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Quality of Higher Education and the Labor Market in Developing Countries: Evidence from an Education Reform in Senegal

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Summary. — While many studies examine the effect of primary education quality on labor market outcomes in developing countries, little is known about the effects at higher levels. We exploit the quasi-experiment provided by a large-scale education reform launched in Senegal in 2000 to investigate how quality improvements at the university level affect employment. Our difference-in-difference estimates suggest that young high-skilled workers experienced a nine percentage-point employment gain relative to older workers. They are also more likely to have "better" jobs (in the service industry or government), suggesting a reduction in the mismatch between the quality of high-skilled labor demanded and supplied.

Key words — higher education, employment, impact analysis, quality mismatch

1. INTRODUCTION

Education is widely considered a key issue in the economic and social development of a country (e.g., Barro & Lee, 1994, 2013). Given the high rates of illiteracy in developing countries, most policies focus on improving access to education and most evaluation studies of the education sector in developing countries focus on access, particularly to primary education (e.g., Duflo, 2001, 2004). However, school quality is slowly emerging as an important issue in developing countries. Recent evidence suggests that quality of education is strongly associated with income and economic growth (see, for example Bloom, Canning, Chan, & Luca, 2006; Hanushek, 2013; Hanushek & Woessmann, 2008; Kaarsen, 2014; Manuelli & Seshadri, 2014; Mingat, 1998; Schoellman, 2012), as well as with higher individual returns to education (e.g., Bedi & Edwards, 2002; Behrman & Birdsall, 1983; Moll, 1992; Zhong, 2011). Moreover, there seems to be a direct link between school quality and attainment. For instance, Hanushek, Lavy, and Hitomi (2008) find that Egyptian children were more likely to drop out of primary schools of lower quality, while Harbison and Hanushek (1992) find that improved school quality reduces the repetition rate among Brazilian primary school students. Finally, Behrman, Ross, and Sabot (2008) find that the return from investing in quantity (access) might be smaller than the return from investing in quality with respect to schooling in rural Pakistan.

Not surprisingly, the research on quality of education in developing countries focuses exclusively on primary and secondary schools, and on the effects on achievement and labor market outcomes (e.g., Bacolod & Justin, 2006; Behrman *et al.*, 2008; Glewwe, 1999; Handa & Simler, 2006; Hanushek, 2009; Hanushek *et al.*, 2008; Harbison & Hanushek, 1992). Economic development, however, seems to depend not only on the average level but also on the distribution of human capital or cognitive skills, particularly at the upper tail (Castelló & Doménech, 2002; Hanushek & Woessmann, 2008). Individual returns to education are also highest at the tertiary education level (Barro & Lee, 2013). Still, higher education and its quality are largely overlooked when it comes to developing countries, both in economic research and in policy design (Kimenyi, 2011).

The purpose of this paper is to estimate the effects of improvements in the quality of higher education on the labor market outcomes of highly educated individuals. In particular, we focus on the short-term effects of an education reform in Senegal in the early 2000s, the Development Program for Education and Training (*Programme de développement de l'éducation et de la formation*, *PDEF*). We study the short-term effects of this reform because its objective in the short-run was an increase in the quality but not in the quantity of education at the university level. Because of data limitations, we can only analyze effects on employment and not on other labor market outcomes such as wages or job quality. This is still an interesting outcome since previous studies found that, unlike in developed countries, a higher level degree in a developing country does not necessarily lead to better employment prospects (e.g., Guarcello *et al.*, 2008; Hanushek, Woessmann, & Zhang, 2011; Pauw, Oosthuizen, & van der Westhuizen, 2008; Pritchett, 2001). In particular, unemployment is often highest among young university graduates in sub-Saharan Africa (Calvès & Schoumaker, 2004; Guarcello *et al.*, 2008; Fan & Stark, 2007). If the higher unemployment rate of highly educated workers is due to a mismatch between the quality of labor demanded and supplied in the high-skilled labor market (Ordine & Rose, 2011; Pauw *et al.*, 2008), then improvements in the quality of higher education can lead to higher employment rates. [1]

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Table 1. *Unemployment rate in Dakar, by education (2002)*

	No education	Primary	High school	University
Head of household	0.061	0.068	0.071	0.027
Dependent	0.097	0.133	0.179	0.238

Source: Agence Nationale de la Statistique et de la Démographie (2004).

Senegal is an appropriate setting for this exercise because its labor market exhibits this pattern of high unemployment rates for highly educated individuals. Table 1 shows the relationship in 2002 between the unemployment rate and education for individuals living in Dakar, Senegal's largest city. Although household heads with university training have the lowest unemployment rate, the situation is exactly the opposite for dependents. In the short term, the individuals most likely to benefit from the reform are the highly educated young, who (as we show later) are also almost exclusively dependents, suggesting that unemployment is a severe problem among those most likely affected by the reform.

