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Development impact of higher education in Africa:
The case of Uganda

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Abstract

Using micro data from a series of household surveys, the paper demonstrates that to some extent there is positive correlation between per capita GDP growth and student enrolment in public universities in Uganda. It also finds that the higher education graduates are employed in those sectors which have recorded higher growth rates. The higher education graduates do contribute to the economy indirectly through tax revenues which are in turn used to support social programs among others that benefit the society at large. The paper also demonstrates that the share of taxes from higher education graduates has been increasing over time.

The paper reveals that the returns to higher education are higher than at any other lower education levels. More importantly, university education shows the highest private returns.

As for the distribution, there are marked disparities across gender and geographical locations. There is a stronger gender disparity with nearly twice as many male students as female higher education graduates. The poorer less developed regions have a lower stock of higher education graduates as well as lower higher education enrolment rates.

Finally, the paper identifies the main sources of financing higher education in Uganda to be both government and private funds. While public higher education institutions are mostly funded from public funds, the private institutions rely exclusively on tuitions received from students and other well-wishers. As for the public higher education institutions, while they also admit private students, they have not been able to compensate for the declining funding from the government.

1. Introduction

For several decades, African countries and their development partners have placed greater emphasis on primary and more recently, secondary education. But they have neglected tertiary/higher education[1] as a means to improve economic growth and mitigate poverty. The Dakar summit on 'Education for All' in 2000, for example, advocated only for primary education as a driver of social welfare. It left tertiary education in the background.

Part of the reason for the exclusion of higher education from development initiatives lies in the shortage of empirical evidence to support the fact that its affects economic growth and poverty reduction. After World War II, several economist, including Milton Friedman, Gary Becker and Jacob Mincer, developed the 'human capital' theory to examine the benefits of education for individuals and society. Friedman originally suggested that there was no evidence that higher education yields 'social benefits' over and above the benefits that accrue to the students themselves.

In contrast to this early view, recent evidence suggests higher education is both a result and a determinant of income, and can produce public and private benefits (Bloom *et al.*, 2006). Higher education can create greater tax revenue, increase savings and investment, and lead to a more entrepreneurial and civic society. It can also improve a nation's health, contribute to reduced population growth, improve technology, and strengthen governance. With regard to the benefits of higher education for a country's economy, many observers attribute India's leap onto the world economic stage as stemming from its decades-long successful efforts to provide high-quality, technically oriented tertiary education to a significant number of its citizens.

Human capital, a concept introduced by Schultz (1961) and elaborated on by another Becker (1964) is the notion that individuals acquire skills and knowledge to increase their value in labour markets. Experience, training and education are the three main mechanisms for acquiring human capital with education being primary for most individuals. Education facilitates the acquisition of new skills and knowledge that increase productivity. This increase in productivity frees up resources to create new technologies, new businesses, and new wealth, eventually resulting in increased economic growth. Education is a 'public good' in that society benefits from increased education as well as the individual.

In the past few decades, collaboration among business and industry, government and universities has helped transform the world around us. Research at universities is now widely recognized to play an important role in local, regional, and national economies. A good example is the development of the Silicon Valley that benefited from the universities nearby such as MIT and Stanford in the US.

But, in spite of all of the interest, the scope and breadth of higher education and the role it plays in the African economy are poorly understood. Literature indicates that higher education is one of the most important contributors to economic growth, efficiency, productivity, and to quality of life although it is among the least examined and understood, particularly in Africa.

[1]. Tertiary and higher education terminologies are used interchangeable in this paper.

Furthermore, considerable socio-economic and quality of life gains such as health care, environmental quality enhancement, human services advances also stem from university laboratories and research centres. These gains often go unexamined, unreported and therefore unrealized by policy makers and the general public.

The overall objective of this paper is to investigate the potential and actual impact of higher education in Uganda's development process and identify ways to enhance that impact. Specifically, the paper sought to:

- Examine the relationship between higher education and economic development;
- Investigate the private and public returns to higher education;
- Determine the cost of financing higher education and who bears the cost;
- Examine the extent to which higher education policy promotes social equity; and
- Draw policy implications and also highlight further research needs.

The rest of the paper is organised as follows: a profile of higher education in Uganda is the subject of the next section. In section three, we broadly discuss the previous literature relating to higher education and economic growth in general and Uganda in particular. The methodological approach is presented in section 4. The empirical findings are presented and discussed in section 5. Section 6 is conclusion and emerging policy issues.

2. Profile of higher education in Uganda

The higher education system in Uganda comprises of universities, national teachers' colleges, colleges of commerce and technology and a host of other tertiary institutions. This present paper focuses only on those institutions that offer diploma and/or degree programs. While the duration of undergraduate programs in universities ranges from two to five years; programs in other tertiary institutions range from two to three years. Individuals are admitted into these institutions on completion of their upper secondary education or its equivalent. These institutions are either public or private. But admission of private students in public institutions has been going on since mid-1990s.

The national and sector-specific reforms have had both positive and negative effects on the overall higher education sub-sector. First, the liberalization reforms have encouraged the participation of the private sector. This partly explains the rapid expansion of higher education institutions since the late 1990s. This in turn increased access to and participation in high education as will be discussed later. Second, the government shifted focus on primary education since 1997. The focus on primary education was supported by increased government spending at this level while the funding at higher education level was reduced (see details in section 5). This shift has, however, increased access to primary education especially that of the poor.

Uganda has witnessed a rapid growth in education development in terms of enrolments of students pursuing a diploma or degree qualification; and number of tertiary institutions offering these qualifications. The number of universities has increased from 3 in 1997 to 16, of which only 5 are government funded universities[2] and the rest are privately owned. Notwithstanding the rapid expansion in higher education institutions, the range of courses/programs offered is almost similar. Humanities remain the most popular field of study (Pillay & Kasirye, 2005) and for some courses/programs there is already over supply of graduates. Pillay & Kasirye (2005) go further to express concerns of the mismatches of labour and education outputs from tertiary institutions. All this presents challenges to the government's current focus on sciences and attaining a private sector-led growth.

Here we present a snap shoot of the population currently attending school based on the household survey data[3] (Table 1 refers). The share of students currently attending school is highest at primary level. This finding is unsurprising given Uganda's population structure that is relatively young and the higher cost of financing education at tertiary level. And more importantly, the Universal Primary Education (UPE) program increased participation at primary level. The UPE effect might partly explain the increased share at secondary level from 8.4% in 1999 to 11.2% in 2002. While less than 1% of the population at school are attending higher education, the enrolment grew at 3.6% between 1992 and 1999 and almost increased four-fold between 1999

[2] . The include Makerere University; Mbarara University of Science and Technology; Kyambogo University; Makerere University Business School and Gulu University.

[3] . Uganda Bureau of Statistics (UBoS) has conducted regular nationally representative household surveys. But for this paper, we focus on the Integrated Household Survey (IHS) of 1992/93; Uganda National Household Survey (UNHS I) of 1999/2000 and Uganda National Household Survey (UNHS II) of 2002/03. Hereinafter, for convenience we refer to these surveys as of 1992, 1999 and 2002 respectively.

and 2002 per annum. While enrolments grew fastest for primary education for the period 1992-1999, the growth was faster in higher education between 1999 and 2002.

Table 1: Uganda: Population currently attending school by education level

Education level	Numbers ('000)			Annualized growth rates (%) pa			Share (%)		
	1992	1999	2002	1992-1999	1999-2002	1992-2002	1992	1999	2002
Primary	2,870.2	6,578.9	6,871.8	11.3	1.6	8.7	90.1	91.1	88.1
Secondary	286.9	607.1	871.6	10.2	13.1	11.0	9.0	8.4	11.2
Tertiary	29.3	38.3	56.2	3.6	14.0	6.5	0.9	0.5	0.7
Uganda	3,186.4	7,224.3	7,799.7	11.2	2.8	8.9	100.0	100.0	100.0

Source: Author's calculations based on IHS, UNHS I & II

Notes: i) The estimates exclude the districts of Kasese, Bundibugyo, Gulu, Kitgum and Pader

ii) Primary education is 7 years, secondary education include ordinary and advanced secondary (the former takes 4 years and the latter 2 years); and Tertiary/higher education leading to a diploma/degree (minimum of 2 years).

Considering student enrolment in the public universities, it stood at 10,818 in 1995 and increased by nearly four-fold by 2004 (Table 2 refers). The micro evidence also confirms that the student enrolment has been increasing over time. More importantly, the results in Table 3 suggest that individuals pursing a degree/diploma qualification almost doubled between 1992 and 2002, increasing from about 29,337 students in 1992 to 56,247 students by 2002. As already alluded to, the increase in enrolment is partly due to improved access to higher education. On the other hand, increased student enrolment is partly attributed to the re-enrolment of those individuals that had left education for the labour market. The stiff competitive in wage employment partly explains this phenomenon. Table 2 further reveals that for the period 1995 and 2004, the trend in female enrolment increased faster relative to their male counterpart.

