Higher Education, Employment and Economic Growth: Exploring the Interactions

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Introduction

- The main objective of this paper is to interrogate economic growth and performance through the human capital lens.

- We focus on three specific areas:
  I. Labour market trends by education cohort
  II. The contribution to economic growth by education cohort
  III. Welfare gains by education cohort

Data and Methodology

Data

- Post-apartheid Labour Market Series (PALMS)
- Post-apartheid Income and Expenditure Survey (PIES)
- South African Reserve Bank data on Capital Accumulation

Methodology

- Descriptive overview of the labour Market using PALMS
- Micro-productivity analysis of returns to labour inputs using simple elasticities and an econometric analysis using a production function.
- Growth Incidence Curve (GIC) using PIES to assess welfare gains for higher education cohorts

Employment and Occupations: A Descriptive Overview

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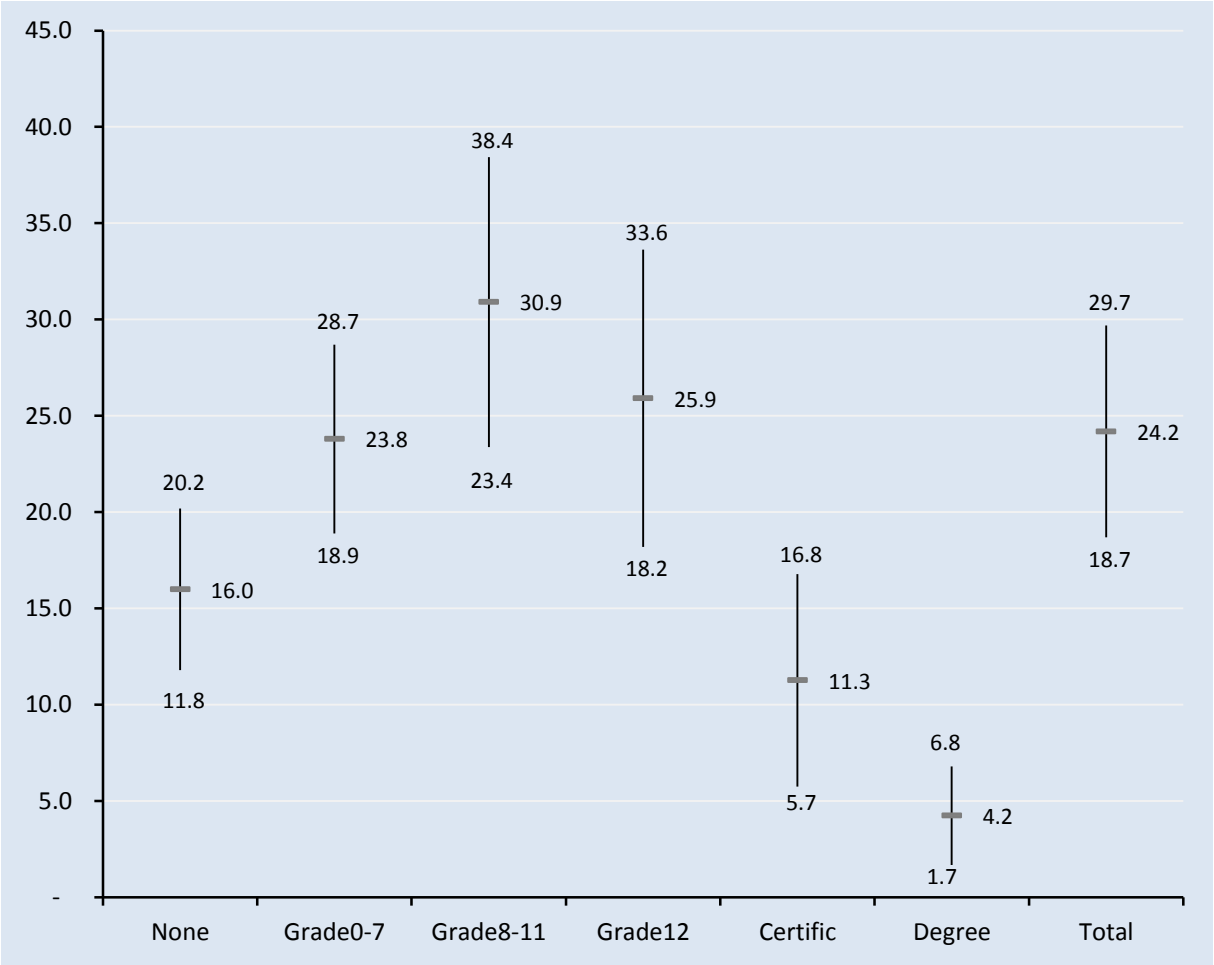
Education and Unemployment

