

Inequality Traps and Human Capital Accumulation in South Africa¹

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1. Introduction

A large body of theoretical literature has emerged in recent decades exploring the links between the degree of inequality in a society and its investment levels and patterns. This literature has the potential to yield useful insights for South Africa. South Africa has one of the highest levels of inequality in the world, as well as very high unemployment levels. Moreover, growth has been relatively sluggish in recent decades, in comparison to other emerging markets. By studying inequality and investment, the aforementioned literature has the potential to shed light on the conditions under which situations of high inequality, low growth and high unemployment can emerge. The key contribution of this literature is to acknowledge that all of these variables are interrelated, and to focus on their interactions. This paper examines the insights of this literature that are potentially most relevant to South Africa and tentatively studies the empirical relevance of the mechanisms emphasized. We believe that this exercise can be helpful in informing policy discussions.

There are several types of investments through which inequality and employment interact to produce poor economic outcomes. An important one is entrepreneurship. Inequality may limit entrepreneurship in certain contexts and thus limit employment levels.² This would be a rather direct connection between inequality and employment, through the demand for labour. Another potential channel is via investment in innovation. Inequality may encourage or discourage innovation, thus affecting growth and employment levels.³ Attempting to account for all of the ways in which inequality and investment interact in a coherent and compact way would be unmanageable. Thus, in order to narrow down the problem, we ignore many of these channels and focus instead specifically on one: investment in education. We believe that education differentials are a crucial element for understanding South Africa's inequality, unemployment, and growth. Regarding inequality, recent empirical evidence shows that labour market differentials account for most of the observed income inequality in South Africa (Leibbrandt et al. 2010). Wage differentials between skilled and unskilled have likewise been shown to be extremely high in international comparisons (Lam 1999). Regarding unemployment, we present strong evidence later in this paper that the unemployment rate of graduates with post-secondary qualifications is substantially lower than the average. From a partial equilibrium point of view, this implies that broadening access to higher education would foster employment. The effects can actually be substantially stronger after considering any general equilibrium effects: increasing the supply of skills is likely to make the remaining unskilled workers more desirable from the employers' point of view, thus relieving the unemployment problem of the unskilled. Finally, regarding growth, skill accumulation would naturally contribute to growth via increased productivity directly, as well as indirectly through the effect mentioned above on unemployment. Thus, broadening

² See, for instance, Banerjee and Newman 1993.

³ See Foellmi and Zweimüller 2006.

access to higher education can be thought of as a labour supply side mechanism for achieving overall growth and, more particularly, employment growth.

In this context, the purpose of this paper is to discuss the role of inequality in enabling or constraining employment and growth via the interactions of inequality with educational decisions. We discuss three different theoretical frameworks to study the interactions between inequality and educational choices. The frameworks are ordered in terms of complexity and (arguably) realism. These are; 1. That markets work perfectly and that the social environment plays no role for decisions, 2. That credit markets are imperfect with no role for the social environment, and 3. That the social environment affects information, preferences and actions.

These three frameworks lead to very different conclusions regarding the effects of inequality for education decisions, and to very different policy implications. According to the perfect markets framework, inequality can actually be beneficial for growth and investment, as it generates incentives to obtain higher levels of education. In such a framework, there is no room for policy, neither on a normative nor on a positive basis. In the second framework of imperfect markets, inequality mainly acts as a constraint to investment. Inequality traps can emerge where high levels of inequality lead to little educational investment which, in turn, regenerates the high levels of inequality. In such a situation, the role of inequality for incentives is minimal, and is dwarfed by its constraining role. Implications for policy include individual income redistribution and education financing, as well as, interestingly, the expansion of educational opportunities for intermediate levels of skill. Finally, the framework where social interactions are taken into account leads to additional mechanisms through which inequality traps might arise: disadvantaged social environments may limit the aspirations or discourage the development of abilities of their members, leading them to remain disadvantaged. This framework warns against the utility of individual income redistribution and rather suggests policy interventions that target groups as a whole.

We then make use of two large datasets to identify which of the hypotheses seems to have greater empirical support. The National Income Dynamics Study of 2008 is used to investigate returns to education for youth, educational attainment and the reasons for not continuing with one's education. All of this is done for different quintiles of household per capita income, which is how we operationalize inequality in our data. We then make use of the Cape Area Panel Study to identify some aspects relating to the third hypothesis, namely those dynamics driven by social influences. In particular, we look at what young people's career aspirations are like, as well as how measures of scholastic aptitude vary with age for youth from different socio-economic backgrounds.

To briefly summarize our findings, we find most support for the second theoretical framework discussed. Youth in SA from all backgrounds would like to study further to obtain a post-secondary qualification, but income and credit constraints bind for many of them. In addition, youth from poorer backgrounds are disadvantaged by their primary and secondary schooling experiences, to the extent that many of them do not graduate from school with sufficient grades to even be eligible for enrolling towards a post-secondary qualification.

We conclude with a discussion of policy choices to improve education and reduce inequality in the South African context. Two types of objectives are considered: improving access to tertiary education and reducing differences in education quality at the primary and secondary level. On the first, we argue that there is scope for improving access to information on existing education subsidy programs, as well as increasing the coverage of these programs to include registration fees. Moreover, there would be potential benefits and scope to improve access at lower levels of tertiary education. Regarding pre-tertiary education, we argue that a policy to integrate students from poorer backgrounds into high quality schools is likely to be fraught with problems and at best have a minor effect. In contrast, efforts focused on improving the quality of schools in disadvantaged communities would probably be more productive.

The paper is organized as follows. Section 2 presents the discussion of the literature, organized on the basis of the three frameworks mentioned above. Section 3 presents the findings of our empirical analyses. Section 4 concludes with a discussion of policy options for the case of South Africa.

2. Inequality and investment: Insights from the theoretical literature

2.1 Introduction and general framework

A growing body of theoretical literature in economics has addressed the interactions between the level of inequality in a society and the investment choices of individuals within that society. Overall inequality and individual investment choices can feed into each other in potentially complex ways. There have been different approaches, or theories, that emphasize different aspects of these interactions, reaching significantly different conclusions as to the role of inequality for investment. The purpose of this section is to give a streamlined and non-

technical account of these different approaches, focusing particularly on the decision to invest in education.⁴

We will discuss the different approaches to analysing interactions between inequality and individual choices using a common overall framework. The key components of this framework are the following. First, when facing a series of choices, individuals make the choice that is best for them, given their aspirations and values, their perceptions and their constraints. The different approaches below make different assumptions regarding how aspirations, perceptions and constraints are formed, but they all assume that once they are taken into account, individuals try to make the best decision possible for them.

Second, we focus particularly on the choice of whether to obtain more/ better education or not, although many of the insights would apply equally well to the decision to become an entrepreneur, for example. For concreteness, we will often frame our analysis in terms of the decision to attend college or not. However, all relevant insights apply to other educational decisions such as whether to attend better quality education at primary and secondary levels.