Table 2: Uganda: Enrolment in public universities, 1995-2004

Year	Number of students enrolled			Share of female students
	Males	Females	Total	
1995	7,571	3,247	10,818	30.0
1996	13,099	6,478	19,577	33.1
1997	…	…	…	…
1998	12,997	6,028	19,025	31.7
1999	…	…	…	…
2000	21,287	13,179	34,466	38.2
2001	22,163	14,326	36,489	39.3
2002	26,359	17,747	44,106	40.2
2003	28,001	18,212	46,213	39.4
2004	25,516	17,585	43,101	40.8

Source: Figures gathered from the MoES Administrative data

Notes: … statistics not readily available

As expected, the trend in higher education going age population has been increasing since 1992, as has been the number of students enrolled (see Table 3). The former grew by 3.4% per annum between 1992 and 2002; whereas the latter recorded an annualized growth rate of 6.5%. This finding has to be interpreted with caution as the currently enrolled students include those outside the higher education going age population. While the gross enrolment ratio depicts an increasing trend over time, these ratios are very low increasing from 1.8% in 1992 to 2.5% in 2002. But these ratios are even lower that those reported in Pillay & Kasirye (2005) for the entire

tertiary education system of 3.2% in 2001. Yet, these ratios are within those reported for sub-Saharan Africa of 2.5% in 2001 (ibid).

Table 3: Uganda: Enrolment in higher education, 1992-2003

Survey year	Higher education going age (19-24 years)	Currently enrolled	Gross enrolment ratio (%)
1992/93	1,590,789	29,337	1.8
1999/00	1,773,824	38,274	2.2
2002/03	2,251,002	56,247	2.5

Source: Author's calculations based on the national household surveys of 1992/93, 1999/00 & 2002/03
Notes: i). The estimates exclude the districts of Kasese, Bundibugyo, Gulu, Kitgum and Pader
ii) For higher education going age population, we have assumed the duration of the longest programs especially science-based programs that take 5 years. This implies that we are giving more weight to long duration programs; iii) These statistics refer to enrolments both in public and private institutions.

Educational attainment indicators are calculated based on micro data of the Uganda National Household Surveys (Table 4 refers). Over the period 1992-02, the number of Ugandans that had acquired a diploma or a degree qualification increased from 155,228 in 1992 to 281,316 by 2002. In other words, the stock of graduates grew by 5.9% per annum, a rate that is faster than the growth rate in higher education going age population of 3.4% but lower than the growth in enrolment rate of 6.5%. The rise partly explained by increased student enrolments (see Table 3). From a regional perspective, the share of graduates is highest in the Central region and lowest in the Northern region (see also Figure 1(a)). Yet striking is the narrowing gap between rural and urban areas.

Table 4: Uganda: Stock of degree/diploma holders, 1992-2002

	Numbers			Shares in total (%)		
	1992	1999	2002	1992	1999	2002
Uganda	**155,228**	**223,087**	**281,316**	**100.0**	**100.0**	**100.0**
Place of residence						
Rural	62,696	91,580	123,713	40.4	41.1	44.0
Urban	92,532	131,507	157,603	59.6	58.9	56.0
Region						
Central	93,862	116,232	154,855	60.5	52.1	55.0
Eastern	34,252	46,751	39,535	22.1	21.0	14.1
Northern	9,347	19,008	18,058	6.0	8.5	6.4
Western	17,767	41,096	68,868	11.4	18.4	24.5
Gender						
Female	49,260	64,374	101,606	31.7	28.9	36.1
Male	105,968	158,713	179,710	68.3	71.1	63.9
Age cohort						
< 25 yrs	16,312	30,416	49,411	10.5	13.6	17.6
25-34yrs	73,639	78,638	98,836	47.4	35.2	35.1
35-44yrs	39,881	64,340	73,694	25.7	28.8	26.2
45-54yrs	21,847	31,291	40,713	14.1	14.0	14.5
55-64yrs	2,737	13,253	15,743	1.8	5.9	5.6
65yrs plus	812	5,149	2,919	0.5	2.3	1.0

Source: Author's calculations based on the national household surveys of 1992/93, 1999/00 and 2002/03
Notes: i) The estimates exclude the districts of Kasese, Bundibugyo, Gulu, Kitgum and Pader
ii) The stock of graduates does not included those that are living outside Uganda.

Figure 1: Uganda: Stock of graduates from higher education institutions, 1992-2002

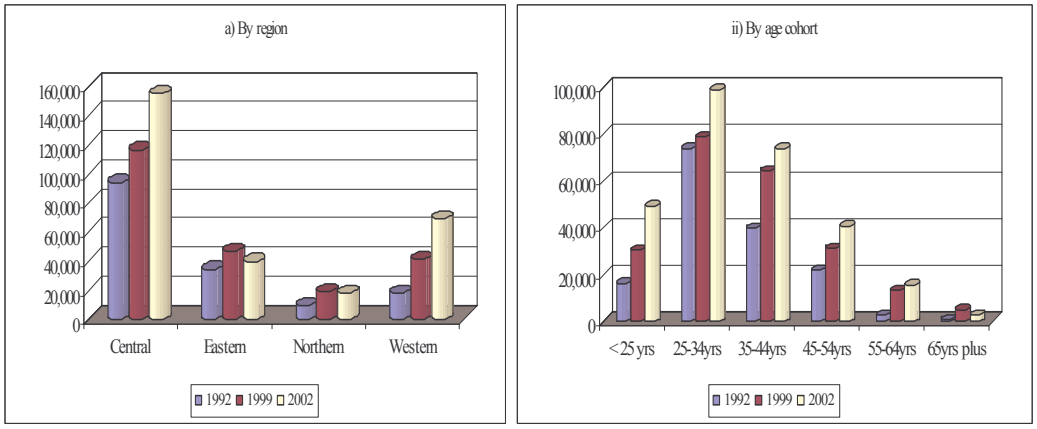


Table 4 further reveals that the share of female graduates is almost twice that of males, though the gender gap seems to be narrowing over time. Different trends emerge by comparing stock of degree/diploma holders across age cohorts (see also Figure 1(b)). Nearly two times as many 45-54 olds have a higher education degree/diploma as the 25-34 olds. Among the 55-64 olds, the share increased by 4.1 percentage points between 1992 and 1999, but stagnated between 1999 and 2002. The share of the young Ugandans aged below 25 years who had acquired a diploma/degree increased from 10.3% in 1992 to 17.6% in 2002. The most plausible explanation for this finding is that Ugandan children start school at the appropriate age than what it used not to be the case in the past.

In Table 5, we present trends in the share of the adult (25-64 years) population that attained a diploma or degree qualification. This is an important indicator of the level of development of higher education in a given country or region. It represents the cumulative efforts of a country/region in the development of higher education over time. Only 3% of the adult population had diploma/degree in 1992, the corresponding figures for 1999 and 2002 are 3.3% and 3.8% respectively. An increasing trend is also observed across age cohorts. The share of the young people aged 25-34 years who had acquired higher education qualification was 3.8% by 2002, a percentage relatively higher than that of the 55-64 olds of 2.9%. Overall, less than 4% of the Ugandan adult population that partly forms the labour force had attained a diploma/degree by 2002.

Table 5: Uganda: Educational attainment of the adult population aged 25-64 years

Age cohort	1992	1999	2002
25-34	3.6	3.5	3.8
35-44	3.4	3.8	4.0
45-54	2.6	3.0	4.0
55-64	0.5	2.0	2.9
All	3.0	3.3	3.8

Source: Author's calculations based on the national household surveys of 1992/93, 1999/00 and 2002/03
Notes: i) The estimates exclude the districts of Kasese, Bundibugyo, Gulu, Kitgum and Pader

There are anecdotal observations that most graduates are unable to find jobs. The 2002 labour survey gathered information on unemployment. The results in Table 6 seem to suggest that unemployment rates increase with the level of educational

attainment. The unemployment rates among the diploma/degree holders are well above the national averages. But this has to be interpreted with caution, as this group might be in a better position to identify themselves as unemployed relative to their counterparts with less education. It would be unrealistic to link it up to an over supply of high education graduates. Although we should not rule out that there is an over supply of those individuals from humanities but under supply from science-based disciplines. Among those with higher education qualification, unemployment is higher among female and those residing in urban areas. That said, it should be borne in mind that this conventional measure of unemployment in Uganda definitely underestimate the true extent of unemployment.

Table 6: Uganda: Unemployment rate (%) by educational attainment, 2002

Educational attainment	Uganda	Female	Male	Rural	Urban
No education	1.6	1.5	1.8	1.4	4.9
Primary	2.2	2.9	1.5	1.3	8.7
Secondary	5.1	7.5	3.2	2.5	10.8
Tertiary	7.4	8.2	6.9	2.6	11.1
Not stated	6.0	3.6	8.1	2.3	16.4
All	2.9	3.6	2.2	1.6	9.6

Source: Author's calculations based on UNHS II.
Notes: i) Estimates excludes the districts of Kasese, Bundibugyo, Gulu, Kitgum and Pader
ii) The conventional definition of unemployment is used.

In sum, access to higher education institution has increased despite relatively low participation levels. Most importantly, the level of private sector participation at the higher education level has increased and partly explains the expansion in tertiary institutions since the late 1990s. The national and education sector reforms partly explain the changes observed in the higher education sub-sector. Notwithstanding this progress so far recorded at higher education level, there is scanty information on how this progress has impacted on Uganda's economic development. And this is the subject of the next sections.

