The labor market effects of skill-biased technological change in Malaysia ☆

Mohamed A. Marouani [a,*], Björn Nilsson [b,c]

[a] Université Paris 1 Panthéon-Sorbonne and DIAL, France
[b] IRD, UMR DIAL, 75010 Paris, France
[c] Paris PSL, Université Paris Dauphine, LEDa, 75016 Paris, France

ARTICLE INFO

ABSTRACT

During the last half-century, the evolution of educational attainment in Malaysia has been spectacular, and the current enrollment rates suggest that this progression will continue. Such a transformation of the labor skill composition should bring about macroeconomic effects such as wage compression, sectoral shifts and high skill unemployment, unless compensatory mechanisms exist. Relying on decomposition techniques, we argue that skill biased technological change (SBTC) occurred in Malaysia in recent years, and permitted unemployment figures to remain low and skill premia not to sink. We also develop a dynamic general equilibrium model, simulating the absence of SBTC and limit the number of admissions to higher education. The results are fed to a microsimulation module. They show that the reduction in wage inequalities could have been substantially more important had SBTC not been present. Furthermore, they suggest that the *open-door* higher education policy has contributed heavily to a reduction in wage inequalities.

© 2016 Elsevier B.V. All rights reserved.

1. Introduction

Many countries have experienced sharp increases of enrollment in tertiary education[1] in the last decades, with varying economic and social outcomes. The massification of higher education is sometimes a deliberate policy tool, and sometimes the result of a laissez-faire attitude from policy makers facing increased demand for higher education. Should increased educational attainment, especially at the tertiary level, always be encouraged? Will an exogenous increase in the numbers of tertiary educated be followed by increased demand from firms, in some sort of skill-driven structural change? What is the likely impact of increased enrollment on returns to education and on graduate unemployment?

In the presence of an increasing supply of educated labor, labor market outcomes of educated workers are conditional on the evolution of their demand. An underlying issue here is that of the substitutability between labor categories with different educational attainment. Several authors argue (Goldin and Katz, 1998; Caselli and Coleman, 2006) that this substitutability is imperfect, some countries being better at taking advantage of their skilled workers than others. Caselli and Coleman (2006) argue that countries more abundant in skilled labor will choose technologies best suited to skilled labor, while countries abundant in unskilled labor will choose technologies best suited to unskilled labor, barriers to technology adoption explaining why some countries are unable to make efficient use of their skilled labor. While it would be a stretch to argue that there is consensus on the issue, skill-biased technological change (SBTC) has often been suggested as one of the drivers behind simultaneously rising wage premia and share of skilled workers in the US (Autor et al., 1998). Empirical evidence has also suggested that

[1] Gross enrolment rates in tertiary education for Upper Middle Income Countries have increased from 8% to 30% in the period 1990–2010. In Malaysia, they have increased from 7% to 37% during the same period.

this is the case in other developed countries. There is some scarce evidence of skill-biased technological change in developing countries (Berman and Machin, 2000), but not many country-specific studies have been carried out. To our knowledge, no one has attempted to study skill biased technical change in Malaysia. We choose to study Malaysia since its spectacular increase in educational attainment has not been accompanied by falling wage premia of tertiary graduates.

The other major labor market adjustment to rising relative quantities of skilled labor is increased unemployment of skilled workers. High public investment in education has been shown to increase unemployment in some contexts, high-skilled unemployment sometimes even being higher than that of low and medium-skilled.[2] The Middle East and North Africa (MENA) region, which has heavily invested in education over four decades[3] serves as a good example of an unsuccessful absorption of young graduates into the labor market (Marouani, 2010; Marouani and Robalino, 2012). However, not only do employment figures matter in their own; it is also important to consider the type of employment facing young graduates. The suggested theoretical links between educational accumulation and growth have sometimes been hard to demonstrate empirically. The arguments put forward range from quality of education to a misallocation problem. Pritchett (1996) argues that one of the reasons education has not been positive for growth is due to inefficient use of graduates, who end up in low productivity sectors such as State-owned enterprises. This could particularly be the case in those contexts where the State acts as a de facto employer of last resort.

An increase in educational attainment implies two things: first of all, a steadily increasing demand for education. Secondly, that this increased demand has been met by an increased supply, either from the government or from private actors. The question is whether this expansion of supply is a deliberate policy choice, or just an expansion to cover what is called the *social demand* for education. Blaug (1967) reflects on this in an early paper, arguing that the spontaneous increase of educational supply faced with increasing demand could find its origin in a belief that something akin to Say's Law operates in the market for professional manpower, i.e. that supply of skilled labor will create its own demand. Thus planners need not fear increasing educational supply in the sense that labor market constraints are unlikely to operate. The topic is however difficult to apprehend: first of all, without a precise picture of the demand for education, it is impossible to know whether supply has been a constraint or not in the evolution of educational attainment. That is, have all those who wished to go into tertiary education been able to do so? If this is the case, have there not been shadow costs associated with the increase, such as increasing rates of exam failure?