We frame the decision of whether to obtain a tertiary education or not, (or whether to attend higher quality primary and secondary education or not) as entailing costs and benefits. The benefits are mainly the perceived improvement of labour market prospects and economic status gained by improving one's education. These benefits may differ from person to person, first because different people have different *abilities* that make them exploit the educational investment differently and second, because even people with similar abilities may hold different *perceptions* as to how the investment is rewarded in the society. In turn, the value attached to these perceived benefits may also differ from person to person, as people differ in *aspirations* and values. Some individuals may value a higher economic status or fear the possibility of a low socio-economic status more strongly than others.

The educational investment also has costs. Here we will focus particularly on monetary costs arising from tuition fees and living expenses as well as potential psychic costs associated with the effort of studying. In addition to the direct benefits and costs of educational investments, we account for the fact that people may face *constraints* when taking their decision. These constraints may prevent people from undertaking their preferred option on the basis of cost-benefit calculations. We focus particularly on monetary constraints: individuals need to acquire the funds necessary to pay for the tuition and the living expenses while studying.

⁴For excellent technical surveys of many of the models discussed in this section, see Piketty 2000, Bertola 2000 and Bertola, Foellmi and Zweimüller 2006.

Thus, in our general framework of individual decisions, people have perceptions about the payoffs from education, have aspirations that make them value these payoffs more or less, consider their costs and constraints, and if the benefits outweigh the costs while satisfying their constraints, they then choose to obtain more education. This is a very stylized account of how actual decisions work. However, we can still capture what we believe are key elements in the decision making process and the framework is sufficiently flexible in the sense that it accommodates vastly different approaches to investment decisions.

Since we are interested in possible interactions between inequality and individual choices, we need to have a framework for how inequality is generated. For simplicity, and to focus as cleanly as possible on certain key mechanisms, we consider inequality as emerging primarily from the differences in pay and economic status that come from differences in productivity, which in turn derive from differences in education and ability.

This stylized framework allows us to discuss different important approaches to the interactions between inequality and education choices. We consider three approaches. We label the first the “perfect world” because it abstracts from many real world factors. Nonetheless, it is useful in the sense that it serves as a benchmark and because some policy debates are informed by its logic. In the “perfect world” approach, everyone knows the returns to education, which depend only on innate ability, and markets work perfectly. The second approach is the “capital market imperfections” approach. This approach is the same as the previous one, except for the fact that markets, and in particular, the market for borrowing and lending, does not work perfectly. The third approach emphasises social interactions and social externalities. This is arguably the most realistic approach where aspirations, perceptions and the development of abilities depend on one's environment, be it one's neighbourhood, or one's social group, however defined.

2.2 Inequality and investment in a “perfect world”

Consider a setting where young individuals differ in their innate abilities and in their family background: some come from wealthy families and others from poor families. Suppose, moreover, that everyone knows the returns to education, which depend only on ability, and that tuition costs are the same for everyone. Who would like to go to college (or, more generally, invest in more/ better education) in such a setting?

The benefits of education in such a setting would be higher for those with higher ability and higher aspirations. The costs would be the same for everyone. Thus, only children with high ability and high aspirations would choose to go to college, while for the rest, the costs would outweigh the benefits and they would prefer not to go to college.

How does this change when we consider wealth constraints? Will poor bright children be able to go to college if they wish to? In a setting where markets work perfectly, the answer is yes. Poor bright children will have good prospects in the labour market; they are very likely to end up with high earnings in the future. For them, the educational investment is very profitable and everyone knows this in our setting. Thus, for banks, financing such an investment can generate considerable returns. Banks, in turn, can obtain the necessary resources from rich parents with children of low ability. For these parents, the returns from the bank are higher than the returns from the education of their children. The key point is that in a perfect world, what matters for investment is not the resources at one's disposal, but the potential benefits of the investment. It does not matter whether one is rich or poor, but whether one is bright or not. Sufficiently bright children can always find financing for their studies.

The fact that wealth does not affect investment choices, in turn, implies that inequality does not matter for access to college. Regardless of the level of inequality in a country, how many poor people there are or how poor they are, all bright people, whether they are rich or poor, will find it desirable to go to college and will be able to finance it. To be sure, in a very poor country, there will be relatively few funds available and borrowing will be costly. But then again, this implies that saving will be very rewarding and, ultimately, only the very brightest children will find it worth it to go to college. Again, individual income will not matter for investment decisions and nor will the level of inequality.

In this setting, there is little scope for policy, neither normatively, nor on efficiency grounds. From a normative point of view, wealth results from one's contribution to the economy, in terms of the higher productivity afforded by ability and education. This distributional criterion can be considered fair. Moreover, to the extent that ability is not transmitted across generations, the resulting society would display high levels of mobility. Even if ability were transmitted across generations, and poor and rich dynasties emerged, each dynasty would be rich or poor on the basis of ability, not on the basis of their prior wealth.

From an efficiency point of view, there are two types of policies that might be considered, a subsidy to pay for tuition fees and progressive redistribution from rich to poor. An education subsidy would induce middle ability individuals to study. However, it is not clear whether that would be a wise policy to follow in this case. In such an economy, there are no "unexploited educational opportunities". Those that don't go to college do not go because it

gives them relatively low returns. Presumably, the resources that would go to the education subsidy could be put to better use; i.e. an activity that yields higher returns. Regarding the policy of redistributing income from rich to poor, redistribution towards poor dynasties would not affect education choices and would not have long lasting effects. This would be the case even if ability were transmitted across dynasties leading to some inequality persistence. In fact, to the extent that such redistribution took resources from the educated and rich, it would reduce the benefits of education, and would actually drive the middle income/ middle ability people away from college.

2.2 Inequality and investment with market imperfections

A large body of theoretical work has addressed the interactions between investment and individual investment choices in a context of imperfect capital markets⁵. Capital market imperfections imply that certain individuals have limited access to credit. In such a situation, family wealth matters for investment choices: only individuals who are rich enough can afford to go to college. This leads to interesting and important interactions between the level of inequality and overall educational attainment and leaves room for policy to improve economic outcomes.

The first question to address in settings of capital market imperfections is: Why would capital markets not work properly in the first place? We focus here on the market for borrowing and lending. Borrowing and lending, and more generally any financial transaction, has the peculiarity that the different elements of the transaction occur at different moments in time. Transactions in traditional markets occur essentially simultaneously: when buying groceries, the product and the payment for the product get exchanged at the same time. When borrowing a sum of money, the product (i.e. the loan), is given first, and the payment (the reimbursement of the loan) is done later, sometimes after a substantial amount of time. This generates the possibility that the payment side of the transaction is not honoured. In the case of educational investments, individuals may ask for an educational loan and then run away, or they may not exert much effort during the studies, end up unskilled and earning insufficient amounts to pay back the debt. The incentives to do such things increase with the amount of money that needs to be paid back. The higher the debt burden, the more attractive it becomes to rescind on one's obligations, and the less reward there is for one's efforts. For this reason, lenders cannot respond to default risks by increasing interest rates on loans, as this just worsens the problem. The solution for banks is to fund only individuals that need to borrow only limited amounts, for whom the incentives to default are smaller. These individuals are the richer ones, so the end result is that the poor get excluded from credit.