Long run average unemployment between 1995 and 2012, by education cohort



Source: Post-apartheid Labour Market Series, DataFirst; Own calculations

Note: The 95% confidence interval is constructed by calculating the mean unemployment rate and standard deviations, then apply the 68–95–99.7 rule.

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Growth and Share of Changes in Employment by Occupation, 1995-2012

	None		Grade 1-12		Certificate		Degree		Total	
	Growth	Share	Growth	Share	Growth	Share	Growth	Share	Growth	Share
Manager	-3.1	-0.1	2.5	0.2	12.1	1.1	17.4	1.3	5.6	2.5
Professionals	-	-	73.4	1.4	32.5	1.3	1.1	-0.3	7.5	2.3
Technical & Associates	1.4	-0.0	2.3	0.2	-	-1.4	32.7	2.0	2.5	0.6
Clerks	-1.0	-0.0	0.1	-2.4	9.8	1.2	12.1	0.3	1.4	-1.0
Service & Sales	-2.2	-0.2	4.4	2.8	8.7	0.6	13.4	0.2	4.5	3.3
Agri. & Fishing	-4.0	-0.1	-2.4	-0.5	-4.8	-0.1	-4.5	-0.1	-3.0	-0.8
Craft & Trade	-2.5	-0.5	2.2	0.1	3.4	0.1	-2.7	-0.1	1.9	-0.2
Operator & Assembler	-4.1	-0.9	-	-2.6	3.6	0.1	14.5	0.0	-0.3	-3.3
Elementary	-3.3	-2.9	3.4	2.8	10.3	0.2	2.1	0.0	2.2	0.4
Domestic	-3.6	-1.3	-0.3	-2.6	0.6	-0.0	-	0.0	-0.8	-3.9
Total	-3.3	-6.0	2.0	-0.6	4.5	3.0	7.5	3.3	2.1	

Source: Post-apartheid Labour Market Surveys (PALMS) and own calculation

Note: The *Growth* column presents the 17-year averaged annual employment growth and the *Share* column, the shift between shares of occupation within each educational category.

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Labour market outcomes

- Highest employment growth for the better educated and declining employment growth for those with less education. Related to the increasingly capital intensive growth path and growth in medium and semi-skilled occupation.

- Workers with low levels of qualifications are clustered around occupational types that demand low skills, while high-level jobs are mostly filled by workers with high skills and education .

- Mixed employment growth for certificate holders- high skilled as well as low skilled employment growth.

- Grade-Hiring inflation where better educated workers are doing are doing work previously reserved for workers with lower skills.

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Micro-productivity Analysis

How does each education cohort contribute to the economic growth?

- Essentially, we examine the productivity or the ability of labour to contribute to economic growth by education cohort.
- Basic labour economics suggest that in an efficient market, long-term returns on factor inputs (labour) should be a function of the factor's marginal product and its imbedded productivity; or
- That the productivity of labour implies something about the returns and therefore the impact of returns on education.

Methodology

- In order to examine this further, we use:
  - Simple Employment Elasticities

$$\varepsilon=(\Delta Y/Y)/\Delta L/L_{education\ level}$$

  - Productivity Analysis using a Cobb Douglas Production Function

$$Yt=AtLt\alpha Kt\delta$$

  - Olley and Pakes Methodology

$$Kt=1-\theta Kt-1+It$$

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Simple Elasticities

Output-Eployment Elasticities by Education

	None	Primary	Secondary	Matric	Certificate	Degree	Total
Employment	-0.1	-0.1	0.4	0.5	0.2	0.1	0.4
Labour Force	-0.1	-0.2	0.3	0.3	0.2	0.1	0.4
Working Age	-0.4	0.1	0.8	0.3	0.2	0.2	2.0
Population	0.2	0.1	0.3	0.2	0.1	0.2	3.1

Source: Post-apartheid Labour Market Surveys (PALMS); Statistics South Africa (StatsSA); South African Reserve Bank (SARB) database and author's own calculation.