3. Previous related studies

Much of the analysis linking higher education to economic development is based on cross-country analyses. Data limitations partly explain the paucity of country specific studies. More importantly, more analyses have focused on developed countries and less on developing countries in general and sub-Saharan African countries in particular. Nonetheless, all concur that higher education plays a key role in a country's economic development. Barro and Sala-i-Martin (1995) found that male educational attainment, particularly secondary and tertiary education, had significant positive growth effect. An increase in average male secondary schooling of 0.68 years raises annual GDP growth by 1.1% a year, while an increase in higher education of 0.09 years raises annual growth by 0.5% a year. They find an interaction between initial GDP and human capital (broadly defined, including health and education), so that countries that lag behind tend to grow faster if they have high levels of human capital. Similarly, De Meulemeester and Rochat (1995) showed that higher education had a strong causal impact on economic growth in Japan, United Kingdom, France, and Sweden, but no impact in Italy and Australia. They conclude that HE is necessary for growth but not sufficient.

Another source for improvement is through research and development (R&D), which can boost economic growth and productivity growth. Lederman and Maloney (2003) conducted a cross-country regression analysis that showed that the rate of return on R&D was 78%. On the other hand, Bloom *et al*. (2006) found a positive and statistically significant correlation between higher education enrollment rates and governance indicators, including absence of corruption, rule of law, absence of ethnic tensions, bureaucratic quality, low risk of repudiation of contracts by governments, and low risk of appropriation.

Recently in a cross-country study Bloom *et al*. (2006) investigated pathways through which tertiary education can improve economic growth: (i) raising GDP directly through a productivity effect; and (ii) increasing the speed at which a country adopts technology and raises its total factor productivity. They find that expanding tertiary education promotes faster technological catch-up and improve a country's ability to maximize its economic output.

Besides cross-country analyses, single country analyses – where data availability permits – have been carried out. However, the findings do no differ much. Jenkins (1995) examined the extent to which an index of total factor productivity is related to different levels of education attainment in United Kingdom. When higher education qualifications (including undergraduate, postgraduate, and other tertiary graduate stock) increased by 1%, annual output grew between 0.42% and 0.63%.

A study in Taiwan showed that higher education played a strong role in the country's economic growth (Lin, 2004). It found that a 1% rise in higher education stock (as defined by those who had completed higher education (including junior college, college, university, or graduate school) led to a 0.35% in industrial output, and that a 1% increase in the number of graduates from engineering or natural sciences led to a 0.15% increase in agricultural output. Likewise, Wolff and Gittleman (1993) showed that university enrollment rates are correlated with labour productivity growth. The

number of scientists and engineers per capita is also associated with economic growth.

A large literature on human capital principally using developed country data, have shown that educated farmers and workers are more productive in a rapidly changing environment and thus earn higher incomes. Literature on endogenous growth, stress the importance of human capital investments as the driver of economic growth (Lucas, 1988; Romer, 1989; Barro and Sala-i-Martin, 1992; Mankiw, *et al*. 1992). Globally, countries with less educated labour force provide low returns on capital and fail to attract foreign investments and empirical evidence has shown that schooling enrolment rates are important in explaining aggregate differences in growth across countries.

Empirical evidence on the role of higher education in Uganda

Although the estimates from previous studies on Uganda are not directly comparable due to differences in specifications and contexts, they do provide insights on how returns to education have evolved over time. The similarity is that all previous studies took advantage of the massive national household survey data. The most obvious difference is on how education variable was included in the earnings determination models. Some enter education in completed years and others use dummy variables for different education levels. Studies that have entered education in dummy form combined upper secondary education and higher education level. Notwithstanding these differences, the micro evidence has demonstrated that the rate of return to higher education has been increasing over time (see Appleton, 2001; Okurut *et al.*, 2006; EPRC, 2005). This is unsurprising given the increasing demand for higher education in Uganda. Most importantly, these returns are found to be higher than at any other education level.

Most of these studies estimated returns to education using Mincer-type models. EPRC (2005) demonstrates that the returns to post secondary (including upper secondary and higher education) were higher relative to no formal education for all the years considered. They found significant increases between 1992 and 1999, and the returns were not significantly difference between 1999 and 2002.

Using repeated cross-section surveys Okurut *et al.*, (2006) estimated separate wage earnings for private and public sector wage employees. Like EPRC (2005) the returns were higher for post secondary relative to no formal education. In 1992, these returns were higher for the public sector compared to the private sector. However, the pattern changed by 2002, when these returns among the private sector employees were 30% more than that of their counterparts in the public sector. Most notable in the private sector is the increasing returns to post secondary education relative to no formal education since 1992 contrary to the trend in the public sector. For the public sector, while the returns increased between 1992 and 1999, a decrease was registered between 1999 and 2002. In the same study, post secondary education was found to be associated with higher participation rate in the labour market. These individuals were more likely to be employed either in private or public sector wage employment. The study concluded that better educated individuals were more likely to be in work, labour force participation increased with level of education attained by the individual, and better qualifications attracted higher wages for individuals.

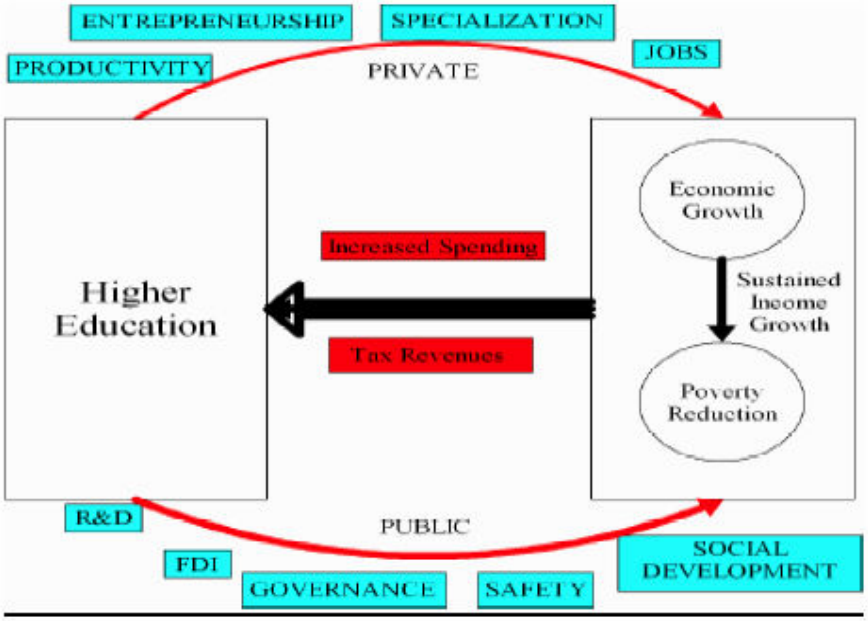
In a descriptive study by Ssewanyana & Appleton (2006) better educated individuals were more likely to have greater employment security. This holds both for private and public sector. In other words, better educated individuals enjoyed more employment security that comes with a range of fringe benefits in addition to basic wages. On a negative side, considering the composition of the unemployed individuals in Uganda those with higher education are more likely to be unemployed (Ssewanyana & Appleton, 2006). This result has to be deciphered cautiously as the unemployed make only a small section of the population (only 2.8% for individuals aged 15-64 years).

4. Methods

Conceptual framework

Figure 2 illustrates how higher education is conceptually linked to economic growth. Higher education can lead to economic growth through both private and public channels. The private benefits for individuals are well established, and include better employment prospects, higher salaries, and a greater ability to save and invest. These benefits may result in better health and improved quality of life, thus setting off a virtuous spiral in which life expectancy improvements enable individuals to work more productively over a longer time further boosting lifetime earnings.

Figure 2: Conceptual framework



Source: Bloom *et al*., 2006

Public benefits are less widely recognized, which explains many governments' neglect of higher education as a vehicle for public investment. Yet individual gains can also benefit society as a whole. Higher earnings for a well-educated individual raise tax revenues for governments and ease demands on state finances. They also translate into greater consumption, which benefits producers from all educational backgrounds.

In knowledge-based economies, higher education can help economies keep up or catch up with more technologically advanced societies. Higher education graduates are likely to be more aware of and better able to use new technologies. They are also more likely to develop new tools and skills themselves. Their knowledge can also improve the skills and understanding of non-graduate co-workers, while the greater confidence and know-how inculcated by advanced schooling may generate entrepreneurship, with positive effects on job creation.

Higher education can also have less direct benefits for economies. By producing well-trained teachers, it can enhance the quality of primary and secondary education

systems and give secondary graduates greater opportunities for economic advancement. By training physicians and other health workers, it can improve a society's health, raising productivity at work. And by nurturing governance and leadership skills, it can provide countries with the talented individuals needed to establish a policy environment favorable to growth. Setting up robust and fair legal and political institutions and making them a part of a country's fabric, and developing a culture of job and business creation, for example, call for advanced knowledge and decision-making skills. Addressing environmental problems and improving security against internal and external threats also place a premium on the skills that advanced education is best placed to deliver.

Social benefits from higher education are much harder to define and estimate. They include a wide range of intersecting and indirect benefits that are not included in the private benefits of individuals or are direct research outcomes. They include for instance: first, increased learning of graduates provides increased learning for non-graduates in the form of knowledge disseminated. Second, cultural and social standards set by higher education institutions improve the social infrastructure which underpins the harmonious working of society and the economy. Third, the promotion of inquiry and dispassionate debate on public policy issues leads to improved public decision making. Four, these institutions are a training ground for staff members who may leave university to take up positions in industry, the public service, governance of the community.

