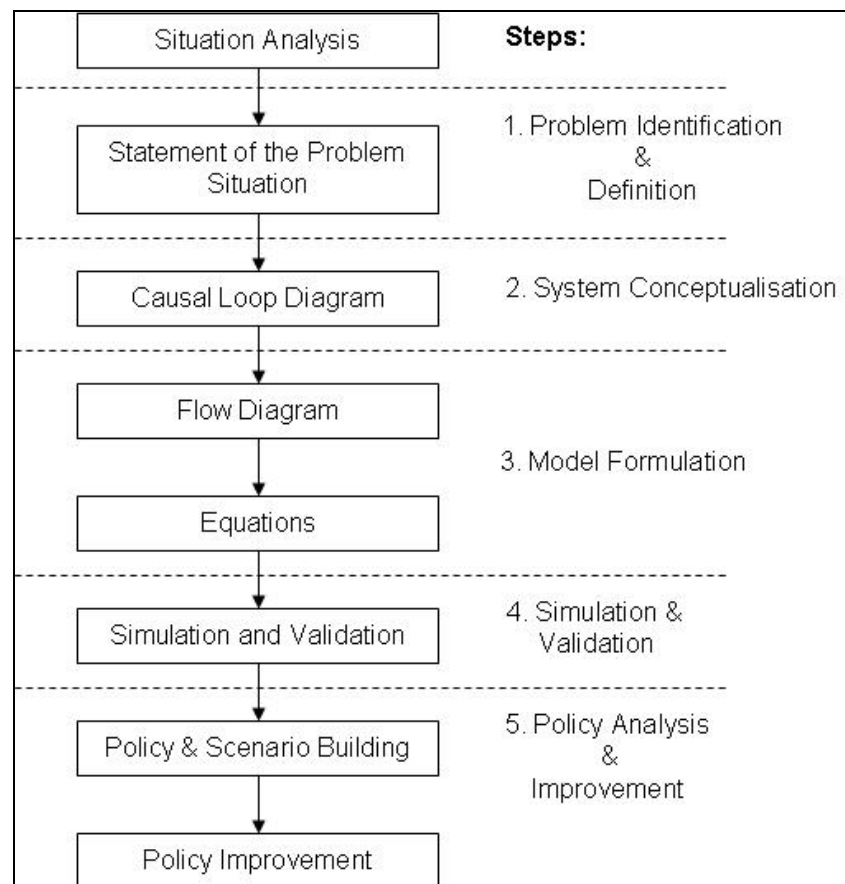


Figure 4: Rodrigues and Martis HRM Modelling Methodology

5.2 High-level and Causal Loop Maps

To help define and articulate the problem, a high-level map can be produced, which shows how skilled labour demands can only be met by university graduates (figure 5) or the up-skilling of jobs (employment being re-classified as skilled, from a status of unskilled).

The cost of High School and Further Education is free, in the UK, but Higher Education must be paid for. The cost is dependent on socio-economic circumstances. As people filter down the map they can choose to start employment or carry on with their education. For simplicity vocational qualifications are not discussed in this paper.

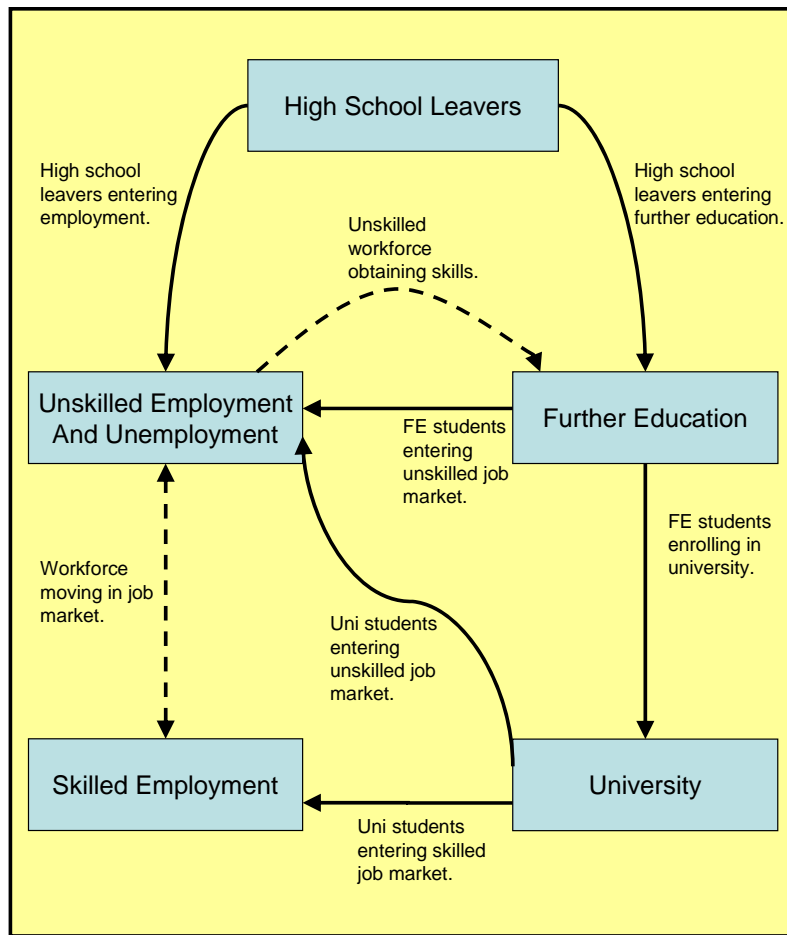


Figure 5: High-level Map of Main System Flows

If a person chooses to enter employment, they will start to earn a wage and pension contributions. The downside of entering employment is a slower progression in their employment and typically lower starting role. These variables are sensitive to particular subject/employment areas. The model (figure 6) runs a number of subscripts, to allow individual subject areas to be analysed.