Note: Only the proportions where the absolute change is statistically significant are shown. Annual data for 1995 and 2012 are used in this analysis.

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Cobb-Douglas production function
OLS results, 1995-2012

VARIABLES	OLS (Employment)	OLS (Labour Force)	OLS (Working Age)	OLS (Population)
Capital	0.543***	0.642***	0.368*	1.254***
Labour	0.639***	0.468***	0.839***	-0.425***

Notes: Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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Cobb-Douglas production function
OLS with Education Cohorts, 1995-2012

	VARIABLES	OLS (Employment)	OLS (Labour Force)	OLS (Working Age)	OLS (Population)
	Investment	0.127**	0.241***	0.228***	0.245***
	Capital	0.648***	0.628***	0.244***	0.13
Labour	None	0.057	0.061	0.012	0.058
	Primary	-0.034	-0.054	0.125*	0.213***
	Secondary	0.1	0.169*	0.688***	0.692***
	Matric	0.275***	0.135***	-0.008	-0.042
	Certificate	-0.135**	-0.191***	-0.069	-0.031
	Degree	0.119***	0.099	0.084*	0.086**

Notes: Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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Labour Productivity and Education Analysis
Olley & Pakes Methodology

	VARIABLES	(Employment)	(Labour Force)	(Working Age)	(Population)
	Investment	-6.23	-2.606	-5.638	0.545
	Investment^2	0.472	0.211	0.399	-0.02
	Investment^3	-0.006	-0.002	-0.003	0
	Capital	2.58	1.474	2.413	0.086
	(Capital*Investment)^3	0	0	0	
Labour	None	-0.024	-0.007	-0.09	0.029
	Primary	-0.023	-0.118	-0.057	0.164
	Secondary	0.145	0.280***	0.466**	0.669***
	Matric	0.159	0.053	-0.023	-0.037
	Certificate	-0.05	-0.075	-0.036	-0.025
	Degree	0.104**	0.092*	0.102**	0.095*

Notes: Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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Which education cohort contributes to economic growth?

- Labour-employment elasticity for degree holders is the only coefficient for labour in the Cobb-Douglas equation that yielded any sign of significance, irrespective of the labour definition used.

- These results indicate that degree-holders who are employed in the labour market are the most closely associated with the movements of economic growth.

- The FET certificate or diploma provides insignificant returns to growth. The higher level of unemployment found earlier in the paper for those with an FET qualification provides descriptive evidence of the less than optimal contribution to the economy .

- The schooling system has also shown not to be a productive element of South Africa's growth path which is not surprising given the low quality of the education system.

Education and Welfare

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Poverty Profiles by Education Cohort

	Upper Poverty Line at R557 per month, per person		Lower Poverty Line at R416 per month, per person	
Headcount Index (P0)				
Education	1995	2010	1995	2010
No Schooling	0.84	0.81	0.73	0.67
Primary (Gr0-7)	0.73	0.71	0.59	0.55
Secondary (Gr8-11)	0.45	0.47	0.31	0.33
Completed Gr12	0.15	0.21	0.09	0.14
Certificate/Diploma (<Gr12)	0.27	0.12	0.11	0.07
Certificate/Diploma (=Gr12)	0.06	0.07	0.03	0.05
>= University Degree	0.02	0.02	0.00	0.02
Other	0.45	0.60	0.36	0.39
Total	0.55	0.49	0.43	0.37

Source: Income and Expenditure Surveys 1995 and 20010; author's own calculations.

Notes: Highlights indicate the change between two poverty estimates is statistical significant at the 95% interval.