While the public good aspects of university output outlined above are not challenged, the more pertinent point is the appropriate level of government support. That is, what level of funding will achieve the appropriate social, return to government (on behalf of society at large)? Should present levels of support be increased or allowed to continue to decrease? Government can only decide this matter relative to competing social returns from other uses of its fixed budget. While the social returns from other forms of investment are unknown and must be judged by government, it is important to be ale to document the likely returns from government investment in higher education.

Model specification

Researchers have employed different model specifications to demonstrate the linkage that exists between higher education and economic development. To achieve the objectives of the paper, we employ an extended Mincerian wage equation. We include human capital variables age and education as well as variables controlling for gender, geographical location, tenure of employment and sector of employment. Education variable enters as a string of dummy variables rather than as a continuous variable. The estimations are done for only wage employees as expressed in equation (1). Separate regressions were estimated by region as discussed in section 5. Education enters the model in dummy form – no formal education, primary, secondary and higher education. Tenure of employment also entered in a dummy form – permanent, temporary or casual employment. We also controlled for the sector of employment whether agriculture, industry or services. Lastly, we controlled for geographical location.

$$\ln W = f(age, agesquared, sex, education, \exp erience, tenure, \sec tor, location) \quad (1)$$

Our analysis combines both descriptive and regression analyses. However, due to data limitation on pecuniary education costs as used in Appleton's (2001) paper, we are unable to extend his analysis using the 2002/03 national household survey. But we assume that the social returns from basic education to remain higher than from higher education.

5. Empirical results

Higher education and economic development

In this section we relate higher education to economic development. Broadly speaking, we consider several "dimensions" of economic development namely: economic growth, poverty, tax revenue, job creation, quality of employment (in terms of wages/earnings and job tenureship) and income growth at household level.

i) Higher education and economic growth

Uganda has been able to record impressive growth despite its relatively low share of the higher education graduates to guide its development, and at the same time devoting a small share of its GDP to education. Undoubtedly, there has been significant progress in raising access to and participation in higher education as was empirically demonstrated in section 2. But how does this progress so far made translate into economic growth? Notwithstanding the very low stock of human capital in higher education, the contribution to the economic growth is enormous. Clearly the improvements in the stock of human capital in terms of education are to some extent related to economic growth Uganda has enjoyed in the past years. In Figure 3, we present a trend analysis between per capita GDP growth rates and student enrolments in public universities[4]. Broadly speaking, there seem to be a positive association between the two variables. Although under supply of higher education graduates in critical areas especially science-based could have partly limited the growth effect of economic growth.

Table 7 presents GDP and contributions from broad sectors, whereas Table 8 presents the distribution of higher education graduates by broad sector based on household survey data. There has been structural transformation in the economy with agriculture contributing 34% of GDP in 2005/06 as compared to 50.3% in 1992/93; service from 37.1% in 1992/93 to 45.5% in 2005/06 and industry from 12.7% to 20.5% over the same period. Since 1999/00, GDP per capita grew by less than 3% as the population growth grew by 3.4%. How do these changes at macro level translate themselves at micro level in general? And how do they relate to changes we have observed in higher education? Does the structural transformation relate to the progress so far achieved in higher education at all? The micro evidence shows that the majority of higher education graduates were employed in the services and industry sectors (Table 8 refers), and these are the sectors that grew faster than agriculture at macro level (Table 7 refers). In terms of annualized growth rates, the growth was 5.1% in services compared to only 1.2% in industry sector between 1992 and 2002. Despite the agricultural sector's declining contribution to growth in GDP, there was a 10.4% per annum increase in graduates working in agriculture. All in all, the structural changes in the labour market were slower than the overall structural transformation of the economy.

[4]. The pattern may not change much even if one was to include student enrolments in private institutions.

Figure 3: Uganda: Per capita GDP growth rates and student enrolment in public universities

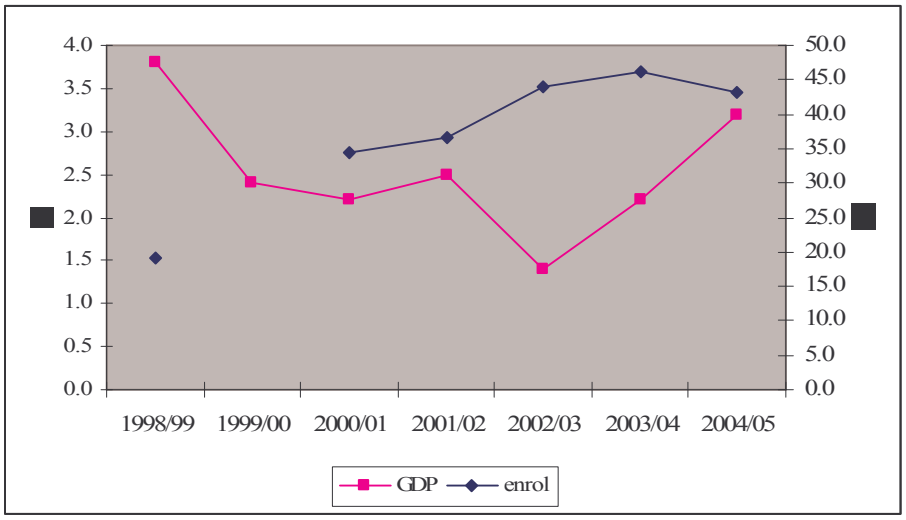


Table 7: Uganda: Gross domestic product trends, 1992/93-2004/05

Financial year	Growth rates				Contribution to GDP			Per capita GDP growth
		Of which						
	GDP	Agriculture	Industry	Services	Agriculture	Industry	Services	
1992/93	8.4	9.3	8.4	7.1	50.3	12.7	37.1	…
1993/94	5.4	1.8	13.0	7.8	48.6	13.6	37.9	…
1994/95	10.6	5.9	20.3	13.2	46.5	14.8	38.8	…
1995/96	7.8	4.3	16.6	8.6	45.0	16.0	39.1	…
1996/97	4.5	1.1	11.4	5.7	43.5	17.1	39.5	…
1997/98	5.4	1.9	11.5	6.5	42.0	18.0	39.9	…
1998/99	7.3	5.8	12.0	6.8	41.4	18.8	39.7	3.8
1999/00	5.9	5.6	5.3	6.5	41.3	18.7	39.9	2.4
2000/01	6.5	4.8	6.6	8.3	40.7	18.7	40.6	2.2
2001/02	6.3	3.9	7.9	8.0	39.7	19.0	41.2	2.5
2002/03	4.9	2.3	7.2	6.3	38.7	19.5	41.8	1.4
2003/04	5.4	…	…	…	37.4	19.8	42.8	2.2
2004/05	6.4	…	…	…	35.6	20.6	43.8	3.2
2005/06	5.1	…	…	…	34.0	20.5	45.5	1.9

Source: MoFPED, Background to the Budget (several issues)
Notes: … statistics not readily available

Table 8: Uganda: Sector of employment for higher education graduates

Sector of employment	Numbers		Share (%)		Annualized growth rate (%)
	1992	2002	1992	2002	
Agriculture	7,221	21,136	5.3	9.1	10.6
Industry	14,276	15,834	10.4	6.8	1.0
Services	115,443	194,996	84.3	84.1	5.2
Uganda	136,940	231,966	100.0	100.0	5.2

Source: Author's calculations based on the national household surveys of 1992/93, 1999/00 and 2002/03
Notes: i) The estimates exclude the districts of Kasese, Bundibugyo, Gulu, Kitgum and Pader
ii) Estimates are based on the main activity status during the last 12 months prior to the survey.

The share of adult population (25-64 years) with higher education qualifications in the labour force remains below 4% (see Table 5). This result seems to imply that Uganda lacks highly skilled labour force, a prerequisite for sustainable economic growth.

Notwithstanding these low shares, more than eight in every 10 higher education graduates are actively employed in the labour force.

ii) Higher education and poverty

In Uganda there are marked differences in the level of development across regions. Here we endeavour to examine the linkage between higher education graduates and incidence of poverty (Table 9 refers). Central region is highly developed compared to Western, Eastern or Northern region. We find regions that have a larger share of higher education graduates to be more economically developed. Regions with higher proportion of higher education graduates tend to have lower incidence of poverty compared to higher incidence poverty regions with lower proportions of higher education graduates in their population. Table 9 further reveals similar results for gross enrolment ratios. The average national gross enrolments mask wide disparities between regions. In other words, higher education either in terms of stock or flow is highly associated with better welfare of its population.

Table 9: Uganda: Graduates, incidence of poverty and gross enrolment ratio by region

	Share of graduates (%)			Poverty headcount (%)			Gross enrolment ratios (%)		
Region	1992	1999	2002	1992	1999	2002	1992	1999	2002
Central	60.5	52.1	55.0	45.6	19.7	22.3	4.2	4.9	4.8
Eastern	22.1	21.0	14.1	58.8	35.0	46.0	0.5	1.0	0.9
Northern	6.0	8.5	6.4	72.2	63.7	63.3	1.0	0.1	0.4
Western	11.4	18.4	24.5	53.1	26.2	31.4	1.0	1.1	1.9
Uganda	100.0	100.0	100.0	55.7	33.8	37.7	1.8	2.2	2.5

Source: Author's calculations based on IHS, UNHS I & II except for poverty headcount cited from Appleton & Ssewanyana (2003)

In addition, previous poverty works have demonstrated that the more educated are less likely to be poor. Below we demonstrate the growth in consumption expenditure by educational attainment of the household head (Table 10 refers). Consumption expenditure per adult equivalent is used as a proxy for household well-being. The ratio of mean income of household head with higher education to income of those with primary education increased from 2.5 in 1992 to 4.0 by 2002. Similar trends are observed relative to other levels. The growth in incomes of those household heads with higher education was well above the national average. Even during the period of rising poverty, those with higher education were able to record a positive growth of 7% per annum.

