

# Impact of education on inequality along the wage distribution profile in Cameroon: 2005-2010

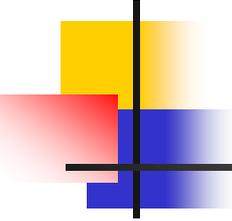
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Presented at the UNU-WIDER Conference on  
'Inequality – Measurement, Trends, Impacts, and  
Policies', Helsinki **5–6 September 2014**

by

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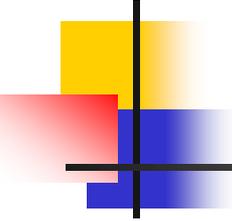
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# Plan

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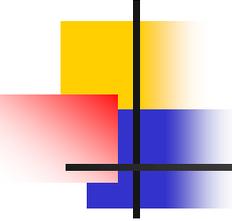
- Introduction
- Research questions
- Objectives/hypotheses
- Methodology
- Empirical Results
- Policy Implications



# Introduction

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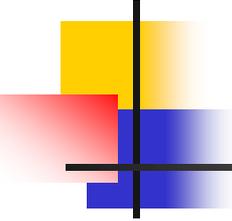
- Popular responses by citizens to lack of fairness has recently been at the root of regime change
- These voices typically call for more social inclusion and fair chances for everybody in society
  - as ingrained in the concepts of equity, fairness and social justice (UNDP 2011)



# Introduction ....

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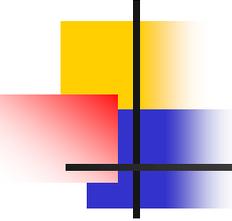
- Inequality typically stifles both macro and household economic growth, yet having both fair and unfair components
- Measured inequality is basically a function of two major components:
  - comprising *inequality of circumstances*, to which an individual may not be held responsible; and
  - *inequality of effort*, to which an individual can largely be held responsible
  - (Roemer 1998; Bourguignon et al. 2007; Baye and Epo 2013)



# Introduction ....

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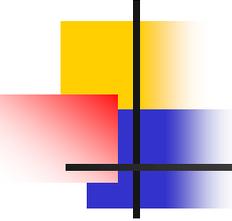
- Education is viewed essentially as an effort-related determinant of individual wages
  - it complements with or substitutes for exogenous circumstances that enhance or constrain individual labour market opportunities
- Education increases the skills and productivity of poor households, enhances their employability and earnings, as well as their welfare.



# Introduction ....

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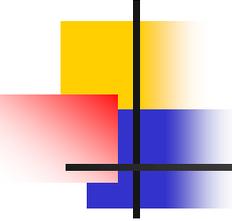
- Resolving deficiencies in access and returns to education is, therefore,
  - expected to be instrumental in augmenting the standard of living of the poor.
- Generally, educational expansion is expected to lead to an increase in the labour market participation opportunities opened to economic agents and
  - thus an essential catalyst for the fight against inequality and poverty.



# Introduction ....

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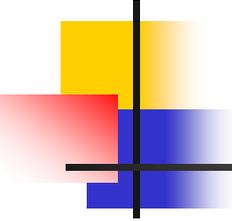
- Education is viewed as the single most important determinant of income.
  - Yet, exploring literature relating education to income inequality reveals mixed results.
- While, some find a positive relation between schooling and inequality (Chiswick 1971); Winegarden 1979),
- Others find a negative association between school enrolment and income inequality (Ahluwalia 1976; Sylwester 2005).



# Introduction ....

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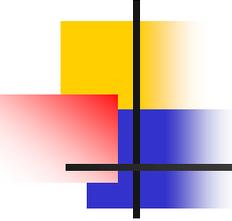
- However, from a state of unequal distribution of educational opportunities,
  - we believe that investments in education and related infrastructures would increase labour market opportunities
  - relatively more for those at the bottom than for those at the top of the income distribution profile.



# Research Questions

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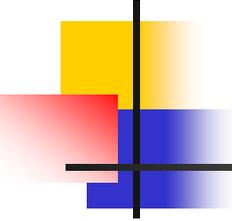
- In this context, a key question arises:
- Is smoothening education more inequality reducing at lower than upper tails of the income distribution profile?



