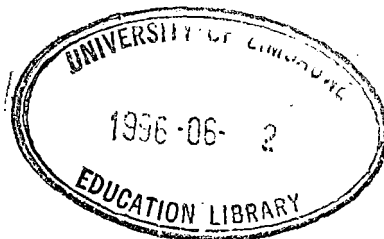


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EDUCATION AND TRAINING OUTCOMES: UNIVERSITY GRADUATES IN ZIMBABWE DURING THE 1980s

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Introduction

The critical importance of university educated and trained personnel for the economic and social development of Zimbabwe has been continually reiterated by politicians, policy makers and educationalists since independence in 1980. Recognising this role, the ZANU (PF) government substantially increased resource commitments to the University of Zimbabwe (UZ), the country's only university during the 1980s. As a consequence, student enrollments expanded from 2,200 in 1980 to just over 9,000 in 1990.

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Despite the undoubted importance of university educated personnel, relatively little is known about what graduates from UZ have done once they have completed their studies. The university itself conducted a first destination survey of graduates in 1989 (University of Zimbabwe, 1990) but no comprehensive tracer surveys have been undertaken of graduates who have been in the labour market for at least a few years.

This article summarises the findings of a tracer survey of two groups of UZ graduates who first enrolled at the university in 1980-1981 and 1985. When properly undertaken (in particular when response rates are reasonably high), tracer surveys provide invaluable information on the current activities of individuals who have completed specific types of education and training. In fact, tracer surveys are increasingly seen as an integral component of a new approach to 'manpower planning' which relies primarily on micro-level 'labour market analysis' of well delineated occupations or occupational groups. (Bennell et al, 1991; Godfrey, 1991; Psacharopoulos, 1991)

The main objectives of the UZ tracer survey were to determine:

- (1) The overall patterns of employment of graduates including the incidence of wage and self employment and breakdowns by major sector and industry;
- (2) The broad occupational profiles of graduates from each degree programme mainly in order to ascertain the extent to which they are being properly utilised;
- (3) The location of graduates both within Zimbabwe and overseas;
- (4) Annual incomes.

The discussion is structured as follows. The survey methodology is outlined in the first section. The second section provides some brief background information on the individuals, namely their ages, gender

composition, socio-economic status, and 'A' level examination results. The survey results are then presented and discussed in the third section.

Survey methodology

The tracer survey was conducted in conjunction with a study of the socio-economic background of UZ students during the 1980s. (Bennell and Ncube, 1992). The names of students who enrolled at UZ in six degree programmes: Bachelor of Arts (B.A.), Bachelor of Science (B.Sc.), economics, engineering, pharmacy and Bachelor of Laws (BL) -in 1980, 1981 and 1985 were obtained from the grant and loan record kept by the Ministry of Higher Education. With the exception of engineering and pharmacy, these are three year degree programmes. Consequently most of these students graduated from UZ in 1982/83, 1983/84, and 1987/88 respectively. Because of the relatively small numbers of African students who applied for government grants and /or loans in 1980, it was decided to combine these students with the 1981 intakes. Also, given the much larger numbers of students applying for loans and grants in 1985, fifty percent random samples were taken of these intakes. Table 1 (see appendix) shows the numbers of students for each of the six degree programmes who were included in the survey.

The first step in tracing these students was to write to them using the parental/sponsor addresses found in the grant and loan application forms. Respondents were requested to complete a very simple one page questionnaire which took them no more than two to three minutes to fill out. There was a strong temptation to make the questionnaire longer but this would almost certainly have resulted in lower completion rates. A list of the students with whom the respondent had studied with was also sent to each of them and they were requested to write down any information they had on the present whereabouts and work activity (i.e. type of job and employer) of their fellow students. Using this methodology of student lists it was possible to ascertain the location and activity status of more than half of the 1980-81 group and three-quarters of the 1985 group (see Table 1). A total of 56 and 79 questionnaire were satisfactorily completed among the 1980-81 and 1985 groups, respectively. The only additional information contained in these questionnaires concerned incomes.

At the start of the survey we had assumed that the UZ Student Records office would be able to provide us with information on the class of degree awarded to students. As it turned out, however, this proved to be difficult. It was decided therefore to include in the survey only those students who we knew for certain had passed their degrees. We strongly suspect that a relatively large number of the remaining untraced students dropped out before completing their degrees which is why their present whereabouts was not known by any of their fellow students.

Background information.

Gender

With the exception of the B.Sc. group, women comprised barely more than ten percent of the students in the 1980-81 group (see Table 1). While female representation was somewhat higher among the 1985 samples (in particular among B.A., law and pharmacy students), in overall terms, only 30 percent of students were women.

