Is African Manufacturing Skill Constrained?

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1 Introduction

In most of the sub-Saharan African economies neither the levels of total factor productivity (TFP) nor the growth rates of TFP in manufacturing have been high. All studies of cross-country performance find that the sub-Saharan African economies are the largest bloc of nations that have not converged on the US. Most of the inter-country explanations have focused on easily measured aggregate variables such as the ratio of investment to GDP, education levels, and, in some models, proxies for political stability (Barro and Lee, 1993; Easterly, 1993). These models have as their underlying theoretical framework a view that the national economy can be modelled with a set of multiplicative inputs – an increase in the right hand side variables such as the investment rate or education level will produce an increase in growth rates. However, as is increasingly recognised, by, among others, the authors of the many papers on convergence, the particular specification of the implied production function is open to question, and the right-hand-side variables may themselves be endogenous. Moreover, in the case of the African nations, close observers question whether a simple increase in investment rates will generate the impact implied by the cross-country regressions – many countries have experienced growing marginal capital-output ratios over the last two decades (Husain, 1993).

There are two divergent though complementary views of the lack of productivity growth in sub-Saharan Africa.¹ The first holds that pervasive government intervention imposes large costs on individual firms and reduces incentives to become efficient (Collier and Gunning, 1999). It is not only protection from foreign competition that has such effects but also problems stemming from bad macroeconomic policies, such as highly variable real exchange rates, which make long-term planning difficult for firms. A second interpretation focuses on the paucity of technological competence as measured by the small supply of trained managers and engineers.² This paper examines the determinants of manufacturing productivity and the
role of education and technology variables at the level of individual firms. A major implication of our results is that, ceteris paribus, it is unlikely that an increase in education levels will have much impact on manufacturing TFP levels. We suggest a more complex view of the role of education, emphasizing that, in the absence of technology inflows, higher skills may have very low productivity.

Using the results of surveys of industrial firms in Ghana, Kenya and Zimbabwe, we consider the connection between technological abilities and productivity in the three nations. Section 2 sets out the determinants of productivity. Section 3 provides some aggregate measures of factors that may affect productivity in the three economies in question. Section 4 presents empirical results on the analysis of the determinants of productivity in a large group of firms in the three countries. Section 5 offers an interpretation of the results, and Section 6 contains conclusions.

2 The determinants of productivity levels

While economy-wide and sectoral shortages of human capital are widely assumed to limit efficient industrial development, there is little empirical evidence on whether this is indeed the case in individual African firms. The presence of trained and experienced managers and workers does not guarantee high firm productivity for several reasons. First, individuals with formal credentials may not possess the cognitive skills necessary to improve TFP. Second, if there is limited rivalry, firms may view investment in cost-reducing efforts as not being necessary to remain competitive. Third, an industry’s organization, such as vertical integration between manufacturers and retailers, may result in low productivity if, for example, each firm produces a large range of products, the profitability of firms being guaranteed by protection from imported goods. Hence, the frequently drawn policy conclusion of the need for higher levels of education and training based on the assumed shortages of skilled manpower may be unwarranted.

In theory technological abilities are important for cost reduction in industrial firms, facilitating learning by doing. The simplest interpretation of pure learning by doing envisons a manual worker tightening a bolt in 40 per cent less time the hundredth time she does it as compared to the first time. But a complete specification of ‘pure’ learning by doing would recognise that there is usually an ongoing reorganization of the flow of work, the design or distribution of improved machinery, and additional training. Thus, even in the simplest case of learning by doing, one would expect that the presence of more educated or trained supervisors and production workers will facilitate realization of greater TFP growth. However, there is little empirical support, even in industrialised countries, for a close relation between technological abilities and cost reduction for industrial firms.\(^3\)