Table 10: Consumption expenditure per adult equivalent by household head education level

	Mean (Ushs, 1997=100)			Annualized growth rate (%)		
	1992	1999	2002	1992-99	1999-02	1992-02
No education	19,108	25,101	22,064	3.7	-4.7	1.4
Primary	22,533	31,286	30,099	4.5	-1.4	2.9
Secondary	33,562	50,335	50,883	5.5	0.4	4.1
Tertiary	55,674	98,834	119,764	7.8	7.0	7.6
Not stated		41,279	44,586			
	24,262	35,711	36,455	5.3	0.7	4.0

Source: Author's calculations based on IHS, UNHS I & II.
Notes: Estimates done at household level.

iii) Higher education and occupation

We also examine the distribution of higher education graduates in different occupations in the total workforce (Table 11 refers). The occupations are classified into seven categories according to ILO standard classification – professionals and their associates; administrators including legislators, senior officials, managers and administrators; clerks and related workers; service including service workers, shop and market sales workers; agriculture including agriculture and fishery; production including craft & related workers, plant, machines operators and assemblers; and unskilled including elementary occupations. Noteworthy, is the declining share of graduates employed as unskilled workers from 2.3% in 1992 to 0.7% in 2002. We observe a drastic increase in graduates working as administrators from 43.7% in 1999 to 64.2% in 2002. In other words, these estimates show that despite their small share in total workforce, graduates are employed in key occupations that drive the economy.

Table 11: Share of higher education graduates aged 25-64years in different occupations (%)

Occupation	1992	1999	2002
Professionals and associated professionals	37.7	33.5	39.4
Legislators, senior officials, managers and administrators	35.5	43.7	64.2
Clerks	21.3	40.1	37.1
Service workers, shop and market sales workers	2.4	4.2	2.8
Agricultural & fishery worker	0.1	0.4	0.3
Production worker	4.5	0.9	2.2
Unskilled worker	2.3	0.2	0.7
Uganda	2.0	2.6	2.9

Source: Author's calculations based on the national household surveys of 1992/93 and 2002/03
Notes: i) The estimates exclude the districts of Kasese, Bundibugyo, Gulu, Kitgum and Pader
ii) Estimates based on the main activity status during the last 12 months prior to the survey.

Turning to higher education graduates, the share of females increased from 27.8% in 1992 to 34.4% by 2002. Most of these females are employed as clerks but their share as legislators increased from only 10.8% in 1992 to 23% in 2002 (Table 12 refers).

Table 12: Female graduates aged 25-64 years by occupation (%)

Occupation	1992	1999	2002
Professionals and associated professionals	28.8	17.9	31.4
Legislators, senior officials, managers and administrators	10.8	13.0	23.0
Clerks	60.5	56.4	61.2
Service workers, shop and market sales workers	27.7	48.8	55.1
Agricultural & fishery worker	26.9	13.8	19.9
Production worker	8.9	5.9	24.9
Unskilled worker	0.0	0.0	20.3
Uganda	27.8	25.2	34.4

Source: Author's calculations based on the national household surveys of 1992/93 and 2002/03
Notes: i) The estimates exclude the districts of Kasese, Bundibugyo, Gulu, Kitgum and Pader
ii) Estimates based on the main activity status during the last 12 months prior to the survey.

iv) Higher education and tax revenue

The higher education graduates do contribute to the economy indirectly through tax revenue. These taxes are in turn used to support social programs among others that benefit the population at large. Considering only those graduates in wage employment, we find their contribution to overall pay-as-you-earn (PAYE) to have increased from 58% in 1999 to 88% in 2002.

We also crudely look at the contribution to VAT and other indirect taxes by the educational attainment of the household head. The results further confirm that the society does reap from the benefits of increased taxes when individuals attain diploma or degree qualifications.

v) Higher education and field of study

Field of study is used as qualitative indicator directly linked to the level of economic activity. As previously noted the share of humanities remains high. And it is expected to remain high as most private universities are offering course/programs in humanities. Yet the government's current focus is on sciences.

vi) Higher education and real wages/earnings

Real wages: The main means by which education is conventionally thought to bring economic private benefits is by raising earnings in wage employment. Most Ugandans are in self employment, very few are in wage employment. In other words, the sample becomes small when it comes to wages data. Table 13 presents the real earnings for only wage employees based on micro evidence. Similar to the findings of Appleton (2001) mean and median wages are higher for more educated employees. In 1992, higher education graduates earnings –at mean - were more than four-fold that of those employees with no formal education, and this ratio increased to almost eight-fold in 1999 and 2002. The mean wage premium for higher education relative to secondary education increased by nearly 2.0 times in 1992 to 2.9 times in 2002. During the period when most reforms were put in place, mean real wages increased by 9.1% per year for all wage employees. However, the period 1999-2002 mean wages decreased by 1.9%. Workers of all educational attainment have seen strong real rises in earnings. Table 13 further shows that there have been changes in the structure of education for wage employees. Most noticeable are the reduction in proportion of employees with no formal education from 36.5% in 1992 to 22.1% in 2002 and some slight increase in the proportion of employees with higher education from 3% to 3.8% over the same period. The decline in the share of employees with no education is partly due to the retirement of older employees and entrance into the workforce of younger and better educated employees.

Figure 4 shows real mean and median wages for wage employees. A large difference between mean and median wages is observed suggestive of a long tail in the distribution. Individuals with higher education had the highest mean and median wage, marked by a growing difference between the mean and median.

In sum, the above micro evidence in Uganda confirms some of the benefits of higher education cited in the section 3. In other words, those with higher education qualifications are less likely to be poor, likely to be employed in relatively more

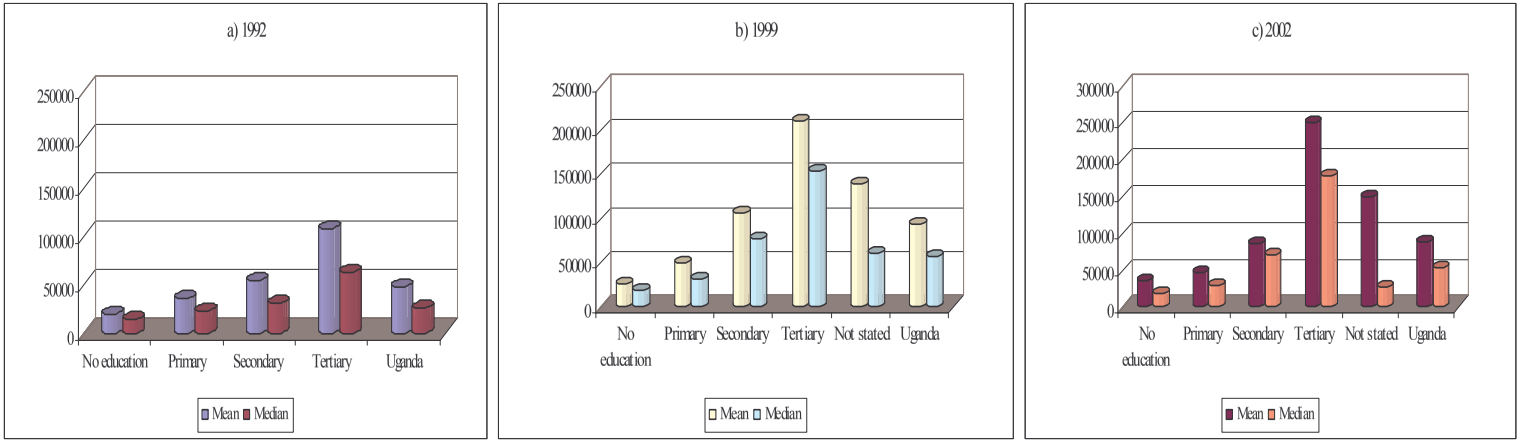
paying jobs, contribute heavily to the government's tax revenue and earn higher wages. However, the mismatch of local labour skills demands is likely to influence these benefits.

Table 13: Uganda: Monthly real earnings for wage employees aged 25-64 years (Ushs), by educational attainment

Educational attainment	1992			1999			2002			Annualized growth at mean			Annualized growth at median		
	Mean	Median	% workers	Mean	Median	% workers	Mean	Median	% workers	1992-1999	1999-2002	1992-2002	1992-1999	1999-2002	1992-2002
No education	19,471	13,992	13.9	26,664	19,317	9.7	35,238	19,578	10.9	4.3	10.1	5.9	4.4	0.5	3.3
Primary	35,199	22,387	43.6	50,854	32,196	39.1	46,965	29,367	41.5	5.0	-2.9	2.9	5.0	-3.3	2.7
Secondary	54,513	30,222	29.7	106,012	77,270	34.4	86,514	71,193	32.2	9.1	-7.4	4.6	12.8	-3.0	8.5
Tertiary	107,586	62,963	12.8	210,762	154,540	15.9	250,623	177,982	14.6	9.2	6.3	8.4	12.2	5.1	10.3
Not stated				139,783	60,367	0.9	149,589	26,697	0.9						
Uganda	48,001	25,185	100.0	93,695	57,952	100.0	89,014	53,395	100.0	9.1	-1.9	6.1	11.4	-3.0	7.4

Source: Author's calculations based on the national household surveys of 1992/93 and 2002/03
Notes: i) The estimates exclude the districts of Kasese, Bundibugyo, Gulu, Kitgum and Pader
ii) Real earnings expressed in 1997/98 prices

Figure 4: Monthly real earnings for wage employees aged 25-64 years, 1992-2002



Returns to higher education

As previously discussed Appleton (2001) using the nationally representative households survey data shows that the returns to university education are higher than at any other lower education level. More importantly, university education shows the highest private returns and also has the lowest social returns relative to primary education (Table 14 refers). This partly explains the government's increased funding to primary education.