⁵See, among others, Galor and Zeira 1993, Banerjee and Newman 1993, Aghion and Bolton 1997, Piketty 1997, Owen and Weil 1998, Maoz and Moav 1999, Ghatak and Jiang 2002 and Mokherjee and Ray 2003. The 2006 World Development Report by the World Bank offers an excellent non-technical survey of some of this literature.

In a setting of imperfect markets, therefore, wealth constraints matter. All high ability individuals, be they poor or rich, would still wish to invest in education. But the poorer ones are not able to do so because they cannot obtain the necessary funding. In this context the level of inequality in the society matters for overall access to education. A highly unequal society, where there are many poor families and these are very poor, will suffer from low levels of education, as most of their population will be unable to finance it.

In this framework, inequality and education levels interact in meaningful ways. Consider, as seems sensible and realistic, that the relative wages of skilled and unskilled workers depends on the relative scarcity of skills: In an economy with severe skills scarcities, the few skilled individuals will command a strong premium while unskilled labour, being so abundant, would suffer from high levels of unemployment and low pay. This generates a potential feedback loop between inequality and education levels. High levels of inequality would generate few educated individuals, making skills scarce. This, in turn, would lead to high differences in pay between the educated (and rich), and the less educated (and poor); i.e. high inequality, which would then generate low levels of education, and so on. The society would be trapped in a high inequality-low education situation, an “inequality trap”.⁶ In contrast, an equal society would feature the reverse type of equilibrium, equally stable: low inequality would lead to broad educational access, which would lead to low skills premia, which would in turn ensure that inequality remains low and education levels high.

An inequality trap of the sort just described leaves extensive room for policy intervention, both for normative and efficiency reasons. From a normative point of view, some people are stuck as there is no equality of opportunity: life opportunities and life trajectories are strongly affected by one’s own family background. People from poor backgrounds are more likely to remain poor, just because they have a poor family. Moreover, the source of wealth differences is questionable from a normative point of view: the rich end up being rich by virtue of being scarce, whereas the poor end up being very poor due to their over-abundance, which in turn, are given by past inequalities. It seems difficult to normatively justify large differences in welfare from such a basis.

From an efficiency point of view inequality traps also feature serious problems. First and most obviously, education levels are low compared to what they could be, as testified by the “good” equilibrium with low inequality and high education levels. This, in turn, directly leads to less productivity, possibly less innovation and possibly large and unnecessary unemployment levels for the unskilled. A second, more subtle efficiency cost of the inequality trap emerges from the type of people that do and do not obtain education. In an

⁶ See Bourguignon et al. 2007.

inequality trap, the criterion for obtaining education is family wealth, not ability. The poor are unable to fund their education, even if they have high ability. At the same time, returns to education are very high because of the skills scarcity. Thus, rich families find it worthwhile to educate their children, even if these children are of low ability. This can entail an important efficiency cost: the inequality trap implies that people that do not really benefit much from education (the low ability rich) go to college while a large proportion of those that would actually benefit most (the high ability poor) do not. This, again, contrasts with the low inequality “good” equilibrium, where the skill premium is low, and the poor earn sufficiently high wages to afford education. In that case, it does not pay off for rich families with low ability children to send them to college, as the benefits are small. Thus, those that go to college are the high ability individuals, for whom education pays off the most, be they rich or poor.

In an inequality trap situation, both education subsidies and income redistribution can lead to long lasting social improvements. Both types of policy, by improving education access below the top of the distribution, can generate a cascade effect that allows the society to escape the inequality trap. Increased levels of education cause skills to become less scarce, and wage differentials become less pronounced. This reduces inequality and improves the capacity of the poor to further increase their access to education, which in turn leads to more skills, less inequality and ever more access, until the “good equilibrium” is reached.

An alternative policy option that emerges from this type of framework is to enlarge the offer of intermediate skills. In a world with two types of skill, say, highly skilled and unskilled, there is scope for inequality traps implying very large wage differentials.⁷ The reason is that in a situation with very high inequality, the poor will be so poor that they will not be able to take advantage of returns to education, even if these are enormous. In contrast, with numerous skill levels, these very large wage differentials are difficult to maintain. Consider an inequality trap with just two skill levels, a strong skill scarcity and large wage differentials between the highly skilled and the unskilled. Now suppose that intermediate semi-skilled training opportunities with more affordable tuition costs emerge. Because the semi-skilled families will be richer than the unskilled, they will certainly want to take advantage of the high skill premium, unless the returns to semi-skilled work are also high. But if that is the case, then the poor will want to exploit the opportunities of semi-skilled work, which they can access more easily due to their lower tuition costs. In any case, skill levels would tend to rise, leading in turn to lower wage differentials; i.e. lower inequality.

⁷ See Mokherjee and Ray 2003.

2.3 Inequality and investment with social externalities

Absent from the previous frameworks is the idea that individuals are affected by their social environment in a manner relevant to their investment decisions. Considering these social effects increases the potential for inequality traps with low investment to occur. The reason is that individuals are affected by their environment but also affect their environment in turn. Thus a situation may arise where a “bad environment” leads to low individual investment which in turn feeds back into the “bad environment”. These types of situations lead to specific policy implications which differ from the ones discussed above.⁸

Following Durlauf (2006), social externalities can be categorized on the basis of the type of social environment that one considers. These range from peer groups where individuals actively interact, to reference groups that consist of groups individuals identify with, to neighbourhoods that might contain both peer and reference groups and where relevant collective decisions, such as the level of school fees might be taken.

Peer groups, reference groups and neighbourhoods can have a significant effect on individual education decisions. Consider first peer groups. Childhood peers often serve as source of information and inspiration. In this way, they can affect substantially one’s perceptions of returns to education as well as one’s aspirations. Moreover, to the extent that individuals within a group engage in imitative behaviour, or to the extent that the group rewards and punishes certain types of behaviour, one’s actual behaviour will be influenced by the behaviour of the group as a whole. This can severely affect the development of abilities. For instance, certain peer groups may encourage hard work while others condemn it, thus creating incentives for members of the group to behave accordingly. Reference groups can have similar effects to peer groups. Even with limited interaction with members of one’s reference group, this type of group can have a great influence as role models. Role models partly shape one’s values and aspirations. For instance, role models that practice and condone behaviours that are not conducive to productive investment are likely to discourage educational investments. Finally, neighbourhood composition can be relevant for individual education decisions in a variety of ways. First, they partly determine peer groups and reference groups, thus helping to shape perceptions and aspirations. Secondly, they represent the setting where important types of collective action is taken. One instance of collective action at the neighbourhood level with important implications for education is school quality. Residents of certain types of neighbourhoods may be able or willing to invest more heavily in education quality (for instance, by setting higher fees) than those in other neighbourhoods. In this way, neighbourhood characteristics exert an externality on the development of each

⁸The theoretical literature on social externalities and investment includes Benabou 1993, Benabou 1996, Fernandez and Rogerson 1996, Durlauf 1996, Brock and Durlauf 2001. See Durlauf 2006 for an excellent non-technical summary of this literature.

child, regardless of the specific situation of the child. Bright children that would derive strong benefits from quality education might not be able to find schools that match their needs if they live in a neighbourhood where high quality education is not available.

