Main Objectives:
1. Estimates the impact of FPE on individuals’ completed years of schooling.
2. Examines the impact of this increase in years of schooling on the welfare of individual households.

Related Literature:
- Studies have examined the progress and challenges of free primary education reforms (Omer, 2009), and its effect on various factors such as school enrolment and quality of education (Deininger, 2003; Nishemura et al., 2008; Grogan, 2009; Lucas and Mbiti, 2012a; Cicioine, 2016a, 2016b; Snistvert et al., 2016;), fertility (Fot et al., 2016), HIV health outcomes (Behmor, 2015), and gender equality (Lucas and Mbiti, 2012b).

Contribution: However, the connection between increased school enrolment, and the welfare gains of the people is still an open question. Thus, the study contribute to literature by examining the degree to which FPE affects the welfare of individuals.

Data
The World Bank LSMS-ISA data for ETH is used. It is a three-wave nationally represented panel data collected in 2011/2012, 2013/2014, and 2015/2016. Study use three-wave panel data, with a total sample of 4,192 individuals from age 20 to 60 years. ESDPRP predicts education as playing a key role in poverty reduction through UPE, which led to inclusion of FPE in the ETH’s PRSP. Welfare is measured in terms of poverty as in Darko et al., (2018), including per adult equivalent consumption expenditure, relative deprivation in terms of per adult equivalent consumption expenditure, and poverty gap.

Empirical Strategy: I conduct DID estimation in a regression framework to predict the impact of the reform on education; and then, I used the first stage equation in a 2SLS estimation of the return to education. Two DID models are used: Restricted and unrestricted models. Restricted estimation categorizes strongly (age 4 and below to age 6 in 1994) and weakly (age 9 to 14 in 1994) affected cohorts separately into two different treatment dummies. Unrestricted uses individual-specific reform dummies (ages: 4 and below, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14). 𝑦 𝑖 is the vector of treatment dummy variables without imposing any groupings.

The structural model (OLS) estimating the direct linkage between welfare and education: 

Where 𝑦 is various measures of welfare of individual i in cohort j; 𝛽 are coefficients, 𝑋 is a vector of time invariant control variables of individual i in cohort j; 𝑆 is the years of schooling of individual i in cohort j; 𝜇 is the residual. 

Restricted: I estimate the first stage equation by imposing a group restriction on the reform dummies: 

Empirical Strategy Cont’d:
Where Tik is a “treatment dummy” indicating whether an individual belongs to the strongly affected cohort (age 4 and below to 6 in 1994); Tik “treatment dummy” indicates whether the individual belongs to the weakly affected cohort (age 9 to 14 in 1994); Xik, and Xik account for long term trends in the determinants of years of schooling. age, is the age of individual households between the ages of 20 to 60. age is the squared of age, that explains the non-linear component of the trend; 𝛽 is the residual of individual i in cohort j; Tik, Tik, 𝛽, 𝛽, 𝜇, 𝜇 are coefficients. The comparison (control) group for this estimation is the unaffected cohorts (age above 14 in 1994). The assumption for the first stage equation is 𝑇𝑖𝑘 ≠ 0 if 𝑇𝑖𝑘 ≠ 0.

The 2SLS restricted estimation of return to education is expressed: 

Where ŷ is the predicted years of schooling from equation (2); ŷ is the residual; 𝜇, 𝜇, 𝜇 are coefficients.

Unrestricted: The first stage equation is specified as the relationship between years of schooling of an individual i born in year k, and their respective degree of exposure to the reform: 

Where Tik is the set of treatment dummy variables indicating whether individual i is of age 𝑘 in 1994, 𝑘 = 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14; 𝑦 is the coefficient of treatment dummy which estimates the impact of the reform on a given cohort. The same restricted group as the restricted estimation is used (unaffected cohorts, age above 14 in 1994). For the 2SLS, the model specification is the same as the restricted except for the different predicted years in schooling.

Conclusion
- Reform increased primary school enrolment, which in turn improved the welfare of households.
- Positive effect of education on strongly exposed cohorts aged 8 and younger in 1994, means the reform affects younger individuals in pre-school (or possibly infants)
- Results on the weakly exposed cohorts aged 9 to 14 could also mean such individuals are either not affected or weakly affected by the reform.
- Suggests cohorts in the 2nd cycle or late stages of primary school at the time of the reform maybe comparable to unaffected cohorts above age 14 in 1994
- Result of the weakly affected is also likely to be caused by the severe famine that occurred in Ethiopia in 1983-1985 and possibly other confounding factors. Revised version of my model controls for all these factors.
- Results of education on the poverty measures indicates the welfare of individuals affected by the reform improved - that FPE led to welfare gains for people of ETH.

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