# Objectives

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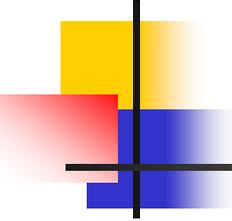
- The related objectives are:
- To evaluate the determinants of employment sector choices;
- To examine the nature of change in returns to formal education between 2005 and 2010 along the wage distribution; and
- To evaluate the impact of education on measured inequality along the wage distribution.



# Hypotheses

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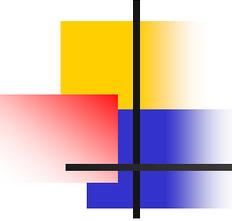
- *Other things being equal:*
- Education is relatively more important in sanctioning wages and allocation of workers to various employment sectors;
- Returns to education were inclusive in the Cameroon labour market between 2005 and 2010; and
- Smoothing education is more inequality reducing at lower than upper percentiles in the distribution of wages.



# Some literature

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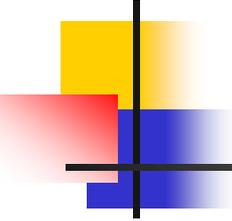
- The role of education in causing or mitigating wage inequalities has been explained theoretically using
  - the human capital theory (Mincer 1958, 1996; Schultz 1960; Becker 1964)
  - the dual labour market theory
  - discrimination theory, and
  - screening and signalling theory (Spencer 1973)



# Some literature ...

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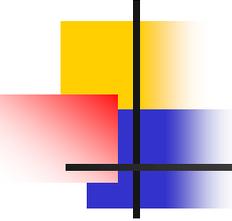
- The acquisition of human capital determines the productive characteristics of individuals and relate positively to productivity (Mincer 1958, 1996; Schultz 1960; Becker 1964).
- Differences in the degree of human capital accumulated by individuals is likely to differentiate their marginal productivities.
- And if workers are rewarded according to their marginal productivities, this generates wage inequalities



# Some literature ...

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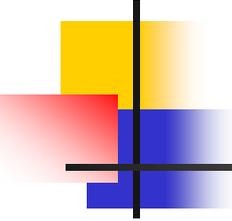
- the marginal productivity theory, therefore, constitutes a potential lens in explaining wage inequalities because
  - those at the bottom of the wage profile are perceived to have lower productivity due to their lower human capital attainment compared to those at the top.



# Some literature ...

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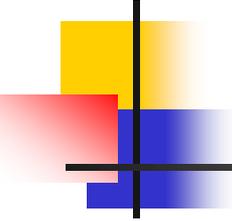
- Another lens to view inequalities in the distribution of wages is
- the dual labour market theory that divides the market into the primary labour market (formal sector), which is more organized and
- the secondary labour market (informal sector), which is rather spontaneous.
- Wages in the primary market are typically higher than those in the secondary market.



# Some literature ...

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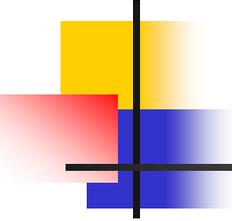
- Alternatively, screening and signalling are competing theories about the value of education
  - because they assume that formal education rather helps only in sorting out potential productive workers.



# Empirical contributions by:

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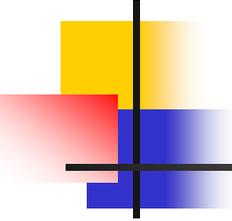
- Conducting analyses based on pooled individual records from the 2005 and 2010 Cameroon LFSs;
- Correcting for potential employment sector-selection bias in the structural wage equation;
- Running conditional quantile wage regressions; and
- Designing factual and counterfactual experiments to elicit the impact of education on inequality along the wage distribution.



# Methodology

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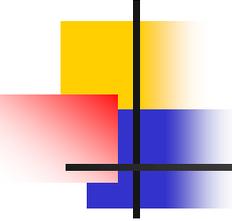
- To study the effects of education on wages, we exploit the 2005 and 2010 Cameroon labour force surveys by pooling them together.
- This enables the testing of how the effect of education on occupational choices and wages changed in the period 2005-2010.



# Methodology ....

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- By way of methodology, we followed:
  - a two-step econometrics estimation procedure and conducted factual and
  - counterfactual experiments for inequality impact assessment.