These types of social externalities can naturally give rise to inequality traps. Certain groups may end up reproducing behaviour not conducive to educational investment while others generate opposite outcomes because of the feedback mechanisms between the group as a whole and each individual's behaviour. Peer groups that encourage ambition, and have optimistic perceptions about the returns to education and productive behaviour, also generate incentives for each of the individuals in the group to exert effort and invest. This behaviour will then tend to confirm the appropriateness of these messages, hence solidifying the outcomes in the group. The same type of mechanisms operate in reference groups, with the exception that the feedback effects tend to occur between different generations, where older generations serve as role models for younger ones who in turn engage in behaviours that lead them to become similar types of role models for the future generation.

Absent from the previous discussion is the issue of group formation. For group externalities to generate inequality traps, groups must themselves be stable; i.e. there must be mechanisms that ensure that individuals stick to their groups, even if these generate bad outcomes. For reference groups, this is largely achieved by identity and cultural influences that may be difficult to break. Peer groups, in turn, may be strongly constrained by availability, particularly in highly segregated communities. To the extent that neighbourhoods provide the main pool of potential peers and to the extent that neighbourhoods are themselves stable in terms of characteristics, peer groups will also need to be constrained correspondingly. This brings us to the question of the stability of neighbourhoods themselves and their potential to generate inequality traps: i.e. the interaction between residential choices and educational outcomes. Several articles have modelled these interactions.⁹ It emerges from this literature that residential segregation can emerge naturally due to the differential preferences of the rich and poor. The sensible assumption is made that everyone benefits from a "good" environment (i.e. an environment composed of wealthier and more educated neighbours or of better education quality). Then, to the extent that the rich/ educated derive a sufficiently higher benefit from it or that they find it less costly to procure it, residential choices will lead to segregation. This can arise via rents or via school financing arrangements. Rich individuals end up living in communities with either higher rents and/or more expensive schools. Because the rich benefit more from a better environment, they are willing to pay more for it and the high rents and expensive schools deter the poor from moving into those neighbourhoods. In this way, segregation results.

⁹See for instance, Benabou 1996 and Fernandez and Rogerson 1996.

This type of framework delivers specific policy implications. First, it clearly leaves room for policy intervention, since undesirable outcomes at the group level cannot be resolved by individuals acting in isolation. This is because these very individuals act rationally and follow their own interest, given the configuration of the group and the influences it exerts on them. This framework leads to policy interventions at the group level. Only by breaking the potentially harmful group effects can bad outcomes be avoided. This stands in stark contrast to the framework of capital market imperfections. There, redistribution of income by itself could help improving educational access and breaking inequality traps. Here, it is not the lack of income per se that constrains poor individuals, but an environment that depresses their aspirations and their perceptions of the benefits of education. Redistributing income does not help solving these issues. Instead, policies targeted at neighbourhoods such as a strong public financing of schools in poor communities can help to break the vicious circle, by directly helping the development of abilities, making schooling more attractive to peers and providing better future role models.

In addition, some of the models in this framework give valuable insights regarding segregation. On the one hand, they make clear that segregation may be to a certain extent inevitable, short of a continuous enforcement of integration. At the same time, they argue that the amount of segregation occurring spontaneously will typically be socially undesirable.¹⁰ This is because individuals, when making their residential decisions, take into account how prospective neighbourhoods will affect them, but not how they themselves will affect the neighbourhoods. Benabou (1996) argues that a highly educated neighbour will typically have a stronger positive impact on a poorer community than in one where everyone is already highly educated. Thus, it would be socially desirable to increase the number of highly educated individuals in poorer communities. Fernandez and Rogerson (1996) argue that if the poorest among the rich living in the rich neighbourhood moved to the poor neighbourhood, both neighbourhoods would become richer and hence lead to higher overall investment in education. Thus, a policy that makes poorer neighbourhoods more attractive would be desirable.

3. Empirical Evidence on the relationship between inequality and higher education

3.1 Introduction

In this section, we present some brief analyses of our own and complement these with some of the existing findings from the relevant literature in the South African context. We quickly argue that the “perfect credit markets” hypothesis should be rejected in favour of the “imperfect credit markets”, using NIDS data. We then consider whether the social externality models *also* seem to have validity in SA. For the second part we use both CAPS data. The evidence (in either direction) that relates to this second question is empirically quite weak.

¹⁰See, specifically, Benabou 1996 and Fernandez and Rogerson 1996.

Identifying peer effects and social externalities empirically is extremely difficult, and our findings are based on a mixture of theoretical insights, crude summary statistics and plausible conjectures.

In general, our overall analysis involves estimating the differences in various outcomes between groups defined by their relative position in the income distribution. The outcomes that we are interested in relate to returns to education, educational attainment and career aspirations. Finally, we look at how poorer and richer students fare in terms of scholastic ability, which reflects both neighbourhood and peer effects as well as other dimensions of school quality.

3.2 Data

For our empirical section, we make use of data from Wave 1 of the National Income Dynamics Study (NIDS) and Wave 1 of the Cape Area Panel Study (CAPS). Wave 1 of NIDS was conducted in 2008, which is reasonably contemporary. The total sample is large, about 30000 individuals, and the sampling frame is nationally representative. Wave 1 of CAPS is a cross-section of about 4800 young adults aged 14 to 22 living in the Cape Metropolitan Area in 2002. This data is well suited for some of our analysis as it focuses in detail on the youth who are at the stage of their lives where educational decisions are still in the process of being finalized. Included in CAPS are several questions about role models, educational expectations and career aspirations. It also has a standardized literacy and numeracy module, which we use as a combined measure of external school quality and peer effects.

Throughout our analysis, we make use of a simple measure of relative income. Since this is the running variable throughout this section of the paper, it is worth explaining in detail how it is calculated and what it does and does not capture. The variable that we use is the quintile in which a respondent's household's per capita income would rank. To explain, suppose we knew the amount of money that each household earns in aggregate and the number of people in that house. The per capita value is simply the amount of money available per person if they shared the aggregate evenly within the household. We then rank all households in terms of their per capita income from smallest to largest. We would then take the poorest 20% of households and place them in the category called quintile 1. Quintile 2 would be comprised of those from the 21st to the 40th percentiles, and so on until we reached the richest households between the 81st and 100th percentiles in quintile 5.