Methodological differences and accuracy problems render educational projection exercises notoriously difficult. Blaug (1967) describes the three major methods of forecasting skill requirements, all relying on a number of assumptions and restrictions. Firstly, manpower-forecasts attempt to project sectoral quantities of skilled labor needed to attain certain GDP targets. They rely on labor–output coefficients and education–occupation matrices that are difficult to estimate. Secondly, social demand methods attempt to project the private demand for education, given fixed direct and indirect costs. Finally, rate of return methods are perhaps the most well-known method used by educational planners. Ceteris paribus, the evolution of the rate of return to a certain skill gives an indication of the value the market places on the skill. If this rate is increasing, it means that employers' demand for this particular skill is rising faster than its supply. Rates of return could thus be used

by planners as an indicator of skill gaps to be filled. All three methods however have their weaknesses. In particular manpower planning, which has been largely abandoned in academia since its less than desirable track record was unveiled in Blaug and Ahamad (1974).

Glytsos (1990) argues that severe imbalances between supply and demand for certain skills have been a feature of developed and developing countries alike during the 1970s and 1980s, which tends to confirm the mediocre track record of educational planning before and during this period.[4] Interestingly, he argues that these imbalances have not only been a feature of countries with open enrollment policies, i.e. where quantitative restrictions on the number of students do not exist (perhaps due to social concerns such as equality of access), but also in those countries where admission controls are a fact. We contend that a general equilibrium approach to educational planning permits to overcome some of the most obvious drawbacks of the main methods used to project or forecast educational needs. Notably, manpower forecasts and social demand estimates both consider educational dynamics from one side — that of demand in the case of manpower-forecasts, and that of supply in the case of the "social" demand for education. The evolution, however, is determined jointly by supply and demand factors. Furthermore, the demand and supplies are derived using a constant price-hypothesis. A general equilibrium approach permits prices to vary according to relative supply and demand, but also according to productivity and international demand trend differentials. Also, while manpower forecasting and social demand give target figures, our model permits a simulation of the labor market impacts of educational policy designed to achieve such target figures. Our focus in doing this is on wage premia and unemployment figures.

The higher education policy of the Malaysian government stems from a willingness to increase quickly and significantly the share of skilled labor in the economy (40% enrolment in higher education is a policy target (Guan, 2012)). This article aims to study the impact of this policy on labor market and income distribution outcomes. As explained above, similar policies have proven inefficient in other contexts. Relying on decomposition techniques, we argue that it is thanks to skill biased technological change that expected wage premia have been relatively stable in Malaysia, maintaining a strong social demand for higher education, thereby perpetuating the educational dynamics. We also develop a dynamic general equilibrium model in which we run a retrospective simulation, looking at how unemployment and wages would have reacted had skill biased technological change not been prevalent. Furthermore we simulate the effects of a restriction in the supply of education to understand the impact of recent educational policy in Malaysia. The results are fed to a microsimulation module, addressing distributional concerns.

The rest of the article is organized as follows. Section 2 describes the Malaysian educational expansion of the last two decades and the accompanying labor market adjustments. Section 3 lays out the various blocks of the model, with a particular emphasis on the accumulation of skilled labor. Section 4 presents the data and the calibration of the model. Section 5 lays out the microsimulation module used to analyze wage inequalities. Section 6 presents the simulations and their results. Section 7 concludes.

2. The evolution of Malaysians' educational attainment

Educational attainment in Malaysia has increased remarkably in the last two decades. The two main features of this increase are a big drop in the number of Malaysians with a primary education or less, coupled with a strong increase in the number of secondary and tertiary educated. The second feature has been a clear policy target for the Malaysian

---

[2] This is the case for Morocco, (Kabbani and Kothari, 2005).

[3] MENA countries spent around 5% of GDP on education over the period. At similar levels of educational attainment, the MENA region boasts significantly higher unemployment rates of graduates (World Bank, 2008) than other emerging regions. The equivalent spending figure for two groups of Asian and Latin American countries respectively is around 3%.

[4] An alternative to educational planning could have been to let the market regulate supply and demand of educational services, requiring that the total cost of educational services is covered by students. Such a system would however have obvious drawbacks in terms of equality of opportunities.