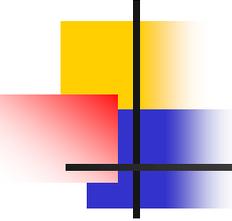


# Methodology ....

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- In terms of econometrics,
  - the first step regression involves the estimation of a multinomial probit model of employment sector choices (children below six years and other wage earners).
  - The employment sectors were public, private, informal and small-scale agriculture - the reference category.
  - After the multinomial probit model, we generated three inverse Mills ratios *a la* Heckman (1979).

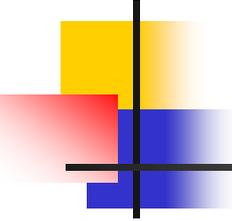




# Methodology ....

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- In the second step, structural wage equations correcting for employment sector-selectivity bias were estimated at the mean and across selected quantiles of the wage distribution.
- Using estimates of the selectivity-corrected wage equations, factual and counterfactual experiments were designed.



# Methodology ....

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- In particular,
  - counterfactual distributions were simulated in which wage inequalities within selected quantiles were independent of variations in years of schooling.
- Inequalities computed by
  - the Gini and the Generalized Entropy class of measures using the simulated factual and counterfactual distributions were compared to elicit the impact of education on inequality overall and along the wage distribution profile

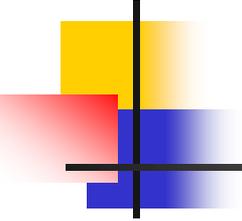
## Wage equations, Factual and Counterfactual Experiments

$$\ln W = \alpha_0 + \alpha_1 d2010 + \alpha_2 E + \alpha_3 d2010 * E + \sum_{k=4}^6 \alpha_k S_k + \sum_{k=7}^m \alpha_k C_k + \sum_{k=m+1}^{m'} \alpha_k \lambda_k + v \quad (5)$$

$$\ln \hat{W} = \hat{\alpha}_0 + \hat{\alpha}_1 d2010 + \hat{\alpha}_2 E + \hat{\alpha}_3 d2010 * E + \sum_{k=4}^6 \hat{\alpha}_k S_k + \sum_{k=7}^m \hat{\alpha}_k C_k + \sum_{k=m+1}^{m'} \hat{\alpha}_k \lambda_k \quad (8)$$

$$W = \exp(\hat{\alpha}_0 + \hat{\alpha}_1 d2010 + \hat{\alpha}_2 E + \hat{\alpha}_3 d2010 * E + \sum_{k=4}^6 \hat{\alpha}_k S_k + \sum_{k=7}^m \hat{\alpha}_k C_k + \sum_{k=m+1}^{m'} \hat{\alpha}_k \lambda_k + \hat{v}) \quad (9)$$

$$W_{\bar{E}_q} = \exp(\hat{\alpha}_0 + \hat{\alpha}_1 d2010 + \hat{\alpha}_2 \bar{E}_q + \hat{\alpha}_3 d2010 * \bar{E}_q + \sum_{k=4}^6 \hat{\alpha}_k S_k + \sum_{k=7}^m \hat{\alpha}_k C_k + \sum_{k=m+1}^{m'} \hat{\alpha}_k \lambda_k + \hat{v}) \quad (10)$$



## Impact of Education on Inequality

### I = Gini or Generalized Entropy Class

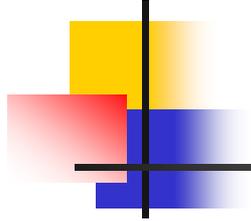
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$$\Theta_I = \frac{I(W) - I(W_{\bar{E}_q})}{I(W)} \quad (11)$$

If  $\Theta > 0$ , education is inequality augmenting in the factual distribution.

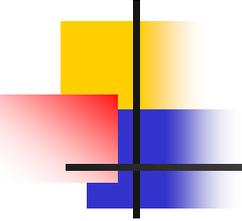
If  $\Theta = 0$ , education is inequality neutral in the factual distribution.

If  $\Theta < 0$ , education is inequality reducing in the factual distribution.