Age

The average ages of first year students in the two groups were 21 in 1980-81 and 20 in 1985.

Socio-economic status

Using father's occupation as the main indicator of socio-economic status, it can be observed in Table 2 (Appendix) that students from 'middle class' families were heavily over-represented in all three year groups. Conversely, students from peasant farming backgrounds were heavily under-represented.

'A' Level examination performance

At least two subject passes in the General Certificate of Education Advanced ('A') level examinations remained the minimum entrance

requirement for UZ during the 1980s. There are five passing grades (A to E) which are assigned the following points A = 5, B = 4, C = 3, D = 2, E = 1. Between 1980 and 1990, the average point scores of UZ students rose in all six programmes, in particular B.A. and economics (See Table 3, Appendix). In addition, the variation in points obtained by students (as measured by the standard deviation) also declined steadily during the period. These increases in entry standards were the direct consequence of growing competition for a university place among Form VI school leavers.

Engineering, law and pharmacy students had consistently the highest mean points scores at 'A' level which reflects the relative popularity of these degree programmes among school leavers and their parents. Of particular concern, however, are the very low point scores of B.Sc. students. The mean values for B.Sc.(natural sciences) intakes were almost half those for engineering throughout the 1980s. Acute shortages of well trained and experienced science teachers coupled with inadequate laboratory facilities in most schools were undoubtedly the main factors responsible for the poor examination performance of science student at 'A' level.

The relatively small numbers of women students makes gender comparisons of 'A' level performance difficult. However, there does not appear to be any major differences especially in those degree programmes where there were more sizeable numbers of women students.

RESULTS

Sector And Type Of Employment:

Wage Versus Self-Employment

Nearly all graduates who were successfully traced were in wage employment in early 1991 (89.9 percent among the 1980-81 group and 99.3 percent for the less experienced 1985 group). Self-employment was only common among the 1980-81 lawyers. Nearly a quarter of them had established their own legal practices.

Public Versus Private Sector Employment

By African standards (Bennell, 1983), a relatively large number of UZ graduates were employed in the private sector (See Table 4, Appendix). Nonetheless, with the exception of the B.Sc.(natural sciences) group, at least half of the graduates from the other programmes were employed in public sector organisations in early 1991. Arts, economics and 1980-81 engineering graduates, in particular, were heavily concentrated in the public sector.

One might have expected that smaller proportions of the 1980-81 group would have been employed in the public sector as they moved on to the 'greener pastures' of the private sector. However, this is only true for lawyers. This may be because the 1980-81 students who went to work in the public sector were rapidly promoted into very senior positions which have high status, power and material benefits. The 1980 Presidential Directive and public sector staffing and the rapid expansion of government services greatly facilitated black occupational advancement during the early 1980s (Bennell and Strachen, 1992).

Industry Breakdown

The employment of traced graduates according to the standard industrial classification is presented in Table 5, (Appendix). What is particularly striking is the relatively small numbers of graduates employed in the productive sectors of the economy (i.e. agriculture, mining and manufacturing)

Skills Utilisation

None of the traced graduates were unemployed and virtually all of them were doing jobs that were appropriate given their particular university education and/or training. This strongly indicates that there was no excess supply of graduates in any of the six areas in the early 1990s and that, therefore no serious under-utilization of university personnel existed as has often been the case in less developed countries most notably India where graduates are commonly employed as clerks, taxi drivers, etc. It

would be interesting to re-survey graduates from UZ in five to ten years time in order to see if any 'filtering down' of graduates into lower, non-professional jobs has started to occur.

Location

As can be observed in Table 6 (Appendix), approximately eighty percent of the UZ graduates who were traced were working in the seven main urban centres of the country (Bulawayo, Gweru, Harare/Chitungwiza, Kwekwe/Redcliff, Marondera, Masvingo and Mutare). Nearly six out of ten graduates were located in Harare but fewer than five percent were in Bulawayo, the country's second largest city. Only B.A. graduates working as teachers and a few engineering and B.Sc graduates employed by mining companies were living in rural areas. In the Zimbabwean context, the over whelming concentration of university trained personnel in towns, and in particular the capital city, is not surprising given the highly dualistic nature of the economy coupled with the continued under-development of rural areas.