What is attractive about this measure is that it cleanly and simply captures groups in terms of their relative economic well being. This is essentially what inequality is about. What it doesn't do well, in and of itself, is to reflect the absolute level of well being corresponding to each quintile. It also doesn't give an idea of how far apart the various quintiles are in terms of

levels. However, we know that South Africa is classified as an upper middle income country by the World Bank, with a GNI per capita of 6090\$ in 2010. In addition, the World Bank reports a Gini coefficient for South Africa of 63.1 in 2009. This places South Africa as one of the most unequal countries in the world. This means that quintile 5 can be considered to be the “Rich”, with developed country levels of income, while the remainder can be considered to be the “Poor”, with developing country levels of income. Of course, between quintiles 1, 2, 3 and 4 there are varying degrees of poorness, and in some ways quintile 4 does seem to have a clearly middle-class type of lifestyle. Nonetheless, we expect that, insofar as income matters for our outcomes, we expect a difference in order of quintile rank, and potentially much larger differences between quintiles 4 and 5 as compared to the other adjacent quintiles.

3.3 Empirical findings

3.3.1: How high are returns to a post-secondary qualification in SA?

An inequality trap emerging from the imperfect credit markets hypothesis implies that the returns to education remain exceptionally high due to the scarcity of skilled people. In Table 1 below, we consider the cohort of 25 – 29 year olds in NIDS in 2008. We separate them into three educational categories, and estimate their mean employment rates and wages conditional on employment.¹¹ Assuming that the wage from being unemployed is zero, then one measure of the rates of returns to college as compared to a matric only, would be to calculate the products of the employment probability and mean wages for the two groups, and to then calculate the ratio of these products.

Turning now to the table, we first observe that the fraction with any type of tertiary qualification in this group is approximately 1 in 6. In fact, the largest group are people who never finished secondary school, at about 3 in 5. This would be expected if unskilled workers could get reasonably well paid jobs easily, but the employment rates of high school dropouts is below 50% while those with some tertiary schooling is thirty percentage points higher at 73.6%. Moreover, the mean income conditional on employment goes up dramatically as we increase the educational qualifications. From the least educated to those with a matric only, the mean income more than doubles. From those with only a matric to those with more than a matric, it more than doubles again. Note also that this is for a fairly young group, and these disparities will almost surely get wider with time. This means that our estimate of the returns to education are likely to be conservative.

Finally, if we consider the ratio of expected values, getting a matric will triple your expected earnings, while moving from a matric to some tertiary qualification will increase your expected earnings by about 167%.

To conclude, our analysis does find both extremely high returns to education as well as a relatively small fraction of people obtaining a tertiary education. These findings are widely supported by the findings of several other researchers. For example, Lam (1999) found evidence of increasing returns to incremental levels of education in South Africa. Hoogeveen

¹¹ All summary statistics are calculated including the post-stratification weights released with the surveys.

and Özler (2005) and Leibbrandt, Levinsohn and McCrary (2010), at the household and individual levels respectively, both identify increases in the rates of return to education between 1995 and 2001. Thus, taken together, the empirical evidence is consistent with the existence of an inequality trap driven by credit constraints.

Table 1: Educational attainment and returns to education:
25 - 29 year olds in NIDS Wave 1

Education	(1)	(2)	(3)	(4)	(5)
Level	N	% (weighted)	Employed (%)	Total Income (mean)	Expected value (3)*(4)
No matric	1,028	59.94	43.2	1237	534
Matric only	356	23.55	56.9	2681	1524
Some tertiary	173	16.51	73.6	5547	4081
Total	1,557	100			

Notes:

1. The total income column is calculated using only 656 observations.

This is due to:

a. The low levels of employment. (754 observations in our sample)

b. Missing data / invalid responses.

2. All summary statistics are calculated using the post stratification weights.

3. The definition of employment includes wage employment, self-employment, casual work, working without pay in a family business, or subsistence agriculture.

3.3.2 Is attainment related to income?

A second testable implication of the credit constraints hypothesis is that the rich are more likely to attain a tertiary education. In Table 2 below, we present the mean proportion with some completed tertiary qualification, by income quintiles, for each age in the 20 – 24 year old age cohort. At age 20, the young adults in the richest households are four times more likely to have some tertiary qualification than any of their counter-parts. While differences between the lower quintiles are not systematic, there is clearly an advantage to being in quintile 4 as compared to quintiles 1, 2 and 3. Moreover, despite the gradual catching up with age of the youth in the lower quintiles, by age 24 the proportion of youth in the richest households remains double that of those in the second richest quintile, at 31.4%. Again, we find that the evidence is quite clearly consistent with the credit constrained model.

Table 2: Mean of some tertiary qualification
(by age and income quintile: NIDS wave 1)

age	Per capita household income quintiles					Total
	1	2	3	4	5	
18	0.000	0.000	0.007	0.000	0.000	0.001
19	0.000	0.041	0.004	0.005	0.037	0.016
20	0.050	0.036	0.038	0.054	0.212	0.070
21	0.035	0.106	0.034	0.043	0.290	0.087
22	0.035	0.063	0.026	0.117	0.345	0.101
23	0.005	0.089	0.007	0.130	0.233	0.084
24	0.097	0.123	0.098	0.157	0.314	0.151
Total	0.027	0.058	0.031	0.075	0.191	0.068

3.3.3 Why do youth who do not have a tertiary qualification not enrol?

A third dimension that is central to the theoretical models being considered is that credit markets do not work well. Given the extremely high rates of return to education, even average students would rationally want to get some type of a tertiary qualification. Yet the fraction that does so is fairly low, especially amongst the bottom three quintiles. In Table 3 below we summarize the proportion that report different reasons as the primary reason that they are not enrolled, even though they do not have any tertiary qualification. As usual, we do so separately by income quintile.

The most important categories include having found employment, financial costs and looking for employment, all of which are directly or indirectly related to financial status. However, there is considerable heterogeneity when we consider the responses by quintiles. Amongst the poorest two quintiles, the main reasons are the costs of staying in school and the decision to look for a job, while the fraction of respondents who stopped enrolling because they had actually found a job is relatively low. Fertility related reasons also feature strongly in this group. The pattern is similar for those in quintile 3, but a substantial fraction had stopped enrolling because they were working instead of looking for work. Quintile 4, our ‘middle class’ quintile, are once again somewhere between the poorer quintiles and the top quintile. While in the poorer quintiles from 1 – 3, somewhere between 1 in 3 and 1 in 4 respondents left their education due to the financial costs of remaining in school, in quintile 4 this number drops to about 1 in 6. In the top quintile, this fraction decreases even further to 1 in 10. Moreover, more than half of the ‘dropouts’ from the top quintile do so because they already have a job. This fraction is more than double the overall average.