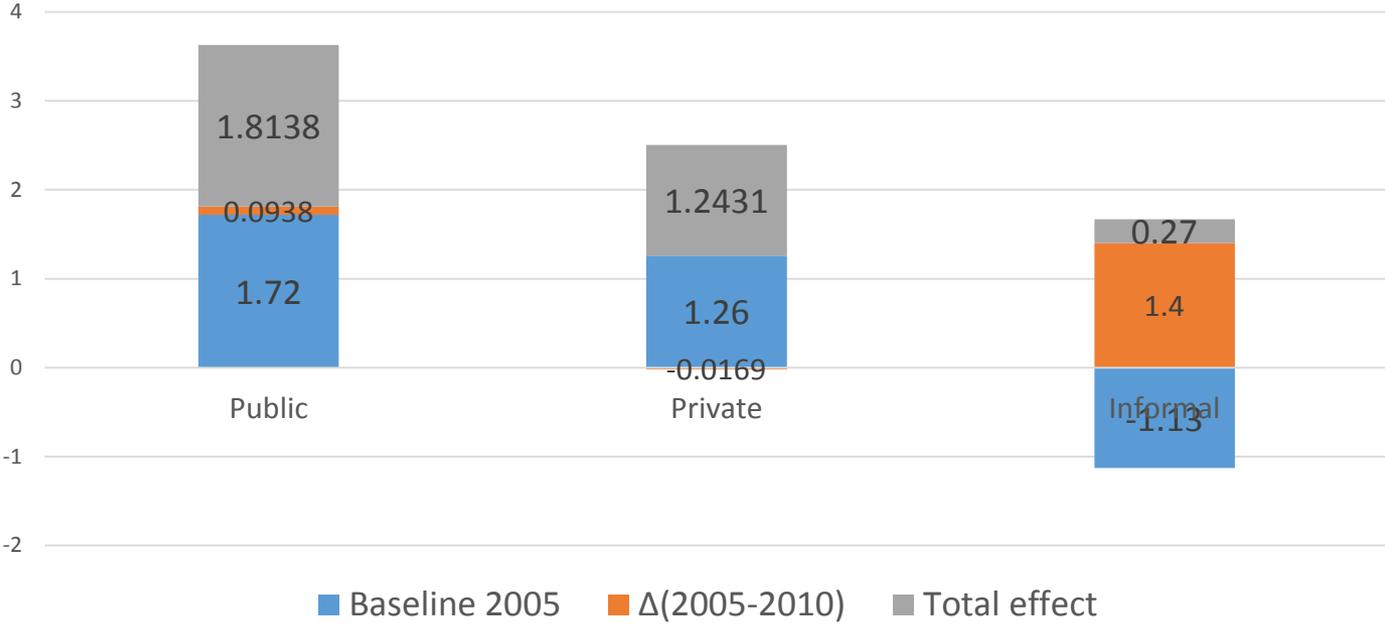


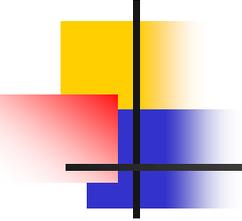
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# Empirical Result