Table 14: Uganda: Standard estimates of rates of return to education (%)

Educational attainment	1992		1999	
	Private	Social	Private	Social
Primary	15.2	13.4	30.2	23.7
Secondary	6.8	6.4	11.5	10.5
University	15.8	2.7	24.2	13.4

Source: Appleton (2001)

Due probably to lack of data on direct pecuniary costs of education, the coefficient on earnings functions has been interpreted as rate of returns to education. We follow this approach bearing in mind the obvious weakness to extend the work of Appleton (2001) and use the 2002/2003 national household survey data. This survey contains the first ever comprehensive information on labour survey in Uganda. Our specification differ from that of Appleton (2001), where we include education variables in dummy form – with higher education referring to diploma qualifications and above (see Equation (1)). For consistent and better interpretation of our results we first estimate the extended Mincerian wage equations for the three nationally representative household surveys. The estimates of the returns to education are limited to the wage workforce, thus excluding the large self employment sector for which UBoS did not gather information on individual earnings. The fact that this analysis relates to less than 16 percent of the workforce for each household survey must therefore be kept in mind.

Table A 1 presents the detailed wage estimates results. The coefficients of the educational dummies have the expected signs. The models explain between 35% and about 55% of the variations in the log of real wages. Consistent with similar studies in Uganda, the coefficients on the educational attainment dummies grew with higher level of education. The results are presented in Table 15 (see Table A 1 for detailed results). The results confirm that the returns are higher to higher education compared to other levels relative to no formal education. Similar finding was reported by Appleton (2001). Noteworthy is the decline between 1999 and 2002 regardless of education level. One would argue that the rapid economic growth recorded during 1990s was partly associated with increasing returns to education in general and higher education in particular. On the other hand, the rise in educational attainment of the Ugandan workforce could partly explain the high returns to education. But most importantly, the returns increased over the 10-year period. The returns were very low in 1992 a time when Uganda was recovering from post conflict era.

Returns to higher education are high, and this is partly attributed to the small proportion of the graduates in the labour force. The relative scarcity of graduates is paying off to holders of diploma/degree. These higher earnings might be providing greater incentives for people to enter and complete higher education. In other words,

high returns to education might have contributed to the observed rise in enrolment rates.

As already discussed, the supply of higher education graduates has been increasing (Table 4 refers). But the increase in relative demand for wage employees with higher education might explain the increase in the returns to higher education than changes in relative supply of higher education graduates.

The reforms undertaken in the 1990s have contributed to rising returns to higher education when wage levels were left to be determined by market forces. The timing of the increases in the returns to higher education is note worthy. The increases are highly concentrated between 1992 and 1999. And this period correspond to the implementations of economic liberalization and restructuring of the public civil service. It is also a period with higher growth rates in GDP as discussed above. In other words, increasing returns to higher education suggest that these reforms played a major role. More noticeable is that returns to education increased for all education levels. This might suggest the reforms implemented during this period increased the rewards to skills. The period 1999-02 was marked with slow growth in household income (see Appleton & Ssewanyana, 2003) and slow growth in GDP (of 5.9% compared to 6.9% for the period 1992-1999). More importantly, it is the period when Uganda experienced an increase in poverty headcount (see Table 9).

Table 15: Uganda: Returns to education for wage employees, 1992-2002

	1992	1999	2002
Primary	0.268	0.394	0.185
Secondary	0.632	0.940	0.640
Higher education	1.093	1.515	1.445

Source: Extracted from Table A 1
Note: i) The reference category is no formal education
ii) All estimates are statistically significant

We further examine the returns to education by region by running separate regressions by region in 2002. Here we controlled for tenure of employment and years of experience. The results are presented in Table 16 (see Table A 2 for details). The returns to education vary by regions. There are differences across regions. By 2002, the returns to higher education relative to no formal education were higher in Central region – a more developed region – compared to the other regions. Notably, the returns to higher education were higher in a less developed region, Northern than in somewhat relatively richer regions of Eastern and Western Uganda. This result is difficult to explain given the very low share of graduates in this part of the country as show in Table 9 above. To some extent there is evidence that more developed Central region has higher returns to higher education than the less developed regions.

Table 16: Returns to education for wage employees by region, 2002

	Central	Eastern	Northern	Western
Primary	0.383	**0.013**	**0.42**	**0.018**
Secondary	0.706	**0.392**	0.913	0.477
Higher education	1.555	0.894	1.262	1.164

Source: Extracted from Table A 2
Notes: i) The figures in **bold** are not statistically significant.
ii) The reference category is no formal education and the estimated are after controlling for tenure of employment and years of experience.

In Table 17, we present estimates for separate model for each region for the period 1992-2002 (for details see Table A 3). However, we do not control for tenure of employment and years of experience since such information was not gathered in the earlier surveys. In the Central region we find the returns to higher education relative to no formal education to have increased from 1.113% in 1992 to 1.752% in 2002. Central is the only region that has continuously recorded increasing returns to higher education relative to no education. However, the rest of the regions experienced a decline between 1999 and 2002, a time when Uganda recorded slow economic growth and an increase in poverty head count. Western Uganda registered the lowest returns in 1992 but seem to have increased faster than in any of the other regions. The lower returns of Western region compared to Eastern region are not supporting the smaller share of graduates as reported in Table 4 and Table 9.

Table 17: Returns to education for wage employees by region, 1992-2002

	Primary			Secondary			Higher education		
	1992	1999	2002	1992	1999	2002	1992	1999	2002
Central	0.325	0.328	0.399	0.673	0.829	0.779	1.155	1.469	1.752
Eastern	**0.264**	0.604	**0.066**	0.683	1.023	0.559	1.175	1.701	1.108
Northern	**0.202**	**0.381**	**0.403**	0.744	1.156	1.031	1.003	1.437	1.450
Western	**0.213**	0.342	**0.010**	0.466	1.031	0.531	0.784	1.468	1.249

Source: Extracted from Table A 3
Notes: i) The figures in **bold** are not statistically significant.
ii) The reference category is no formal education and the estimated are after controlling for tenure of employment and years of experience.

In sum, the returns to higher education than at any other level relative to no formal education. The returns have a regional dimension. Over time, the returns depicted an increasing trend in Central and Northern region.

Financing of higher education

Some studies (such as Court, 1999; Kasozi, 2003; Pillay & Kasirye, 2005) have been carried out on financing higher education in Uganda. The main sources of financing for higher education are government and private funds. The public funds for higher education institutions are allocated entirely to public institutions. Yet, the private institutions rely exclusively on tuition received from students and other well-wishers.

The overall education budget increased from 1.6% in yy to 3.8% in hh of GDP and more recently to 5% in 2003, though the share is well below that goes into the health sub-sector. On the other hand, the share of total government budget that is allocated to education sector was 25.99% in 1997/98 and declined to 24.79% by 2002/03. But within the education sector, the primary education takes a lion's share, which increased from less than 40% of the overall education budget in the early 1990s to nearly 60% by 2003/04[5] (Table 18 refers). The increased government's investment at this level largely explains the rapid progress achieved so far. In the recent years, there has been a steady decline in the public expenditure on higher education from 12.13% in 1997/98 to 8.42% in 2003/04.

[5] . The cost of education a child at university is six-fold that of educating a child at primary level (Bategeka *et al.*, 2004).

Comparing the distribution of education expenditures (Table 18 refers) with the population at school (Table 1 refers) some observations do emerge. The majority of the resources are focused at primary level where the majority of students are found (see also Fig. 5). Although the share of education expenditures devoted to primary education remain lower than the share of primary students in the total population currently attending school. Going by Appleton's findings, the government expenditure is disproportionately directed to primary education level where social returns are higher than at any other level.