Despite the concerns of politicians and the media about the 'brain drain' of Zimbabwean professionals and other skilled workers, only a handful of the traced graduates were working outside Zimbabwe. (2 in Namibia, 1 in Ghana and 1 in the US). Given the inexperience of these graduates, with many of them still undergoing professional training at the time of the survey, their ability to migrate overseas was inevitably quite limited. Again, it would be interesting to re-survey these same graduates in five-ten years time to see how many of them are working overseas, and in particular South Africa where African university graduates are still in very short supply and affirmative action programmes are becoming increasingly widespread (Hugo, 1992).

Incomes and rates of return

Given individual sensitivities about disclosing detailed information concerning earnings and other non-monetary benefits, questionnaire respondents were simply asked to indicate which of the following income groups they fell into in 1990: less than Z\$10, 000, Z\$10,001-15,000, Z\$15,001-20,000, Z\$20,000-30,000, Z\$30,001-40,000, Z\$40,001-50,000,

Z\$50,001-75,000, more than Z\$75,000. These are gross i.e. pre-tax incomes and include all fringe benefits such as housing and car allowances. However, with small numbers of respondents in the majority of subject groups, these data need to be treated with some caution.

The 1990 median and lower and upper quartile gross incomes of UZ graduates are presented in Table 7 (see Appendix). As expected, the more experienced 1980-81 group generally earned more than the 1985 group. It can be observed that the 1980-81 economics and engineering graduates had particularly high upper quartile incomes of over Z\$50,00 per annum. With average annual household incomes in the rural areas of no more than Z\$1,000 in the late 1980s (Amin and Chipika, 1990), it is not difficult to see why the demand for university education remained so high in Zimbabwe during the 1980.

Very low social rates of return (ROR) to university education have, however, been widely reported in African and other developing countries (Psacharopoulos, 1985). The World Bank in particular has used these estimates to back-up their policy recommendation that governments should place more emphasis on primary rather than higher education since the social RORs to this primary education are generally much higher (World Bank, 1988). But what the UZ tracer questionnaire data clearly show is that the variations in average incomes among graduates with different degrees are very sizeable indeed. Deriving a single aggregate social ROR to university education obviously masks these variations and as such is an inappropriate criterion for guiding policy decisions about resources allocations to university education and training. As is well known, there are numerous theoretical and empirical problems with the methodologies that underpin the ROR approach (Lesley, 1990) but, if policy makers, the World Bank and other economists persist in using RORs, then at the very least, separate ROR estimates must be calculated for each degree course at the university level.

To derive social RORs for separate university degrees, the net gross income benefits and direct and indirect costs of each degree programme must be accurately ascertained. The total net income benefit is the difference between the average lifetime gross incomes of the degree

holders under investigation and the equivalent incomes earned by individuals who have only 'A' levels but could have enrolled in this degree course. Unfortunately, no tracer surveys of Form VI school leavers have yet been undertaken in Zimbabwe so it is not possible to derive RORs for specific university degrees.

In the absence of cross sectional lifetime earning data, the following equation has been commonly used as a short hand method for calculating RORs:

$$r = k/C$$

where r is the rate of return and k is the aggregate net income benefit immediately after the education/training activity has been completed which in this case is the difference between the average starting incomes of graduates and the average starting incomes of 'A' level school leavers. C is the total social costs of the investment which includes all the direct expenditures incurred both by government in providing the education or training and by students whilst in training. This method is a good approximation to the standard ROR methodology using lifetime earnings when (i) the post-training period is relatively long i.e. at least thirty years; and (ii) the income differential between the with and without training groups remains fairly constant (Addison and Siebert, 1978).

The median starting salary of UZ graduates in the late 1980s was in the income range Z\$20,001-30,00 per annum. Let us assume therefore that the average income was Z\$25,000. The average annual direct costs (both public and private) of UZ education was approximately Z\$12,000 per annum in the mid 1980s. Notwithstanding our earlier reservations about the value of aggregate ROR estimates for university education as a whole, these data can be used to derive aggregate social RORs to UZ education. If, for example, it is assumed that the university-'A' level income differential was 50 percent then for a three year degree the average social ROR for university education would be as follows:

$$r = 25,000 - 16,670 / ((12,000 \times 3) + (3 \times 16,670)) = 0.0968$$

Given overall real rates of return to capital investments in Zimbabwe during the early 1980s, a social ROR to university education of around ten percent would have been quite respectable. But, as can be observed in Figures II, once university degree-'A' level income differentials fall much below 50 percent, then the social RORs decline rapidly and university education ceases to be a socially profitable investment. Age-incomes data from the 1986-87 Labour Force Survey showed that this differential was typically less than 20 percent for each age cohort and that, with the very high direct and opportunity costs of UZ education, this yields social rates of return to university education of less than five percent (Bennell and Malaba, 1992).