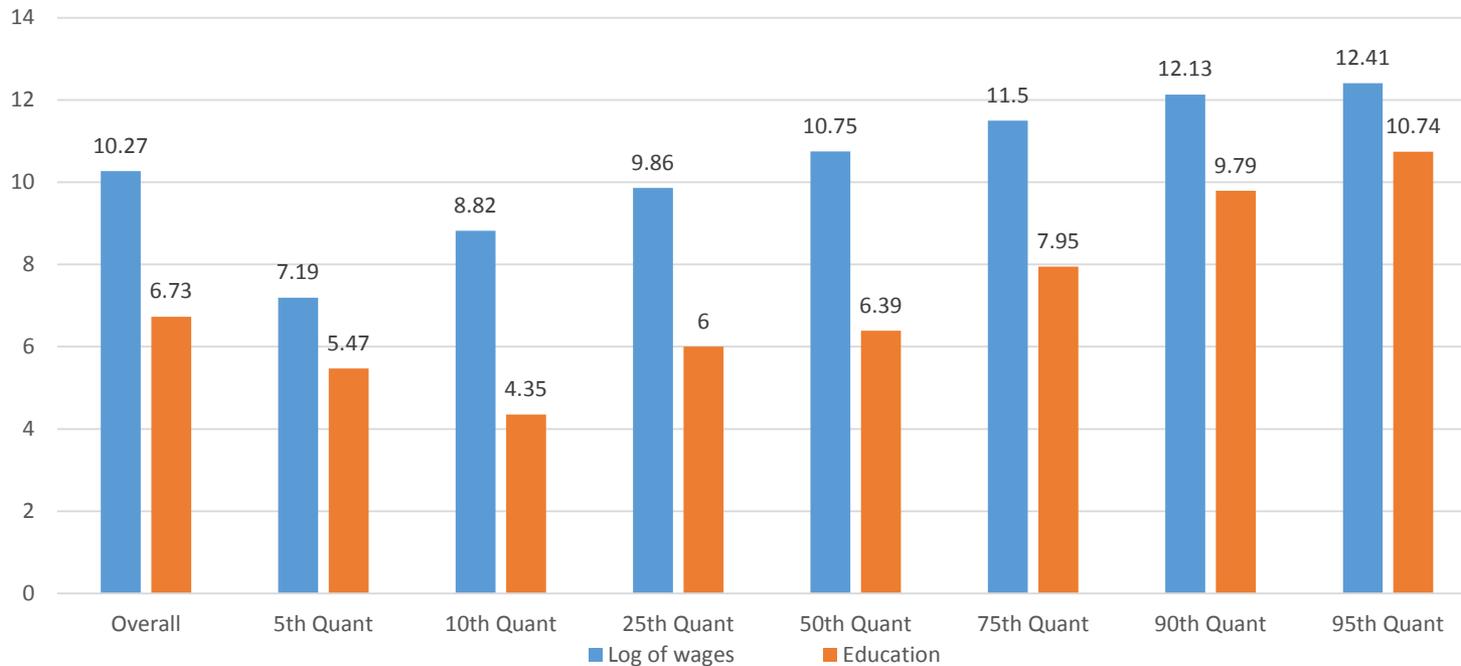


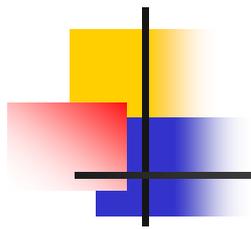
### Marginal effects of + year of schooling: Baseline, $\Delta(2005-2010)$ and Total effect