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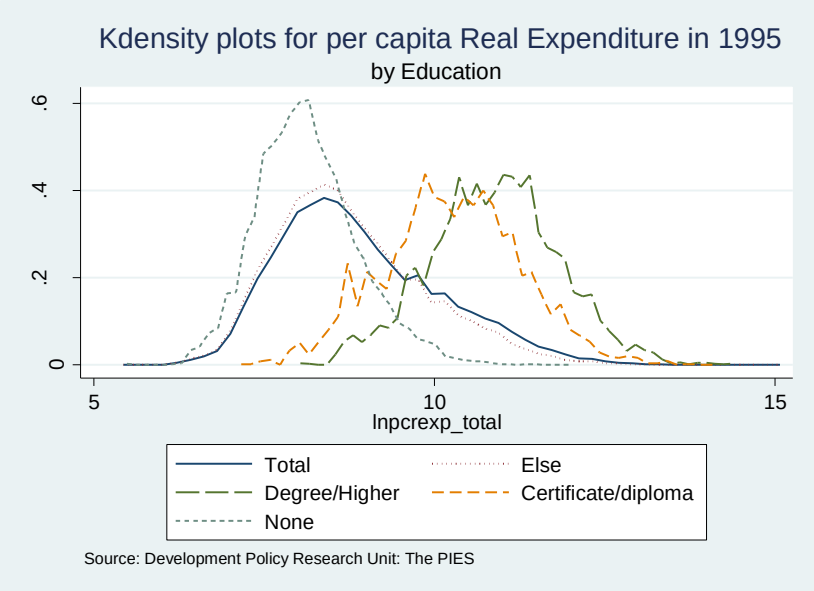
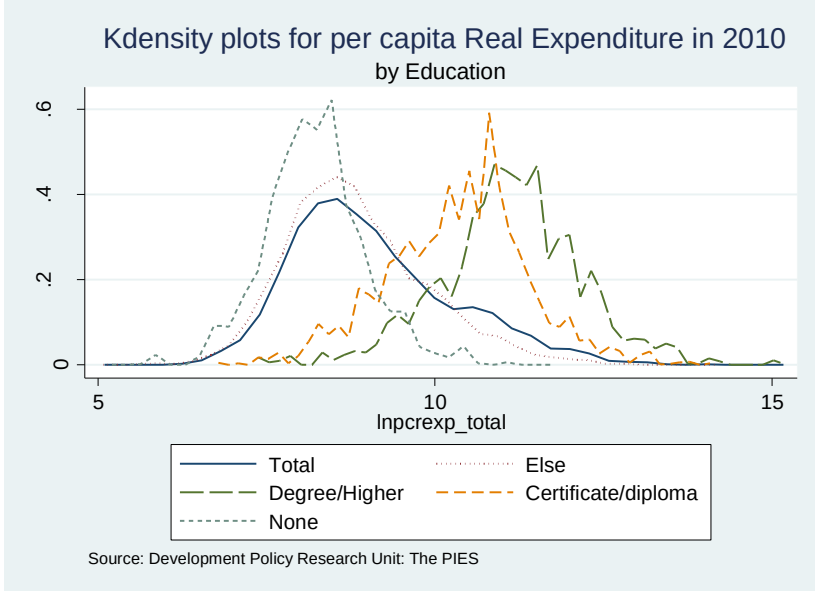
How does expenditure compare?

K-density plots for real per capita expenditure

1995



2010



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Exploring the interaction between Growth Gains and Higher Education

- The previous section confirmed that the most educated contributed to productivity and economic growth, but what does this mean for household welfare?

- We use a GIC to examine whether income or expenditure growth for the lowest part of the income distribution has changed relative to the mean growth rate.
  - The GIC measures the the rate of growth per capita expenditure between two points in time (between 1995 and 2010) at each percentile of the expenditure distribution.
  - The rate of pro-poor growth is thus the average growth in consumption over the population up to the headcount index referred to as the as ‘mean of growth rates’.
  - The GIC graph allows us to compare the incidence of growth in poorer segments of the population with the better off segments or with the rate of growth of mean income (or expenditure).