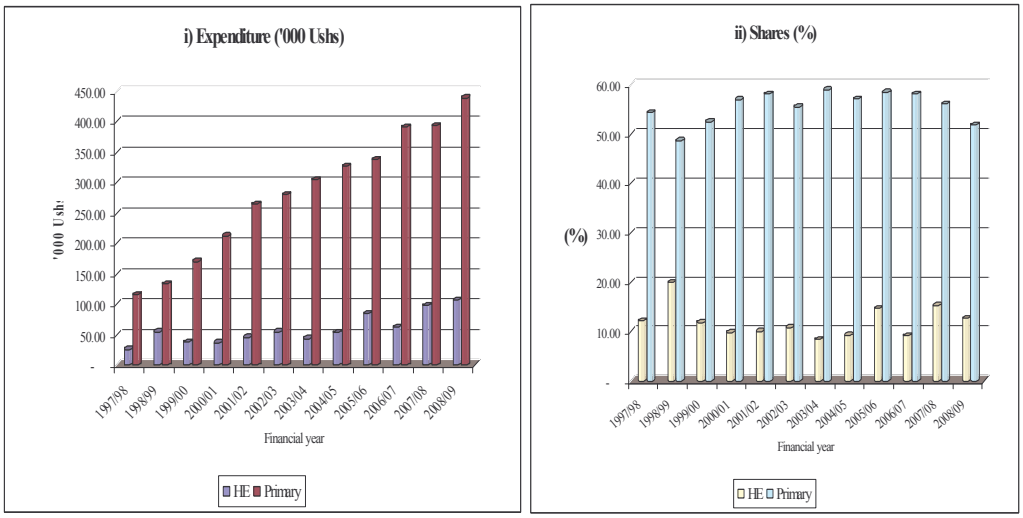
Because of this shift, public universities in particular are encouraged to generate resources of their own, and as a result, there are making several innovations in the mobilization of non-public resources. For instance, Makerere University started of with cost sharing in the early 1990's and later introduced private programs. However, this alternative funding has had its own challenges. On the hand, the public universities are now faced with the problem of offsetting declining public funding with hiking tuition, examination fees etc. On several occasions, for instance, Makerere University has tried this option with a lot of resistance from both students and government. This avenue is yet to be a success. Notwithstanding such challenges, the public institutions have been able to supplement the dwindling public funding with tuition from private students as discussed later.

Table 18: Uganda: Education expenditure on primary and higher education

	Higher education		Primary	
Financial year	UShs (bn)	Shares (%)	UShs (bn)	Shares (%)
1997/98	25.76	12.13	115.54	54.39
1998/99	54.73	19.90	133.85	48.67
1999/00	38.33	11.79	170.75	52.52
2000/01	36.61	9.82	212.50	56.97
2001/02	45.59	10.00	264.94	58.12
2002/03	54.46	10.78	280.49	55.52
2003/04	43.53	8.42	305.18	59.00
2004/05	53.00	9.26	326.81	57.13
2005/06	84.58	14.62	338.59	58.51
2006/07	61.80	9.15	392.40	58.08
2007/08	98.23	15.26	393.91	56.11
2008/09	107.14	12.62	440.07	51.86

Source: Statistics extracted from the MoFPED, MTEF
Notes: 2005/06-2008/09 are projections

Figure 5: Uganda: Public expenditures on education, 1997/98-2008/09



While financing of higher education was mostly by government, private contributions have grown over time. While the data limitation cannot allow us to quantify this contribution, judging from private student enrolments the private contributions have grown drastically over time. All this said, the introduction of private programs in the public higher education institutions has helped these institutions to close the funding gap between actual unit cost and tuition.

For public universities, government funds are disbursed to public institutions in two blocks: one for recurrent and the other for development budget. For the recurrent budget, each public institution receives from the Ministry of Education and Sports (MoES) a block grant or "subvention". The amount of the subvention is calculated based on the number of government students and the "unit cost" which the MoES thinks is reasonable for that particular institution. Often the government "unit cost" is set very high, more than twice the amount of annual fee paid by a private fee student, as it usually includes a substantial proportion of welfare costs.

Pillay & Kasirye (2005) provide an illustration on how subvention funding is arrived at in the case of Makerere University. For the financial year 2003/04 it received a subvention of UShs. 26 billion. The amount was based on about 9,000 students at an estimated annual unit cost of UShs. 3 million per student. This unit cost is well above the average annual tuition of UShs 1.5 million per private student. Almost exclusively, public institutions pay their regular staff out of the subvention. Public universities also receive development budgets from the Ministry, although the development budget fluctuates significantly from year to year and tends to favour Makerere University in general.

These higher institutions of learning offer a range of courses/programs in the field of humanities and science. The unit cost does not only vary across field of study but also within each field of study. Researches (see for example Kasozi *et al.*, 2003 as cited in Pillay & Kasirye, 2005) on unit cost of education show the average cost to vary substantially by institution and by programme. Table 19 indicates wide inter-institutional variation in average unit cost, ranging from Ushs 1.07 million at Nkumba University to Ushs 4.2 million at Mbarara University. There is moreover, a disturbing gap between what it costs to educate a student for a year and what the student pays in

terms of tuition. Nkumba University stands out with a positive gap. Otherwise, the rest of the universities where data are available spend more on the student than what each university charges in terms of fees and other payments. The public universities have been able to narrow this gap through initiating a number of money generating programmes as discussed earlier. Otherwise, government and/or donor agencies seem to subsidize students in these institutions.

Table 19: Annual average unit costs and tuition in selected Universities ('000 Ushs), 2002

University	Unit Cost	Tuition	Gap between unit cost and tuition
Makerere University	1,920.9	1,800	-128.9
Mbale Islamic University	3,447.6	1,300	- 2,147.6
Mbarara University of Science & Technology	4,227.6	1,800	- 2,427.6
Uganda Martys University, Nkozi	4,182.5	3,060	- 1,122.5
Nkumba University	1,072.7	1,374	301.3
Bugema University	...	2,260	
E.A Christian University, Ndejje	1,750.0	1,400	- 350.0
Uganda Christian Univeristy, Mukono	2,182.3	1,000	- 1,182.3
Kampala International University	...	1,000	
Average	*2,683.4*	*1,661*	

Source: Kasozi, 2003
Notes: … statistics not readily available

This situation is not different from higher education institutions in other countries, developed and developing and it applies to both private and public institutions. The unit cost is considerably higher in the more specialized science based programs where the teaching materials, equipment as well as a higher staff student ratio are required. The average unit cost in institutions offering liberal arts and the humanities on the other hand is relatively lower than the average unit cost. At Mbarara University, the cost of the hospital is part and parcel of the academic institution. The university then offers health service to the community as well as it usual academic mandate. Consequently, the cost of educating a doctor in Mbarara University (Ushs. 7.7 million) is higher than that in Makerere University (of UShs. 5.2 million).

In summary, government's investment in higher education has continued to decline over time. The observed increases in student enrolments are largely due to privately sponsored students. On the other hand, the participation of private sector in improving access to higher education institutions has also contributed to the ever increasing student enrolments. All these factors combined, are indicative of increasing private financing of higher education. And the trend is expected to continue. Based on the available literature on unit cost, we have demonstrated that universities do charge fees lower than their unit cost. Yet, from the stakeholders' perspective tuition at the current rates remains an entry barrier to students from less advantaged socio-economic background. This partly explains the observed low gross enrolment ratios. Thus increasing access to and participation in higher education requires considerable financial demand. Definitely, the financial demand has to be met by someone. The government's long term plan for tertiary education is to raise student numbers to 126,000 by 2015 of which half should be at universities and half female (MoFPED, 2005). It also intends to introduce bursaries for poorer students and putting in place a loan scheme.

Higher education policy and equity issues

As discussed in section 2, liberalization brought on board the participation of the private sector in the higher education system. Unfortunately, the private institutions did not come in as to meet the excess demand due to short falls in public sector supply. Instead, they have ended up offering similar education opportunities that are offered by the public institutions. And in most cases you find similar course/program content.

Uganda is pursuing a private sector-led growth. Yet, the education system seems not to be designed in accordance with the actual needs of the economy in general and the private sector in particular. The government is yet to come up with a comprehensive strategy of relating higher education to economic growth. A pointed out by Pillay & Kasirye (2005), the skills produced are not highly related to the work environment. In other words, there is a mismatch between curriculum and the skills needed in the economy.

While results so far have confirmed expansion of higher education, some individuals are excluded from participating in the system. Undoubtedly, tuition is a barrier for talented student from lower socio-economic background. This challenges the policy of more equitable access. The graduation rates and gross enrolment ratios discussed in section 2 do suggest some inequalities both spatially and by gender. But the government has come up with affirmative action policies to increase enrolment of the disadvantaged social groups through its 1.5 points to female students and through the district quota system. Efforts to achieve gender equity in higher education have focused on affirmative action policies. Table 2 shows the share of female students to have increased, partly due to the affirmative action. In addition, Table 4 shows that the share of female graduates increased from 28.9% in 1999 to 36.1% in 2002. But their numbers in sciences remain very low. By extension, the share of female at professional levels has also increased partly attributed to increased number of highly educated female. Tertiary institutions such as Makerere University have established a gender unit under the Academic Registrar's to conduct research on female education.

The results on stock of graduates and gross enrolment ratios did suggest marked differences spatially. The Northern region lags in both of these indicators and is the poorest and least developed region in the country. Insecurity that has persisted in the region for more than two decades partly explains these findings. These spatial differences have been recognized by the government especially in its efforts to implement its decentralization policy. For instance, some districts do not have the capacity required to successfully implement government's development programs. The current higher education policy to a greater extent barriers student from lower socio-economic background to compete for government sponsorship in public institutions in general and public universities in particular as entrance examinations are highly competitive and require good preparation at upper secondary level. The best upper secondary schools are located in urban areas and Central region in particular. This leaves the children in rural areas at a disadvantage as there are in most cases unable to compete with their counterparts from urban secondary schools. With the implementation of the district quota system in academic year 2006/07, it is assumed that children from poor districts will be able to access higher education. However, most of the students admitted through the system are in humanities. Yet, the government's current focus is on sciences. Notwithstanding this challenge, the

affirmative action policies are all aimed at having equal distribution of education opportunities to all Ugandans. Once this is achieved, there is hope that it will help to sustain economic growth.