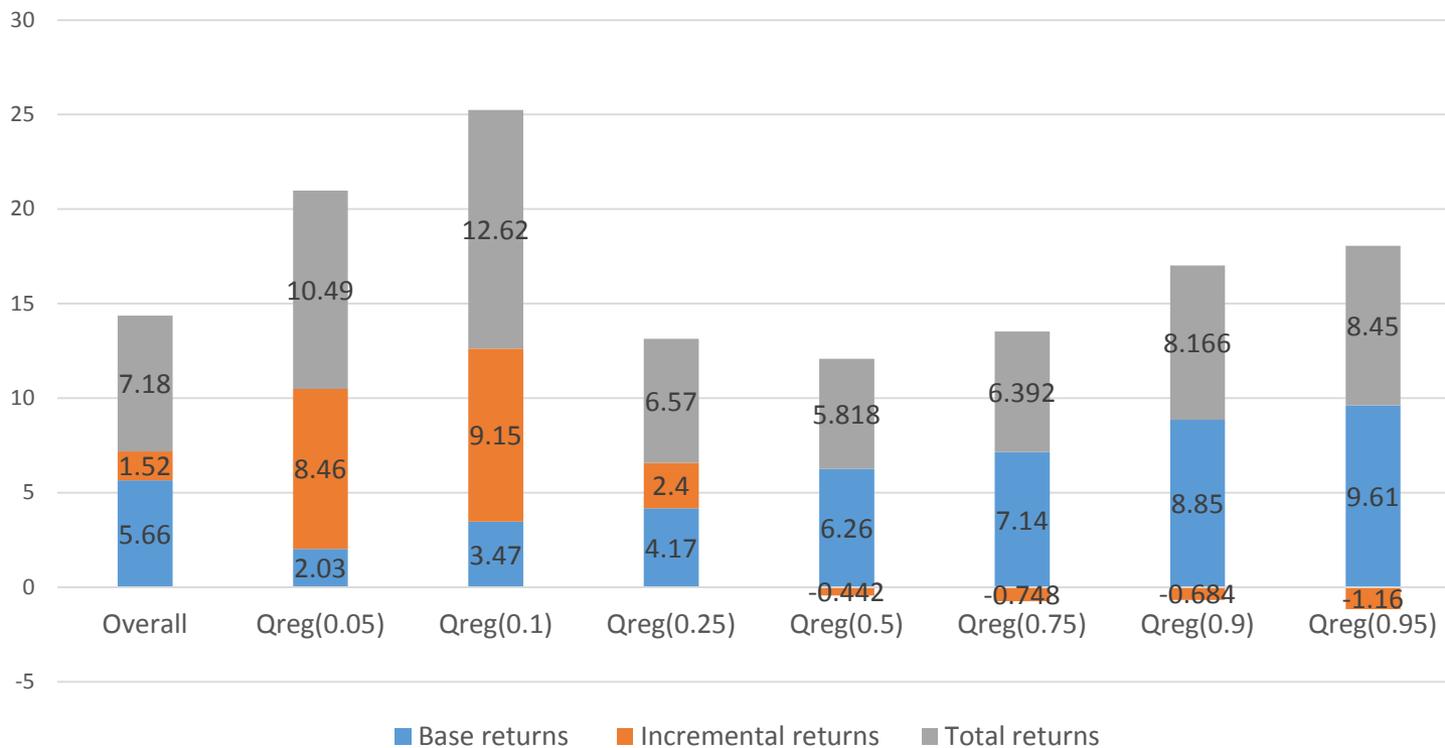


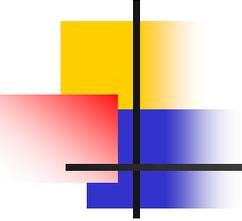
Distribution of log wage and years of schooling by selected percentiles: 2005-2010