Any person opting to enter tertiary education will incur the costs of the course and living expenses. They will also lose 3-7 years income and pension contributions. For this monetary loss to be recouped the subject area chosen must be one where there is a sufficient gap in the market to allow graduates to start at a higher salary level, than those opting out of HE.

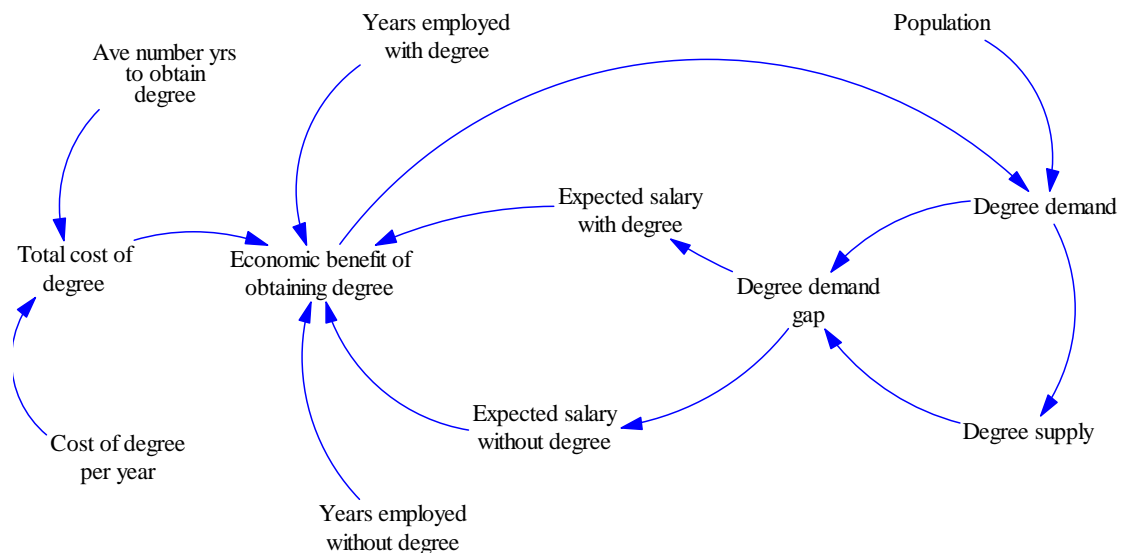


Figure 6: Causal Loop Diagram of Economic Benefits Model

The causal loop diagram shows that the total cost of obtaining the degree (currently £8,500/year) has little long-term effects on the economic benefits of obtaining a degree.

This is interesting, because there is discontent amongst the population that higher tuition fees will lead to a lifetime of debt. The model indicates that any reasonable increase in tuition or living costs will not lead to these problems. The key drivers that can increase/decrease the economic benefits of a degree are the job availability.

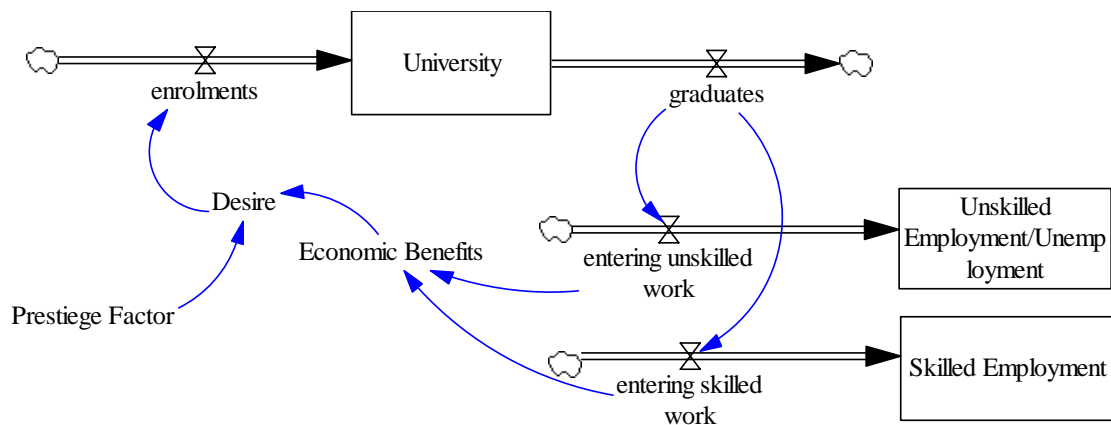
A low demand for a skill obtained at university will lead to the economic benefits being marginal, if not negative. The subjects that offer negative or marginal monetary benefit are art, history, sociology and languages.

Accountancy, medicine and engineering offer the best long-term payout for students.

5.3 Stock-and-Flow Diagrams

By expanding the causal loop model to incorporate the employment sector, a more sophisticated model can help clarify the situation. The stock-and-flow diagram can also incorporate variables relating to migration of labour and prestige value of degrees. Subject areas, such as art, are often chosen for reasons other than job prospects/economic benefits.

A replication of a small section of the stock-and-flow model has been produced in figure 7. This model is continuing to be



6. Further Work

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