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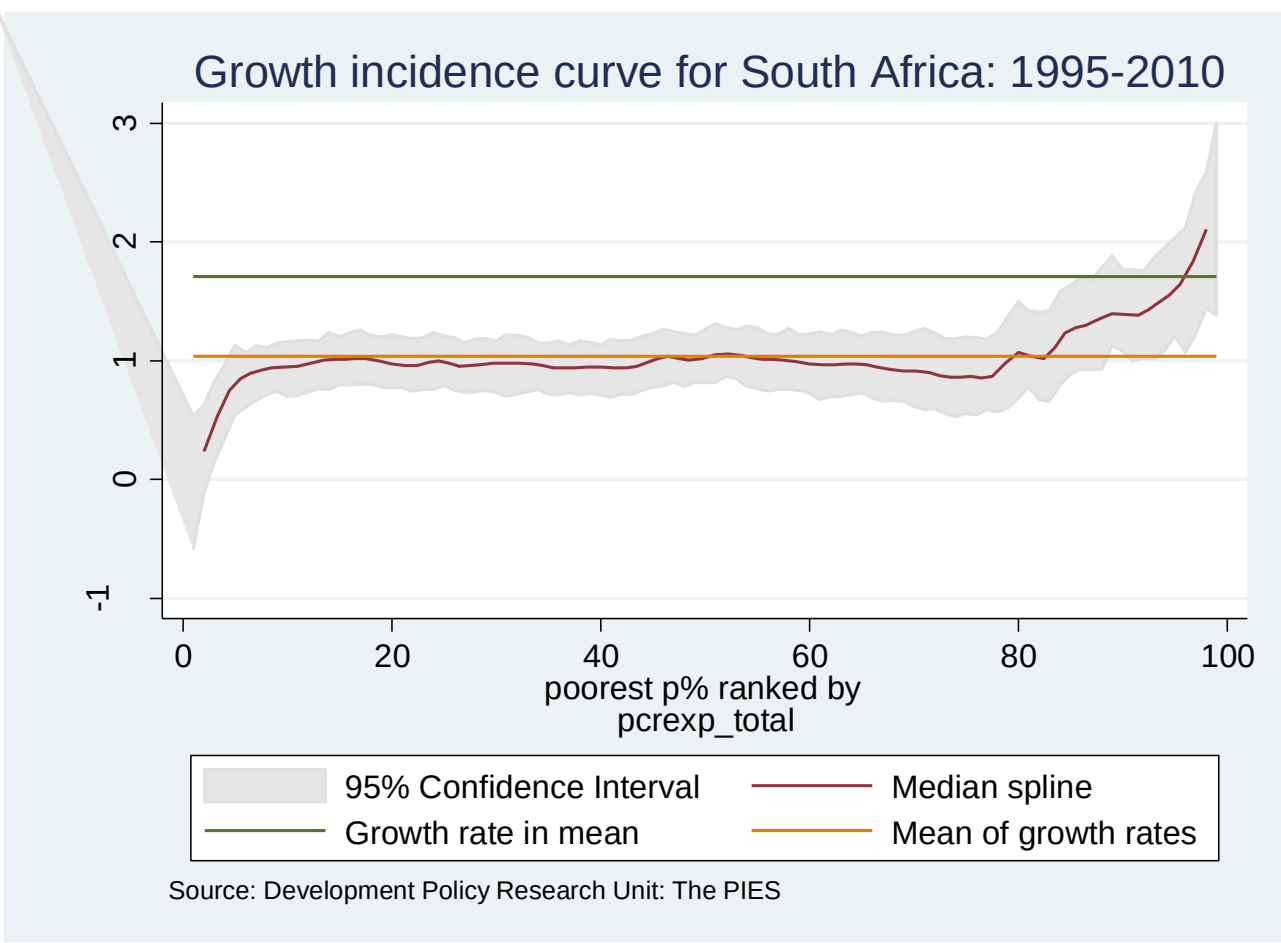
The Socio-Economic Outcomes of Economic Growth
Real Growth Incidence Curve for South Africa, 1995-2010



Source: Development Policy Research Unit: The PIES

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The Socio-Economic Outcomes of Economic Growth on Higher Education Cohorts

	National Expenditure (%)	Certificate holder Expenditure (%)	Degree holder Expenditure (%)
Growth rate in mean	1,71	0,9	2,53
Growth rate at median	1,04	1,18	1,57
Mean percentile growth rate	1,04	0,63	1,64
Corresponding percentile Rate of pro-poor growth			
10	0,67	-0,37	-0,38
15	0,78	-0,05	0,11
20	0,83	0,09	0,41
25	0,86	0,16	0,66
30	0,88	0,22	0,87