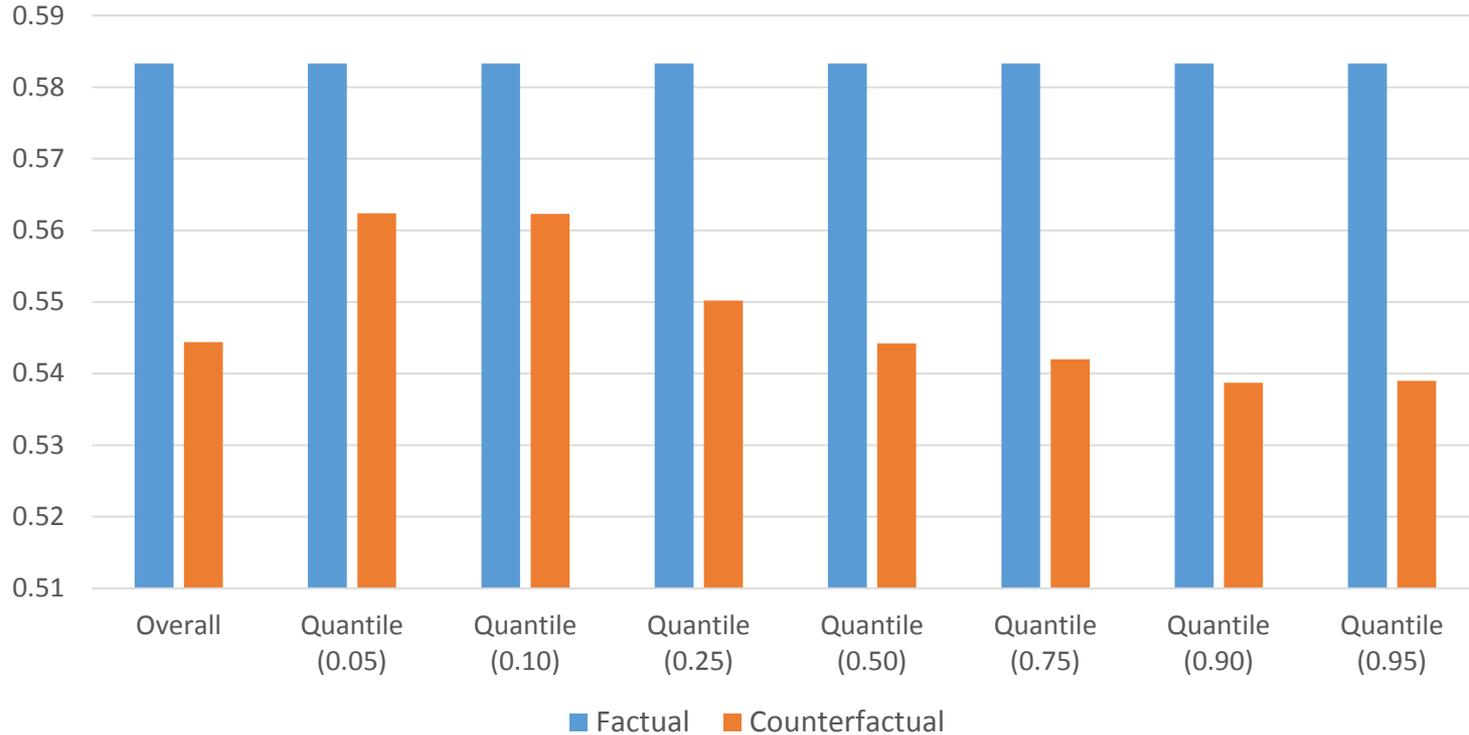


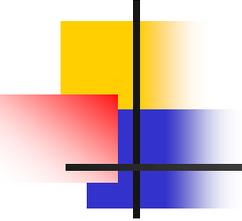
## Logwage Estimates: Baseline, incremental and total returns of education: 2005-2010



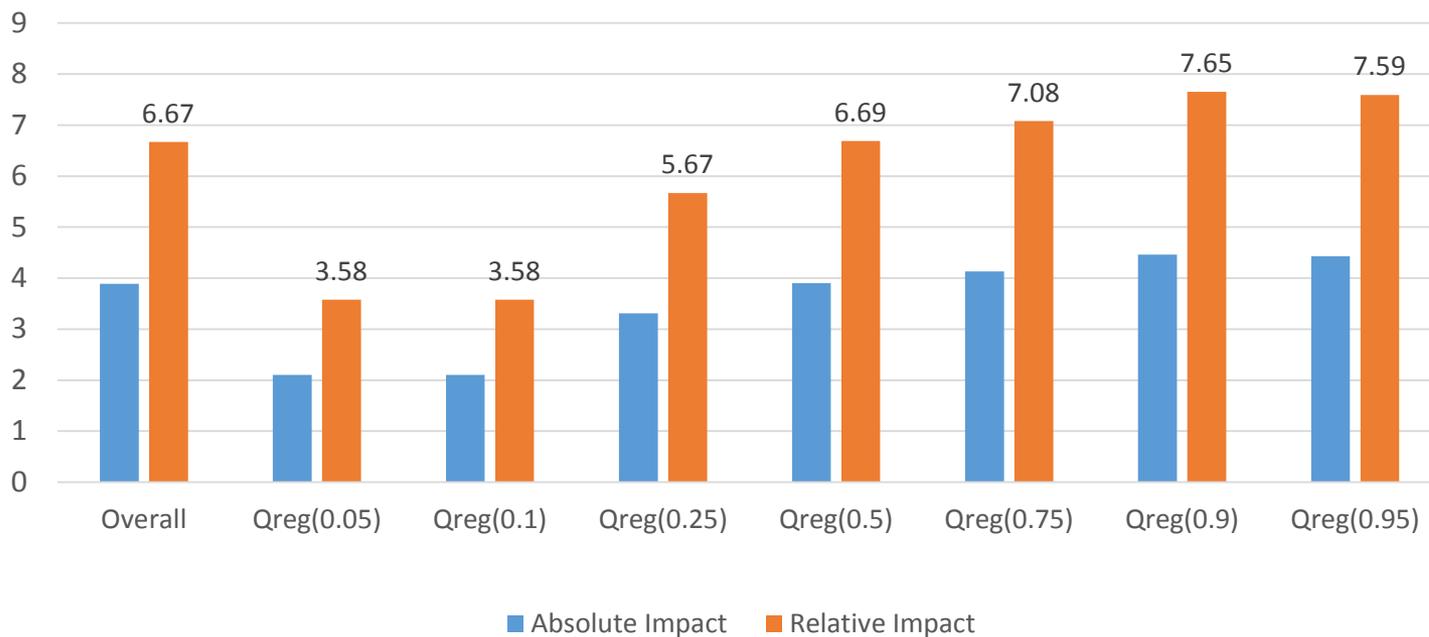


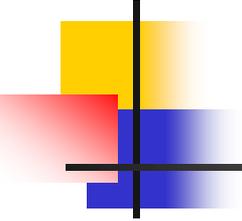
## Gini Inequalities from factual and counterfactual distributions