Concluding remarks

The simple tracer survey methodology that underpinned this research has generated a considerable amount of valuable information concerning the outcomes of university education in Zimbabwe during the 1980s. Clearly, more detailed information (in particular, individual chronologies of activities undertaken by students since graduating) could have been collected but this would have required a more detailed questionnaire instrument with probably lower response rates. And, on its own, a tracer survey of this kind has obvious limitations. Thus, it would be particularly worthwhile to re-survey the same graduates at least at five yearly intervals in the future in order to derive good quality longitudinal data and also undertake tracer surveys of students from other higher education and training institutions in particular those that 'compete' with universities most notably the polytechnics and technical colleges.

REFERENCES

Addison, F. and Siebert, N. (1978). *Labour Economics*. Los Angeles: University of California Press

Bennell, P.S. (1993). Earnings differentials between public and private sectors in Africa. *Labour and Society*, vol 6, No 3, July-September.

Bennell, P.S. and Ncube, M. (1992). The nose brigade and SRBs: the socio-economic background of university students in Zimbabwe since Independence. *Journal of Southern African Studies*, forthcoming.

Bennell, P.S. and Malaba, J. (1992). Up-dating rates of return to education: Zimbabwe in the late 1980s. *International Journal of Educational Development*, forthcoming.

Bennell, P.S. and Strachan, B. (1992). Black occupational advancement in Zimbabwe: The experience of the 1980s. P. Hugo (ed.), *Redistribution and affirmative action: Working on South Africa's political economy*. Johannesburg, Southern.

Bennell, P.S., Katsidzira, D. and Madziya, F. (1991). Skilled labour markets in Zimbabwe: A case study of mechanical engineering personnel. *The Zimbabwe Journal of Educational Research Vol 3 No 1, 76-105*.

Godfrey, M. (1991). Planning vocational training and employment: a minimalist approach. Paper presented at workshop on New Approaches to Manpower Planning and Analysis. ILO, Geneva. 3-4 October.

Lesley, L.L. (1990). Rates of return as informer of public policy. *Higher Education. Vol 20*.

Psacharopoulos, G. (1991). From manpower analysis to labour market analysis. Paper presented at Workshop on New approaches to Manpower Planning and Analysis. ILO, Geneva. 3-4 October.

Psacharopoulos, G. (1985). Returns to education: a further international up-date and implications. *Journal of Human Resources. Vol. 4*.

University of Zimbabwe. (1990). *First destination survey of 1990 graduates from the University of Zimbabwe*. Harare, University of Zimbabwe.

World Bank. (1988). *Education in Sub-Saharan Africa*. Washington DC, World Bank.

Appendix
Table 1: sample sizes and response rates.

Subject	Sample size		%women		%traced	
	1980-81	1985	1980-81	1985	1980-81	1985
Economics	41	28	12.2	14.2	52.5	89.3
Law	37	14	13.5	42.9	42.9	92.9
Pharmacy	7	12	14.3	33.3	0.0	100.0
Engineering	30	27	11.1	6.7	53.3	77.8
B.A.	34	94	8.8	44.7	38.2	78.7
B.Sc	33	38	21.2	21.1	39.4	39.5
Totals	182	213	13.2	30.9	54.1	75.1

Table 2: Fathers' occupational level among first year UZ students, 1980-81 and 1985.

Type and Level of occupation	1980-81	1985
Wage employment		
Professional	25.4	41.6
of whom		
Teachers	18.0	34.7
Middle	32.8	20.8
of whom		
Mental	17.7	10.8
Manual	15.1	10.0
Semi-unskilled	17.4	23.0
Sub-total	75.5	85.4
Self-employed		
Peasant farmers	22.8	12.3
Modern sector	1.1	0.9
Informal sector	0.6	1.4
Sub-total	24.5	14.6
Totals	100.0	100.0
Totals	100.0	100.0

Source: Bennell and Ncube, 1992.

Table 3: 'A' level points scores: means and standard deviations

Subject	Year	Mean	StdDev	Number
B.A	80	4.78	2.49	9
	81	6.09	2.61	21
	85	3.48	1.57	82
	90	8.82	1.32	106
B.Sc.	80	5.70	1.95	10
	81	5.06	1.25	18
	85	5.77	1.76	35
	90	6.34	1.35	86
Economics	80	5.90	2.85	11
	81	4.44	1.86	27
	85	7.12	3.86	25
	90	8.65	1.40	27
Law	80	7.25	4.79	12
	81	8.62	3.70	21
	85	9.84	1.46	13
	90	10.60	3.48	15
Pharmacy	80	10.00	2.44	4
	81	7.67	2.08	3
	85	9.40	2.85	15
	90	10.08	1.90	13
Engineering	80	9.88	3.87	8
	81	10.16	2.72	18
	85	11.33	2.47	30
	90	11.19	2.17	43

Table 4: Employment by main type of employer (percentages).