This fits well with other existing research. In a very comprehensive report by Branson, Zuze and Leibbrandt (2009) on “The Demand for Tertiary Education in South Africa”, the authors found that the returns to tertiary education are indeed very high, but that students face two substantial yet quite different sets of constraints that restrict their ability to obtain such qualifications. First, many students choose subjects or attain grades at the pre-tertiary level that result in them not being eligible to enter into tertiary institutions. Second, the costs and

financial considerations associated with attending a tertiary institution can be prohibitively high, for most of the (minority of) students whose secondary school performance does meet the various entrance criteria.

In summation then, we find clear evidence that returns to education are very high, that richer students are much more likely to attain a tertiary qualification, and that financial costs are a significant deterrent to poorer students. Overall, the data seem to strongly favour the credit constraints model over the perfect credit markets model.

Table 3: Reasons for not being enrolled in 2008 (NIDS Wave 1)

	Quintiles					Total
	1	2	3	4	5	
Finished school/education	9.1	15.1	12.2	10.5	16.1	12.1
I was working	3.7	7.4	21.7	35.4	52.2	21.3
Could not afford to stay in school	32.2	24.8	31.2	17.4	10.0	24.7
Wanted to look for a job	24.8	27.1	14.7	18.3	11.6	19.9
Was pregnant/had a baby	17.2	13.5	9.1	9.2	3.8	11.3
Was needed at home	2.0	1.6	2.8	1.1	0.3	1.7
Was ill/sick	2.7	2.5	2.8	2.1	0.6	2.3
I got married	2.1	2.3	0.0	1.7	0.7	1.4
Grades were very poor	2.1	0.4	2.4	1.5	0.6	1.5
Was suspended/expelled	0.9	0.5	0.3	0.5	1.1	0.6
Other (specify)	3.3	4.7	2.3	1.8	3.2	3.0
Too old	0.0	0.0	0.5	0.5	0.0	0.2
Total	100	100	100	100	100	100
N	422	396	440	350	135	1,743

Notes:

Sample is aged 18 - 24, are not currently enrolled and do not have a tertiary qualification

Means are weighted using the post-stratification weights

3.3.4 What empirical evidence is there to support the social externalities theories?

In general, it is very hard to find compelling evidence that speaks to the social externalities hypotheses. The reason for this is that, due to social stratification by neighbourhoods, it is almost impossible to disentangle neighbourhood effects from individual or household level income effects. Even if one were to focus on the small number of poorer students who commute to richer schools, any comparison would be contaminated by unobserved selection; the parents who make such sacrifices are likely to have a strong preference to invest in their children's education. This would probably manifest in several other dimensions that are important but unobservable to an empirical economist.

To date, there are at least two papers that speak to potential peer effects. The first, by Lam, Marteleto and Ranchhod (2009), makes use of CAPS data and finds that the age profile of one's peer group significantly affects the probability of early sexual debut for girls. The second, by Garlick (2012), makes use of the random allocation of peers in dormitories at the University of Cape Town to investigate the effects of the scholastic aptitude of one's peers on

one's own academic performance at university. He finds that peer effects are substantial and significant, and manifest most strongly for weaker students.

We provide two pieces of evidence that speak to the social externalities literature, one relating to career aspirations and the other concerning the development of abilities.

In Table 4 below, we summarize CAPS data and calculate the fraction responding to a particular category as their response to the question, "What work do you expect/plan to do at 30?" Recall that these were all young adults aged 14 – 22 at the time of the wave 1 survey in 2002. The responses are varied as there are several categories, so we present the largest categories and collapse the remainder, which is the majority of responses, in an "other" category.

Overall, it is hard to see clear patterns in this table. We find, for example, that youth in the poorest quintiles were the most likely to plan to be doctors, lawyers, social workers, college professors and nurses. Youth in the 5th quintile, in contrast, were most likely to be in agriculture or fisheries, decorators or designers or general managers in trade. The lack of a clear pattern, combined with the fact that even the poorest youth expect to be doctors and lawyers, suggests that aspirations are not being negatively affected through social externalities.¹²

Table 4: Expected occupation at age 30. (CAPS wave 1 data)

Occupation	Quintile					Total
	1	2	3	4	5	
Accountant	4.68	3.64	4.4	7.44	6.3	5.39
Medical doctors	7.75	6.47	4.85	2.93	4.14	5.14
Agriculture and fishery	4.29	4.12	6.08	3.15	7.63	5.11
Lawyers/Attorneys	6.56	4.86	5.43	3.88	2.89	4.61
Social worker	7.27	4.81	3.16	3	0.8	3.67
Teaching professional in higher education	4.95	4.47	1.68	2.63	2.25	3.18
Nursing	6.26	4.27	3.78	1.87	0.53	3.17
Decorators and designers	1.39	1.57	1.81	3.23	6.69	3.14
Machinery, mechanics and fitters	2.43	3.88	2.78	2.65	1.5	2.6
Mechanical Engineers	2.48	3.35	2.61	2.74	1.21	2.42
Productions and operations manager	2.5	2.13	2.68	2.74	1.79	2.34
General manager (Wholesale/retail trade)	1.5	1.67	1.55	1.86	3.29	2.04
Other	47.94	54.76	59.19	61.88	60.98	57.19
Total	100	100	100	100	100	100

The second piece of data relates to scholastic aptitude, and how it varies across income groups. We use the standardize literacy and numeracy scores from CAPS for this, and present

¹² In analyses of the NIDS data that are not included in this paper, we also found no discernible differences in terms of expectations regarding obtaining a tertiary qualification across the quintiles.

the results graphically. In order to make the graphs clearer, we collapsed the respondents into three income categories; “low income” which means that they are in quintiles 1 or 2, “middle income” which corresponds to quintiles 3 or 4, and “upper income” which corresponds to quintile 5. We then plot the distribution of aptitudes for three different age groups. This allows us to compare the differences in aptitudes across income groups, as well as how these differences evolve with time.¹³

The first thing that is striking is that the distributions are clearly different, and unambiguously improve with income. Even amongst the youngest CAPS respondents, these differences are already pronounced by the time they would ordinarily be in the early parts of secondary school. This corroborates the findings of Branson *et al* (2009) regarding the statement that many students might experience sufficiently

poor learning environments well before the tertiary level, such that eligibility for the tertiary level becomes a binding constraint.