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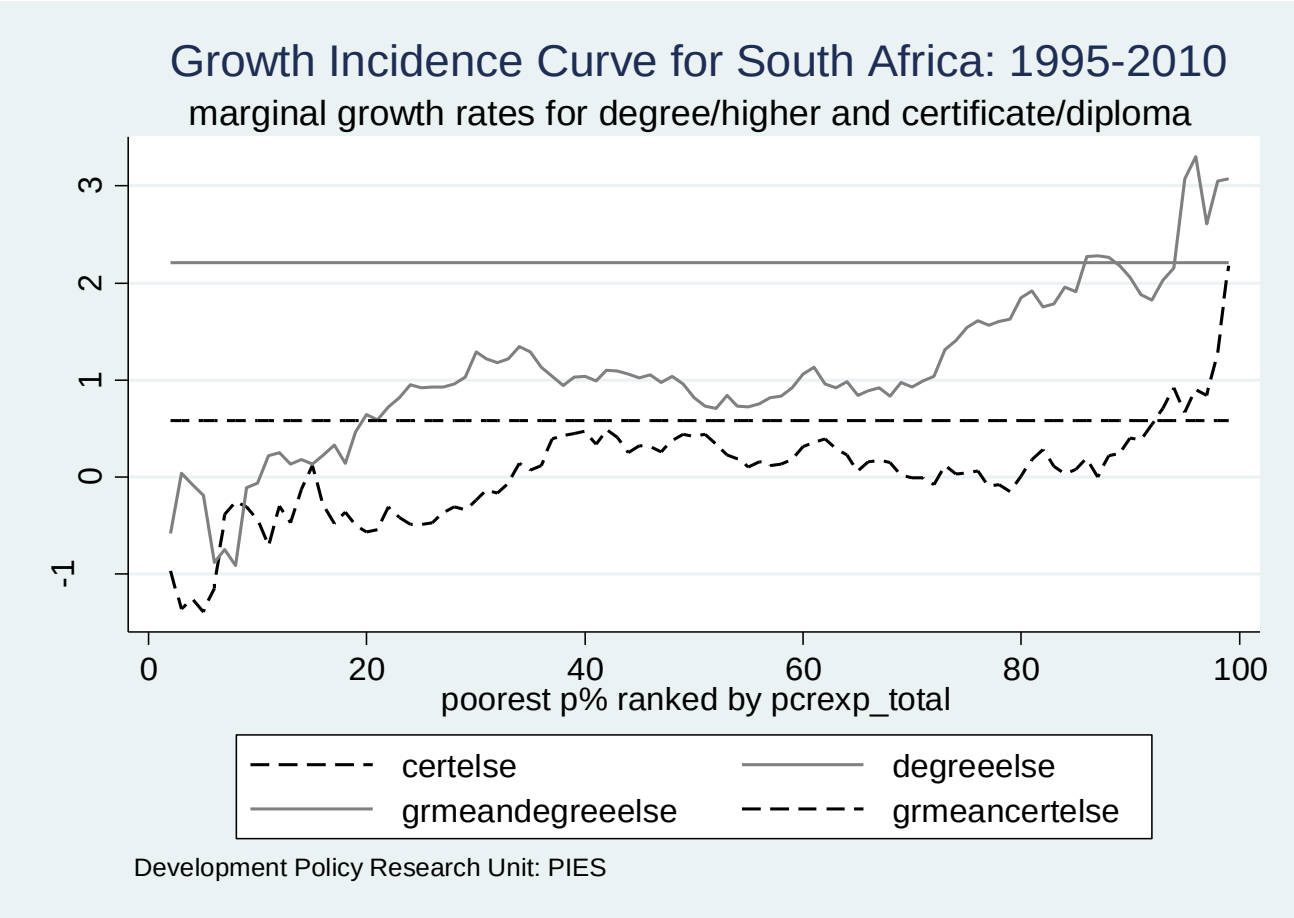
Growth Incidence Curve
Degree and Certificate relative to 'No Education'



