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A simple model of globalization, schooling and skill acquisition ☆

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ABSTRACT

We develop a model of schooling and skill acquisition, highlighting informational asymmetries that distort the incentives to educate. A key feature of our model is that education acts simultaneously as a signaling device and as a method for workers to enhance their productivity. We show that when firms can only imperfectly screen workers, the result is an economy in which too many workers purchase schooling and too few workers devote sufficient effort to their coursework to qualify for the high skill labor pool. We then examine how greater openness to international markets alters the skill mix of the domestic workforce and show that greater openness usually eases one labor market distortion while making the other distortion worse. Globalization impacts educational behavior and labor market outcomes differently as the extent of firms engaged in international markets varies, and affects wage inequality both within and across educational groups.

1. Introduction

It is often argued that the key to individual success in a globalized economy lies in higher education. From a national perspective, a highly educated workforce is seen as an essential component needed to maintain international competitiveness and foster economic growth. Yet, the educational process is complex, requiring a variety of individual choices, and the manner in which globalization affects those choices is not well understood. In this paper we develop a simple model of schooling and skill acquisition, highlighting informational asymmetries that distort the incentives to educate. We then examine how greater openness to international markets alters the skill mix of the domestic workforce, given that worker schooling and skill acquisition decisions are not perfectly observed by firms.

The notion that educational choices might be distorted is not new. Forty years ago Ivar Berg (1970) and Richard Freeman (1975, 1976) argued that 'too many' Americans seek a college education. More recently, Charles Murray (2009) continued to push this idea, arguing that the marginal student in college today would be much better off going to a trade school.[1] Consistent with these views, Carneiro et al. (2011) provide evidence that the marginal return to college is often well below the average return. They show that policies expanding college enrollment induce "students who should not attend college to

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[1] For anyone who has taught at a large state university and dealt with students who rarely come to class and seem to devote almost no effort to the educational process, this sentiment probably rings true.

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attend it. Too many people go to college." On the other hand, we often hear that firms are complaining that they need more high-skilled workers to fill available positions. Popular reports from the 2012 *Talent Shortage Survey Research Results,* ManpowerGroup and the McKinsey Global Institute cite concerns of employers across the globe that difficulties in filling positions are due to a lack of available talent among the labor force, and further contend that "[i]n advanced economies, demand for high-skilled labor is now growing faster than supply…," so the shortage of high skill workers may actually be growing. In line with this perspective, Autor et al. (2003); Goos et al. (2009) and Acemoglu and Autor (2011) document that the demand for occupations with high cognitive and skill requirements has risen substantially in US and Europe over the last several decades, due to technological changes in production methods and increased foreign sourcing of routine tasks that require low/moderate skill levels.

These features of worker schooling behavior are seemingly at odds with one another. How can it be that there are simultaneously 'too many' workers earning advanced degrees in school, yet there are 'too few' high-skill workers available for hire? We argue that such a market condition can arise if the efforts that workers put forth during school, and hence the benefits of their high skills to productivity, are not perfectly observed when firms screen applicants. If high skill workers cannot perfectly distinguish themselves from low skill workers that obtained schooling solely as a signaling device, then the problem of adverse selection arises in the labor market. Firms compensate for the lack of information about skills by offering wages that reflect the average productivity of the educated workers, rather than their marginal productivity. As a result, too many low aptitude workers choose schooling because the expected returns to education are higher than their individual productivity. Likewise, too few high aptitude workers put forth effort in school to enhance their productivity because the returns to education do not fully compensate them for being high skilled if there is imperfect screening. A key feature of our analysis is to model skill acquisition as both a signaling device and a mode for workers to enhance their productivity, which allows us to rationalize the opposing views of the labor force as having both too many workers obtaining advanced degrees, and too few high skill workers.[2,3]

Globalization has long been recognized as a mechanism that shifts the relative demand for skilled workers, and thus the expected returns from education and skill acquisition. Hickman and Olney (2011) provide direct evidence that the offshoring of local production, and international migration into local labor markets, both induce U.S. workers to enroll in post-secondary education institutions. Consistent with our analysis here, Atkin (2012) provides empirical evidence that export activities are not always biased toward high skill workers, and thus global integration may actually reduce educational attainment. Specifically, he shows that young Mexican workers respond to increased export opportunities for low-skill occupations by reducing their enrollment in school, whereas greater export opportunities for high-skill occupations increase the acquisition of schooling among Mexican workers. It is clear that the expansion of the global economy influences the schooling and skill acquisition of native workers. However, it is unclear if changes in the educational behavior of workers following episodes of globalization mitigate, or exacerbate, the distortions present when firms screen worker skills imperfectly. Our goal here is to examine the impact of increased trading opportunities on (i) the decisions of workers to go to school, and (ii) the decisions of workers to obtain high levels of skill, when workers have more information about their skills than firms.

To analyze the impact of globalization on the mix of worker skills, we build a two-sector model with perfectly competitive markets. Workers differ in aptitude and can choose to go to school to become a low-skill worker, and subsequently choose whether to put forth effort to become a more productive high-skill worker. Both schooling and effort are costly, and the costs are each declining in the innate aptitude of workers. The schooling decisions of workers are observed through the earning of a degree, however the efforts of workers toward improving their productivity are not observable. Firms can screen for high skill workers, but the screening technology is imperfect. In one sector of the economy, output is produced by identical firms using unskilled labor, while the other good requires skilled labor, and can be produced using two different technologies: the *basic* technology utilizes low-skilled labor but the *modern* technology requires high-skilled workers. Firms that adopt the basic technology hire less productive workers but also pay lower wages so that firms of both types of firms can co-exist in equilibrium. We show that when there are heterogeneous firms, differing in the skill intensity of their production techniques, the autarky and open economy equilibria are unique – even when worker skills are not perfectly observed.

The ability to flexibly choose the skill intensity of their production techniques offers firms an additional margin, besides adjusting wages, on which they can respond to information asymmetries, thereby eroding the potential for multiple equilibria. In previous analyses of imperfect labor markets, where workers use education to both signal skills and enhance productivity, multiplicity of equilibria has generally made it difficult to characterize equilibrium outcomes, at least without

[2] Fang (2006) uses a structural model to quantify the relative importance of signaling motives and productivity enhancement in explaining the college wage premium in the US and finds that *both* motives contribute substantially to educational incentives. Similarly, Lange (2007) estimates the speed of employer learning about worker attributes and finds both signaling and productivity enhancement are persistent motives that influence educational behavior.

[3] Our approach here is different from the empirical literature on over-education, as indicated by the qualifications of *individual* workers that exceed specific job requirements. As an example, as of 2010, the BLS reported that over 17 million Americans with college degrees are employed in positions that require a lower level of skills than those associated with a college degree. More details can be found in Matgouranis (2010) who reports that: 29.8% of flight attendants, 24.5% of retail salespersons, 21.6% of customer service representatives, 15.2% of taxi drivers, and 13.9% of mail carriers hold college degrees. For a recent review of the literature on mismatches between worker skills and job tasks see Leuven and Oosterbeek (2011). Our analysis of educational behavior when there are informational asymmetries across the entire market is distinct from, but complementary to, the studies of mismatch and coordination problems for individual workers.