When we consider the distributions amongst slightly older respondents, the differences become even more pronounced. The distributions for the low and middle income groups are mostly stable, with slight increases in both the means and variances. In contrast, the distribution of the upper income youths clearly shifts sharply to the right, and converges to the upper bound of the test.¹⁴

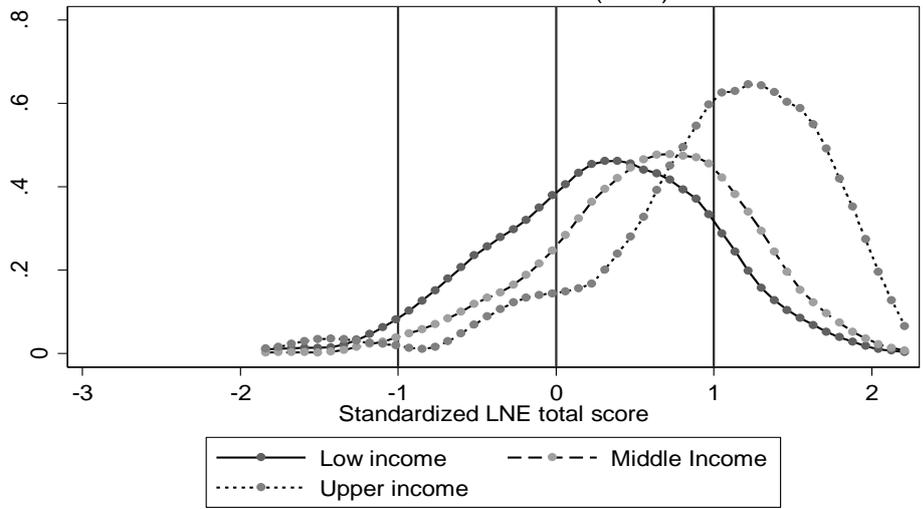
These findings are likely to be a result of several factors, one of which must be school quality. School quality itself will likely be a function of resources, infrastructure, teacher quality as well as peer effects. As explained above, we cannot separate the effects of these factors empirically. A partial resolution might be found in Wittenberg (2005). He makes use of time use data from Statistics South Africa’s 2000 Time Use survey and analyses differences in time allocated by children from different socio-economic groups to school and studies. He finds that punctuality and absenteeism seem to be problems disproportionately among poor learners, and that poor learners spend considerable time each day on chores. One could interpret this as weak evidence in favour of the social effects hypotheses, although the links are somewhat tenuous.¹⁵

¹³ Technically, we cannot separate between effects due to aging or potential differences in cohorts.

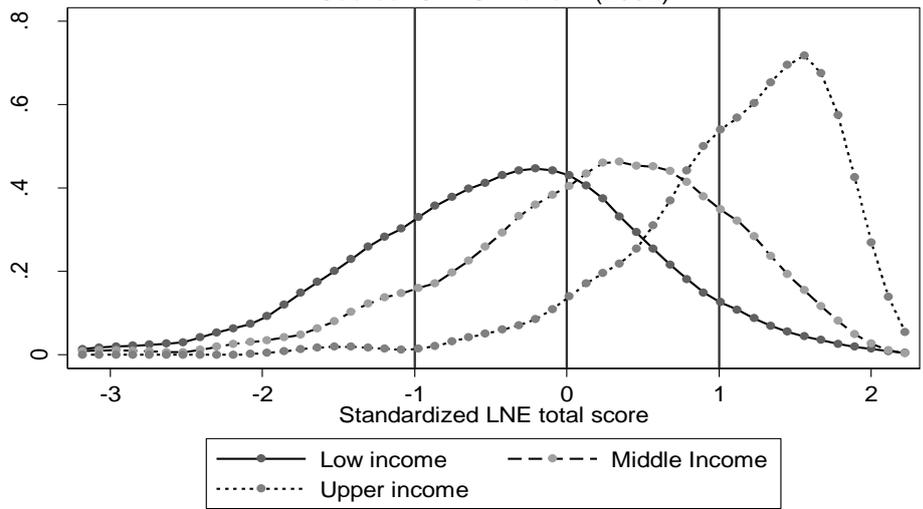
¹⁴ The test was relatively simple and composed of just a few questions. For this reason, it is a relatively poor discriminator of aptitude amongst relatively strong students. We would strongly expect that a more thorough test would have yielded even more striking levels of divergence as the groups from different socio-economic backgrounds get older.

¹⁵ It could also simply be the case that chores in richer households are outsourced to domestic workers, or are less time intensive. This would be a more conventional resources based explanation.

Performance on aptitude test by income group: Ages 14 - 16
Source: CAPS Wave 1 (2002)

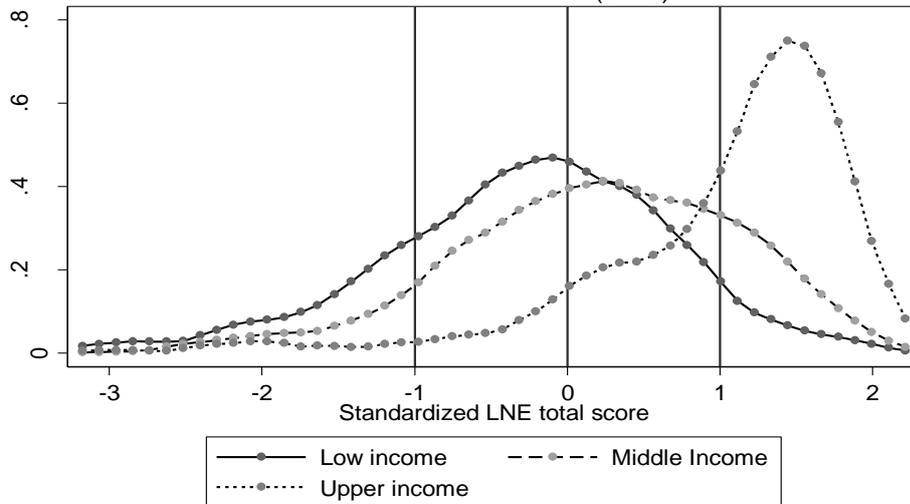


Performance on aptitude test by income group: Ages 17 - 19
Source: CAPS Wave 1 (2002)



Performance on aptitude test by income group: Ages 20 - 22

Source: CAPS Wave 1 (2002)



4. Policy Discussion

There appears to be sufficient evidence to suspect that South Africa is caught in an inequality trap where high inequality leads to low levels of skill accumulation, which in turn consolidates the high levels of inequality. The trap works particularly through tertiary education: it is at the tertiary level that access is very limited and that returns are very large. Credit constraints and social externalities are both likely to play a role in sustaining this trap, although we do not find evidence that lack of aspirations are part of the story. Credit constraints and social externalities matter for access to tertiary education directly, when making the actual decision, as well as indirectly, by limiting access to high quality education at the primary and secondary levels. This in turn prevents students from qualifying for tertiary studies. Thus, policies that seek to break the South African inequality trap need to address both access to tertiary education as well as the large differences in education quality at the primary and secondary levels.