Government does recognize the changing patterns of employment and that it requires changing pattern of skills. With the private sector led-growth, this implies that skills at higher education level should match the relevant skills by the private sector. The government through the district quota system is targeting its educational funds at higher level at economically productive disciplines. But as previously discussed, achieving this might take some time given the challenges of the whole education system in rural areas and less developed districts.

The education system is yet to produce successful entrepreneurs to create employment. The number of employers remains very low. More importantly, the education system continues to produce job seekers than job creators.

6. Conclusions and emerging policies issues

This paper sought to investigate the potential and actual impact of higher education in Uganda's development process and identify ways to enhance such impact. The findings, though it is based on admittedly inadequate data especially for wage/earnings, have implications for higher education reforms.

Using micro data from a series of household surveys, some observations do emerge. First, despite its strong economic growth during the period under review and impressive poverty reduction, the stock of higher education graduates remains relatively low. The gross enrolment rates are also very low but depicted an increasing trend over time. The national and sector reforms partly increased the participation of the private sector in terms of building higher education infrastructure/facilities and in turn improved access. Second, to some extent there is positive correlation between per capita GDP growth and student enrolment in public universities. The paper has also demonstrated that the majority of the higher education graduates are employed in those sectors which have recorded higher growth rates.

Third, there are marked disparities across gender and geographical locations. There is a stronger gender disparity with nearly twice as many male students as female higher education graduates. But this should not over shadow the fact that the gender gap has been narrowing over time with increasing female enrolments into higher education institutions. Turning to geographical locations, the poorer, less developed regions have a lower stock of higher education graduates and lower higher education enrolment rates. The regions that have a larger share of higher education graduates are more economically developed. Regions with bigger proportions of higher education graduates tend to have lower incidence of poverty. For example, the Northern region with least student enrolment and stock of graduates from higher education institutions, has the highest level of poverty incidence. Thus, higher education either in terms of stock or flow is highly associated with better welfare of its population.

Fourth, the main sources of financing higher education are government and private funds. The public higher education institutions are mostly funded from public funds. Yet, the private institutions rely exclusively on tuitions received from students and other well-wishers. For the public higher education institutions, while there are admitting private students they have not been able to overcome the declining funding from the government.

Fifth, the higher education graduates do contribute to the economy indirectly through tax revenue. These taxes are in turn used to support social programs among others that benefit the population at large. We have demonstrated that the share of taxes from graduates has been increasing over time.

Sixth, considering only those individuals in wage employment the results have revealed that the returns to higher education are higher than at any other lower education level. More importantly, university education shows the highest private returns. These higher returns than at any other level might have contributed to the observed increased student enrolment in higher education institutions.

Among the key emerging issues include:

- Demand for access to higher education is still a major challenge despite considerable achievements noted in the preceding sections. There is still need to broaden the participation rates similar to what has been achieved at primary education level;

- Need to ensure that the private higher education sub-sector fills the local demand skills that are not filled by the already existing public institutions. The programs/courses should respond to the development needs of the country and minimally driven by profit motives;

- Despite the increasing share of the tertiary students enrolled in sciences, the education system is marked with weak performance in science-related subjects. The performance in science subjects at both primary and secondary levels remain weak and needs to be looked into if the Government is to succeed in its science-based focus;

- The growth in higher education enrolment has been built on the strength of the primary and secondary education systems. We are yet to incorporate the local needs into the curriculum design;

- The private sector operates in isolation of the education system. The government should engage the private sector as a major stakeholder in the reform and development of the higher education sub-sector;

- There are wider disparities in both the stock and flow of higher education across gender and regions that need to be addressed.

While the private as well as the public good aspects of university output are not challenged, the more pertinent point is the appropriate level of government support. That is, what level of funding will achieve the appropriate social return to government (on behalf of society at large)? Should present levels of support be increased or allowed to continue declining? Government can only decide this matter based on competing social returns from other uses of its limited resource envelope. While the social returns from other forms of investment are unknown and must be judged by government, it is important to be able to document the likely returns from government investment in higher education. These also can generate reas of further investigations.

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Table A 1: OLS estimates for earnings for wage employees

	1992	1999	2002
Male employee (c*f: female)*	0.343***	0.310***	0.329***
Age	0.083***	0.099***	0.082***
Age squared	-0.001***	-0.001***	-0.001***
Education*:(cf: no formal education)*			
Primary	0.268***	0.394***	0.185*
Secondary	0.632***	0.940***	0.640***
Higher education	1.093***	1.515***	1.445***
Not stated		0.829**	0.437
Sector of employment:*(cf:agriculture)*			
Industry	0.355***	0.487***	0.514***
Services	0.180**	0.420***	0.322***
Not stated	0.667***	0.458	0.091
Private sector	-0.19	-0.367***	-0.432***
Region*:(cf: Central rural)*			
Central, urban	0.667***	0.682***	0.229**
Eastern, rural	-0.19	-0.038	-0.228*
Eastern, urban	0.271*	0.244**	-0.027
Northern, rural	-0.242	-0.250*	-0.107
Northern, urban	-0.05	0.019	-0.055
Western, rural	-0.257**	-0.178*	-0.226**
Western, urban	0.304**	0.350*	0.05
Constant	7.481***	7.691***	8.614***
R-squared	0.3665	0.5092	0.5341

Source: Author's calculations based on IHS, UNHS I & II
Notes: * p<0.05; ** p<0.01; *** p<0.001

Table A 2: OLS estimates for earnings for wage employees by region, 2002

	Central	Eastern	Northern	Western
Male dummy *(cf: Female)*	0.429***	0.317***	0.209	0.239**
Age	0.063***	0.05	0.054	0.081***
Age squared	-0.001**	-0.001	-0.001	-0.001**
Education*:(cf: no formal education)*				
Primary	0.383**	0.013	0.42	0.018
Secondary	0.706***	0.392	0.913**	0.477***
Higher education	1.555***	0.894***	1.262***	1.164***
Not stated	0.61	0.372		
Years of experience	0.019	0.032	0.014	0.004
Years of experience squared	-0.001*	-0.001	0	0
Tenure of employment*:(cf: Permanent)*				
Temporary	-0.414***	-0.317*	-0.310*	-0.155
Casual	-0.407***	-0.563**	-0.352	-0.331**
Sector of employment:*(cf: Agriculture)*				
Industry	0.599***	0.369*	0.606**	0.404**
Services	0.361**	0.251	0.289	0.252*
Not stated		0.007		0.088
Private sector	-0.350***	-0.203	-0.082	-0.331**
Urban dummy *(cf: Rural)*	0.235**	0.175*	0.076	0.285***
Constant	8.801***	9.438***	8.988***	8.695***
R-squared	0.563	0.543	0.507	0.595

Source: Author's calculations based on UNHS II
Notes: * p<0.05; ** p<0.01; *** p<0.001

Table A 3: OLS estimates for earnings for wage employees, 1992-2002

	1992				1999				2002			
	Central	Eastern	Northern	Western	Central	Eastern	Northern	Western	Central	Eastern	Northern	Western
Male dummy	0.427***	0.537**	0.051	0.176	0.353**	0.228*	0.145	0.302**	0.407***	0.323***	0.233	0.253***
Age	0.117***	0.045	0.103*	0.050*	0.113***	0.081**	0.061	0.090***	0.086***	0.069**	0.048	0.080**
Age squared	-0.002***	-0.001	-0.001*	-0.001	-0.001***	-0.001**	-0.001	-0.001**	-0.001***	-0.001**	0	-0.001*
Education:												
Primary	0.325**	0.264	0.202	0.213	0.328*	0.604***	0.381	0.342*	0.399**	0.066	0.403	0.01
Secondary	0.673***	0.683***	0.744**	0.466*	0.829***	1.023***	1.156***	1.031***	0.779***	0.559*	1.031***	0.531***
Higher education	1.155***	1.175***	1.003***	0.784***	1.469***	1.701***	1.437***	1.468***	1.752***	1.108***	1.450***	1.249***
Not stated	0.527***	-0.005	0.49	0.593***	1.144***	0.294	0.029	0.298	0.594	0.509		
Sector of employment:												
Industry	0.527***	-0.005	0.49	0.593***	0.536**	0.775***	0.105	0.292*	0.615***	0.382*	0.524**	0.437***
Services	0.583***	0.074	0.326	0.027	0.506***	0.463***	0.071	0.388***	0.394**	0.356*	0.242	0.309**
Not stated					0.303	1.141**	0.244	-0.088	0	0.184	0	0.169
Private sector	0.158	0.323**	0.428*	-0.21	-0.477***	-0.481***	-0.27	-0.12	-0.516***	-0.451***	-0.226	-0.422***
Urban dummy	0.573***	0.486***	0.156	0.614***	0.644***	0.286**	0.292	0.532***	0.214**	0.187*	0.089	0.289***
Constant	6.714***	7.992***	7.098***	8.311***	7.561***	7.862***	8.642***	7.464***	8.281***	8.907***	8.882***	8.555***
R-squared	0.421	0.236	0.249	0.232	0.558	0.490	0.376	0.478	0.536	0.510	0.490	0.587

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