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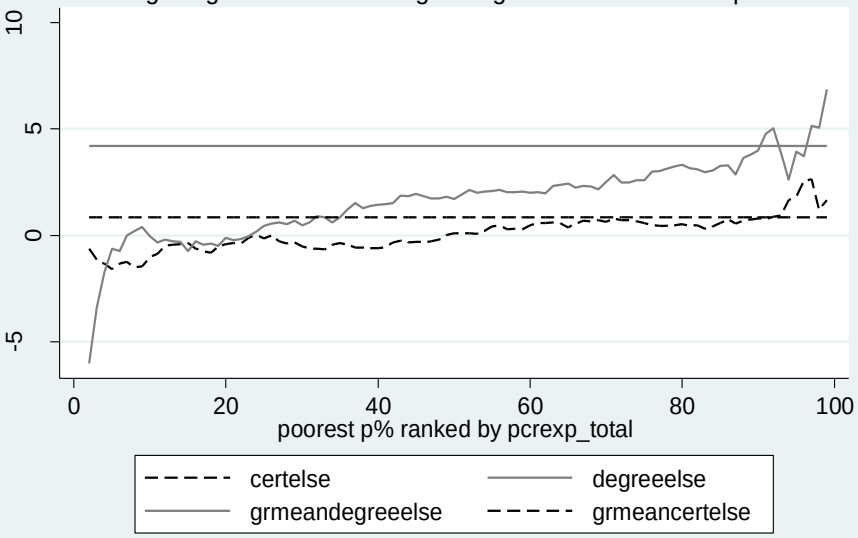
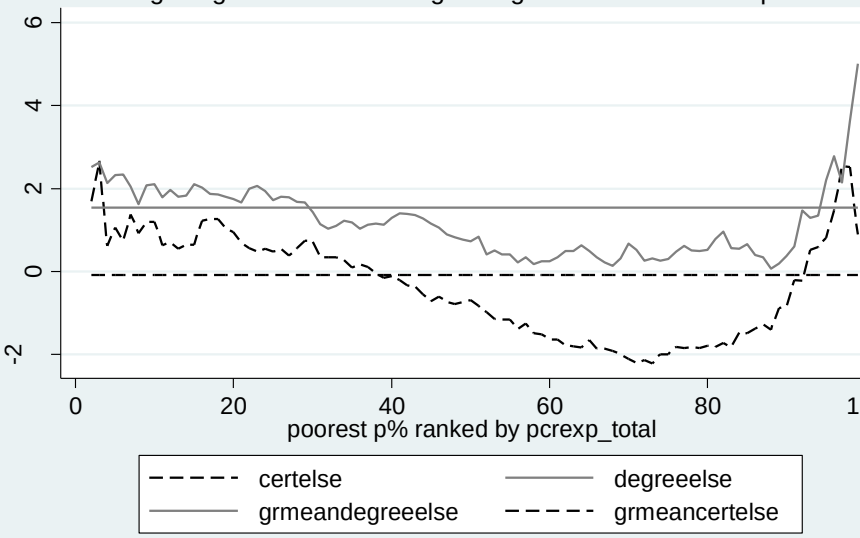
Growth Incidence Curve
Degree and Certificate relative to 'No Education' by Race





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What impact does higher education have on household welfare?

- Degree holders are better off than certificate holders in terms of poverty headcount, level of expenditure and relative growth in expenditure between 1995 and 2012.

- Certificate holders with a matric are better off (in terms of poverty headcount) than those without a matric certificate

- Generally, for those at the lowest end of the income distribution relative expenditure increases at a rate lower than the mean and or declines suggesting a limited pro-poor effect.

- Welfare outcomes for certificate and degree holders have a racial bias. Africans, with higher education, at the lower end of the income distribution experience lower relative growth in expenditure than Whites.

Key *Issues* for Policy-makers

- *The Growth Issue*
  - A very limited portion of the population is contributing to economic growth, in part, facilitating South Africa's low growth trap.
- *The Quality Issue*.
  - The quality of both the schooling as well as the FET college system is hampering labour market absorption of those qualified with less than a university degree.
  - Fiscal investment into FET institutions has not paid off given the the poor growth and welfare results found for certificate holders.
- *The Quantity Issue*.
  - The labour market has been unable to absorb the supply of vocational graduates available entering the labour force.
  - Can industrial policy be used to create low and medium skilled jobs that are suited to our labour force?
- *The Poverty Issue*
  - Income mobility of the poorest is still limited, even with higher education. This is probably given the limited networks that poorer South African households have.
  - How can we facilitate opportunities that are more broad reaching and not biased to certain classes of income?