We consider first policies that focus directly on improving access to tertiary education. One branch of these policies needs to address the issue of credit constraints. Theoretical models that incorporate credit constraints often mention general progressive redistribution as a policy implication. In the context of South Africa, this message should probably be viewed more as an argument adding to the debate on the benefits and costs of redistribution, rather than as a practical means to actually increase access to education. The reason is that, in South Africa, credit constraints in the tertiary decision are likely to apply to a minority of the population and are unlikely to bring about dramatic improvements in access: most prospective students from poorer backgrounds are actually not eligible to enter into universities. To this minority, however, credit constraints appear to be binding, and targeted redistributive programs are likely to be effective. Currently, there is an extensive means-targeted public program of financial aid, the NSFAS, consisting of bursaries and loans. In principle, this should alleviate

financial constraints for students willing and eligible to attend higher education. However, even in the presence of this program, there are still reasons why these constraints may still bind. Preliminary suggestive evidence on the basis of focus groups with matric students by Branson, Hofmeyr, Pellicer, Ranchhod and Wegner reveal two such reasons. First, prospective students often appear to lack information regarding the public program. For instance, when asked about possibilities to finance higher education, several students focused on the possibility of obtaining loans from large private banks. This suggests a lack of information about public financial aid, which provides loans on better terms and are far more accessible. Second, even if eligible for public financial aid, students typically need to pay registration fees up front. The existence of these fees was frequently mentioned in focus group discussions as dissuading applications to higher education institutions. Thus, for the public program to be more effective, efforts should probably be directed into extending the financing to cover registration fees as well as in disseminating information regarding the benefits and procedures of the program more widely.

A second policy intervention that flows from our analysis is to strengthen intermediate degrees: degrees between the high school certificate and university. As mentioned above, enlarging the offer of intermediate skills can help reducing inequality and promoting skill acquisition. In South Africa, FET colleges in principle fulfil that role. However, there are reasons to believe that access to these colleges could be improved. The focus groups mentioned above provide some evidence that the problem of lack of information and of registration fees might be most problematic regarding FET colleges. First, discussions made clear that prospective students have very little information on the types of studies and the financing possibilities afforded by public FET colleges. As an example, several students had applied only to the FET colleges that had visited their school, which often happened to be private colleges which typically charge higher fees. Second, there is evidence that school performance is a poor indicator of skill in many South African schools (see Lam et al. 2011). This suggests that students face high uncertainty regarding the level of their own skills and the likelihood of being accepted to universities. In that case, registration fees might deter particularly applications to FET colleges. When constrained by registration fees, students might put their resources into university applications rather than FET colleges in order to avoid the frustrating eventuality of finding themselves eligible but not having applied to universities.

Alleviating credit constraints and encouraging access to FET colleges would help in improving skills and reducing inequality. However, to achieve a major improvement, eligibility constraints need to be addressed. This involves encouraging broad access to quality education at the primary and secondary level. There are two basic approaches to this. First, to increase integration of the poor into existing high quality schools. Second, to improve the quality of poorer schools.

We consider first the challenge of integration of students from poorer backgrounds into high quality schools. As mentioned above, the same type of constraints that prevent the poor from accessing higher education; i.e. credit constraints and social externalities, can deter access to high quality schools. High quality schools demand not only higher transport costs and fees, but also higher expenses to ensure a successful social integration, (for example, via extra-curricular activities and lifestyle choices). Peer pressures (from one's own as well as other social groups) and role models may make it difficult from students from poor neighbourhoods to integrate successfully into schools dominated by students from rich backgrounds. Policy interventions to alleviate these constraints could include fee waiving for students from poor backgrounds (a policy already in place), as well as additional aid to cover transport and extra-curricular activities.

There are reasons to believe that these type of policies might achieve only limited success. First, it is difficult to conceive and implement policies that limit negative social influences on students from poorer backgrounds. Second, as argued by Selod and Zenou (2003), rich (typically white) families can adapt their behaviour in order to counter the effects of such policies. In their model, white parents raise fees to counter policy interventions to encourage black attendance to high quality formerly white schools. More generally, privileged families may increase all sorts of monetary and non-monetary barriers to outsiders. They may even leave the system altogether to set up private schools where the potential of government intervention is limited, bringing with them the very resources (eg. High quality teachers) that made their schools of higher quality in the first place. Moreover, integration policies, even if successful, are likely to drain poorer neighbourhoods from their most able students, thus deepening potentially negative social externalities in the schools of those neighbourhoods. Finally, and possibly most importantly, this type of policy can only succeed in improving the skills of a minority of poor students. The reason is that high quality schools in richer neighbourhoods are so few in relative terms that they can only productively absorb a small proportion of students from poorer backgrounds.

A policy geared towards increasing the quality of poorer schools has more potential to be successful. Based on the evidence provided here as well as the work of several others, it seems widely accepted that improving school quality remains a fundamental developmental objective that is also frustratingly difficult to achieve. The post-1994 era involved a shift in investment and redistribution towards historically disadvantaged schools, but research by van der Berg and Burger (2003) suggests that this did not result in improved student performance. However, for a combination of methodological and interpretative reasons, we should interpret his findings with caution. Indeed, Case and Deaton (1999) found quite the opposite; that school resources in South Africa do indeed explain differences in scholastic performance.

One aspect of improvement that we feel might be very important for improving school quality is to improve teacher quality. When we looked at career aspirations in CAPS, we

found that fewer than 10 respondents, out of approximately 4800, plan to be teachers at the age of 30. Teaching is thus clearly not seen as an occupation of choice for most young people. There are several reasons why this might be the case, and each of these could be addressed as part of a holistic approach to improving teacher quality. First, to qualify as a teacher generally requires a four year university degree. As argued in this chapter, this comes with considerable costs and barriers. Second, the financial remuneration is not that attractive, given the cost of the qualification. Starting salaries for teachers are only just over R70 000 per annum¹⁶, and while this could go up with seniority and qualifications, they remain relatively low when compared to private sector employment which also requires a four year degree. As such, the financial calculus and the time investment combined with the stream of financial payoffs might explain the low ranking of teaching as a career of choice.

More generally, there are other mechanisms that may also improve teacher quality. First, it might be worthwhile to reward teachers who display high levels of initiative and motivation. Second, there could be some negative consequence for poor behaviour. In the gift exchange models of effort (Akerlof, 1982 and 1984), people decide on what is fair effort for a given wage, and their concept of fairness is calculated by some reference group. Even if a small fraction of teachers are putting in low effort and obtaining the same wage, then this could make other teachers resentful, and eventually the equilibrium might converge to a low-effort equilibrium.

There may be political constraints in implementing overall wage increases or incentive schemes for teachers. Some social actors traditionally oppose the former while other actors oppose the latter. A possible politically feasible package would be to combine the two policies as a bundle: higher overall wages *and* incentive schemes. This could become palatable to a wide spectrum of social actors while promoting overall teacher quality.¹⁷

Moreover, our arguments, particularly those relating to remuneration, link almost directly back to inequality: There is a scarcity of high quality education, skilled people need to choose between medium-pay skilled occupations (which have positive social externalities), or highly paid skilled occupations in the private sector (which do not have the same social externalities), and this subsequently guarantees the lack of human capital in the subsequent generation. This vicious circle is stable or possibly even widening, and will continue to replicate itself unless strong and well directed government intervention is forthcoming.

¹⁶ Source: Government Gazette 34559 of 26 August 2011.

¹⁷ Note that these suggestions, while directed specifically at teachers, would also apply to any other professions that generate strong social externalities. Examples of these professions would include nurses, other healthcare professionals and social workers.

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