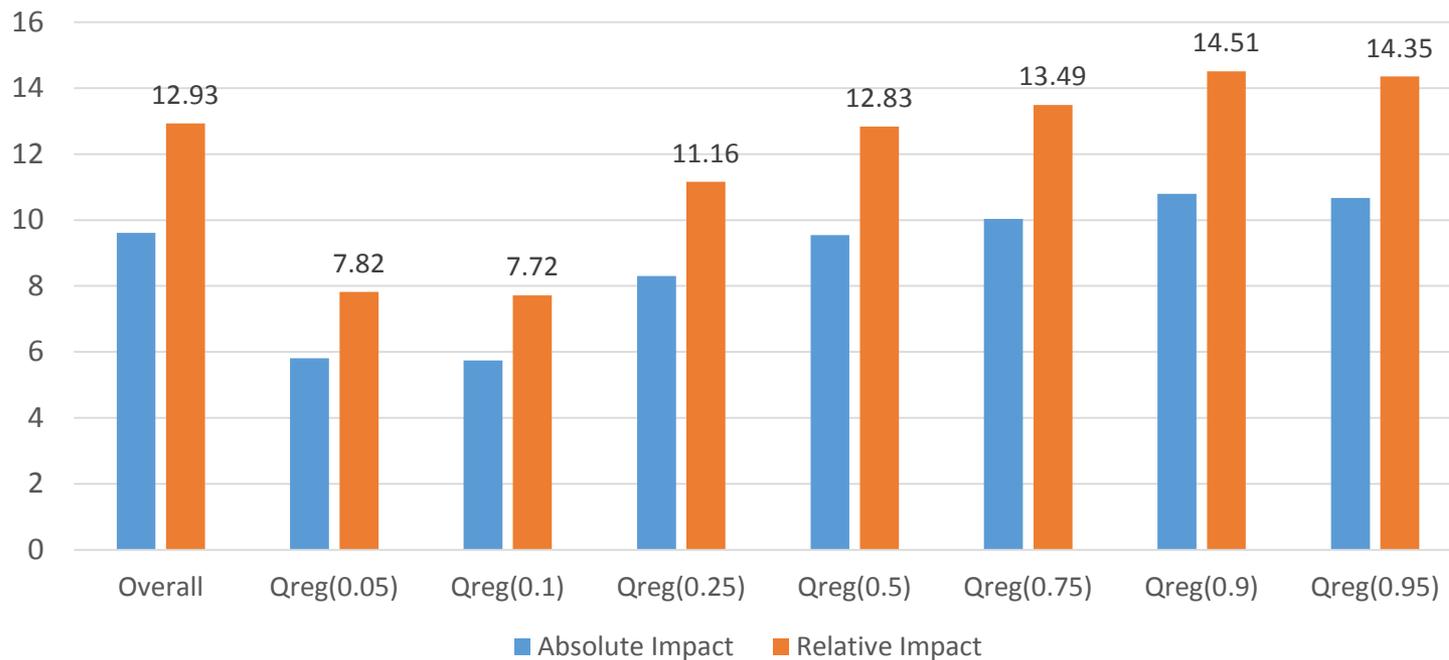


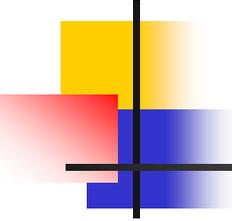
## Gini inequality: impacts of education on wage inequalities: 2005-2010





## Generalized entropy inequality: impacts of education on wage inequalities (for $\theta=0$ ): 2005-2010

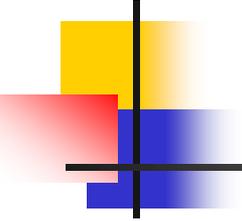




# Policy Implications

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- Levelling the playing field in terms of schooling opportunities would be an important public policy when trying to reduce inequality and poverty.
- In this context, a more balanced schooling profile would result in a more or less balanced distribution of labour market opportunities and earnings.
- Our findings endorse public policies that favour investments leading to educational expansion.



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Thanks for your  
attention