We use data from two surveys of the Senegalese population, one conducted right before the implementation of the reform (in 2001) and one five years later (in 2006), to estimate a difference-in-difference model. Because we cannot precisely identify in our data the individuals who benefit from the reform, we restrict our sample to individuals 20–39 years old and we use age to proxy for exposure to the reform. This leads to a trade-off between the size of the treated group and the contamination of both the treated and the control group: a wider age interval includes in the treated group a larger fraction of the individuals educated (at least partially) after the start of the reform, but also a larger number of individuals who completed their education before the first year of the reform. Taking this contamination into account, our results are generally robust to the definition of treatment. Our preferred definition is the 20–26 year-olds, a group that seems to offer the most balanced combination of size and contamination.

Our estimates suggest that the reform had strong positive short-term effects on the employment rate of all groups of young highly educated workers. For our preferred definition of reform exposure, 20–26 year-olds, we find an increase of about nine percentage points in their employment rate as compared to older highly educated workers. This represents a 16% increase from their employment rate in 2000. In order to gauge the magnitude of our results, we compare them to existing estimates of returns to college quality. There is a vast literature on the returns to quality of higher education in developed countries such as the United States (see Zhang, 2005, for a review). Almost all of this literature deals with effects on earnings due to the high level of employment among college graduates.[2] The literature on the returns to quality of education in less developed countries is usually concerned with pre-university education (e.g., Behrman *et al.*, 2008; Hanushek *et al.*, 2008; Harbison & Hanushek, 1992; Malamud & Pop-Eleches, 2010). The closest study to ours is Saavedra (2009), who uses a regression discontinuity design to estimate that attending a better-quality university in Colombia increases employment post-graduation by 16%. This estimate represents an intention-to-treat effect comparable in magnitude to our estimates.

We verify the robustness of our results to several specification checks. One particular issue is that this improvement in the labor market outcomes of young workers could be due to a skill-biased economic expansion over the study period. If this was the case, we would expect to find a negative relationship between age and the employment rate of high-skilled workers, and an increase in the labor force participation and in the dropout rate (entry into the labor market) of young high-skilled workers. However, we find no evidence of a decline in the employment rate of 37–49 year-old high-skilled workers as compared to younger workers. We also find evidence of a reduction in the labor force participation of young high-skilled workers, as well as an increase in university enrollment. We conduct several additional checks, such as a triple-difference model that adds 20–39 year-old high-school-educated individuals as an additional control group. The estimates from this model confirm that our estimates are not driven by age effects. We also estimate a placebo specification among individuals with only high-school education, which produces small and insignificant results indicating that our baseline findings are not due to general shifts in labor demand. Taken together, these results suggest that there is indeed an increase in the employment rate of young highly educated workers after the education reform that is not due to a skill-biased economic expansion.

Several studies of the labor market in developing countries (e.g., Calvès & Schoumaker, 2004; Fan & Stark, 2007; Guarcello *et al.*, 2008) posit that the high rate of unemployment among young highly trained individuals is due to a "waiting queue" for jobs in the formal sector. According to this scenario, a rise in the employment rate of high-skilled workers is due to an expansion of the formal sector. However, our robustness tests do not suggest that this is the case. In addition, in the last part of the paper we investigate the sources of the employment growth found. Because of data limitations, we can only examine the choice of industry and of employer by young high-skilled workers. We find an increase in the fraction of individuals employed in services to the detriment of manufacturing (and of other industries), as well as a large decrease in self-employment accompanied by an increase in government jobs. These suggest that high-skilled individuals are better able to find jobs that pay better than the outside option (self-employment) after the reform, and that they mostly work in the service sector and for the government. These results provide suggestive evidence in favor of our hypothesis that the mechanism explaining the observed employment growth is the reduction in the quality gap between labor supplied and demanded due to the reform.

Our study has several limitations. First, we only examine the short-term effects of the reform. However, proof of immediate results is essential for the continued implementation of a reform in volatile political environments such as in much of the developing world. Second, we cannot determine the effect of the reform on the quality of employment or on wages because of data limitations. We do not believe that this is a major concern since none of our robustness tests suggests the presence of some factor that pushes younger high-skilled workers to accept lower quality jobs after the reform. Moreover, we interpret the reduction in self-employment and the rise in government jobs as suggestive evidence that individuals are able to find better paying and presumably better quality jobs after implementation of the reform. Third, we cannot distinguish between full or partial exposure to the reform. However, this implies that our estimates are likely a lower bound for the true effects of the reform. Fourth, data limitations prevent us from identifying the mechanism through which the reform leads to improved labor market prospects. Finally, similar to many other studies using data from Sub-Saharan Africa, we have a relatively small sample, mostly due to the size of the high-skilled workforce in the Senegalese economy. While this is likely to generate imprecision in our estimates, the effects are robust to several specification checks and generally statistically significant.