Subject	Year	Private	Central Govt.	Parastatal	Local Govt.	Public Total	Number
Economics	80+81	15.0	50.0	20.0	10.0	80.0	20
	85	39.1	39.1	21.7	0.0	80.8	23
Law	80+81	48.5	24.2	21.2	6.1	51.5	33
	85	38.5	61.5	0.0	0.0	61.5	13
Pharmacy	80+81	na	na	na	na	na	0
	85	50.0	41.7	8.3	0.0	50.0	12
Engineering	80+81	16.7	25.0	50.0	8.3	85.3	12
	85	40.0	25.0	35.0	0.0	60.0	20
B.A.	80+81	0.0	100.0	0.0	0.0	100.0	12
	85	8.7	84.1	7.2	0.0	91.3	69
B.Sc.	80+81	53.8	38.5	7.7	0.0	46.2	13
	85	53.8	15.4	30.8	0.0	46.2	13
Overall	80+81	31.1	42.2	20.0	5.6	67.8	90
	85	27.3	58.0	14.7	0.0	72.7	150
UZ First destination survey	1989	26.0	63.7	9.6	0.6	73.9	1161

Table 5: Employment of graduates in industry (percentages).

Subjects	Ag	Min	Mfg	E&W	Con	Fin	Dist	T&C	PA	Ed	H	Other
Eco 80	0.0	0.0	0.0	0.0	0.0	15.8	0.0	0.0	63.2	10.5	0.0	10.5
85	4.3	0.0	13.0	4.3	0.0	8.7	0.0	0.0	38.1	4.3	0.0	28.1
Law 81	0.0	0.0	5.9	2.8	0.0	8.8	0.0	5.9	26.5	8.8	0.0	41.2
85	0.0	0.0	0.0	0.0	0.0	7.7	0.0	0.0	61.5	7.7	0.0	23.1
Phar 85	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.1	90.9	0.0
Erg 80	6.7	6.7	13.3	26.7	13.3	0.0	0.0	33.3	0.0	0.0	0.0	0.0
85	0.0	11.1	22.2	22.2	16.7	0.0	5.6	22.2	0.0	0.0	0.0	0.0
B.A. 80	0.0	0.0	7.1	0.0	0.0	0.0	0.0	0.0	14.3	64.3	0.0	14.3
85	0.0	0.0	2.8	0.0	0.0	1.4	0.0	0.0	20.0	74.3	0.0	1.4
B.Sc. 80	0.0	53.8	7.7	0.0	0.0	7.7	0.0	7.7	0.0	7.7	7.7	7.7
85	0.0	28.5	21.4	7.1	0.0	0.0	0.0	0.0	0.0	35.7	0.0	7.1

Note: "1980" figure include both 1980 and 1981 groups.

Ag = Agriculture, Min = mining, Mfg = manufacturing, E&W = electricity and water, Con = construction, Fin = finance, insurance etc.,
Dist = wholesale and retail distribution, T&C = transport and communication, PA = public administration, E = educational services,
H = health services, Other = self-employed lawyers etc.

Table 6: Location of graduates

Location	1980-81	1985
Harare	59.3	58.3
Bulawayo	3.2	4.3
Other major towns	16.5	20.1
Other locations	21.0	17.3
Totals	100.0	100.0

Notes: 1)Gweru, Kwekwe/Redcliff, Masvingo, Mutare, Marondera
2)Other smaller town and rural areas.

Table 7:Median and lower and upper quartile gross income (Z\$ '000), early 1991.

Subject	Year	Lower	Median quartile	Upper	Number quartile
Economics	80 + 81	20-30	40-50	50-75	9
	85	15-20	20-30	20-30	12
Law	80 + 81	20-30	30-40	40-50	23
	85	20-30	20-30	20-30	7
Pharmacy	85	20-30	30-40	40-50	7
Engineering	80 + 81	30-40	30-40	50-75	7
	85	20-30	30-40	30-40	12
B.A.	80 + 81	20-30	20-30	30-40	7
	85	15-20	20-30	30-40	28
B.Sc.	80 + 81	20-30	30-40	40-50	9
	85	20-30	20-30	30-40	10



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