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What we can learn from a comparison of the schooling systems of South Africa and Argentina

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ABSTRACT

An existing accounting framework to describe an education system is elaborated and used as a framework for understanding and comparing the resource allocation policies of the South African and Argentinean schooling systems. The comparison highlights how, by paying fewer teachers more (relative to GDP per capita), South Africa is structurally forced to deal with relatively large class sizes. Both countries have attempted to use production function studies to understand ways of improving pupil performance, and in both countries the utilisation of education human resources appears particularly important. The economic case for expanding secondary schooling is perhaps not as strong as the policies, especially those in Argentina, suggest. Whilst rates of return to secondary schooling do not appear to offer concrete policy direction, a cross-country analysis that takes into account a secondary school completion ratio (a statistic calculated for this analysis) suggests that more policy emphasis should go towards improving the quality of secondary schooling.

Keywords: South Africa, Argentina, education policy, education financing, school, education, secondary school, educational quality.
JEL codes: D20, H52, I22

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1 Introduction

This paper aims to present an economically-oriented and policy-focussed comparison of the schooling systems of two middle income developing countries: South Africa and Argentina. For comparisons to be interesting and meaningful, there needs to be both sufficient similarities, and sufficient differences between the objects of comparison. South Africa and Argentina seem to satisfy these criteria. Both are middle income countries with elected governments espousing policies aimed at reducing poverty and inequality, partly through educational transformation. Both face high incidences of poverty (officially around 40% and 25% of the population in South Africa and Argentina respectively) and have recent experiences of authoritarian government aimed at promoting the interests of a small elite. The two countries are similar in terms of the size of the economy and the population, and both make the provision of schooling a provincial responsibility. At the same time, there are key differences with respect to educational policy, above all policies governing the determination of teacher salary and the allocation of teacher time.

The comparison leads to two types of outputs. Firstly, policy conclusions relating to the more economic aspects of the two schooling systems are presented. Given how much analysis occurs in the two countries, these conclusions are to a fairly large degree re-iterations of what others have already said, though we have tried to present the conclusions in a fresh way, partly through new data analysis. Secondly, through some discussion of the economics of education epistemology in our countries, and in the developing world in general, we arrive at suggestions on how the contribution of economics of education to education planning can be enhanced.

In section 2, an existing accounting framework to describe the key variables of an education system (originally put forward by Mingat and Tan in 1998) is extended, so that teaching time and class size are accounted for, and the framework is then used (in sections 3 and 4) as a basis for describing the two schooling systems. This analysis highlights how the two countries, despite similarities with respect to key economic variables, go about the schooling of their children in very different ways. South Africa pays its teachers relatively well, but requires them to teach large classes for a relatively long working year. Argentina pays its teachers less (relative to GDP per capita), but has smaller classes and a shorter school year. If one considers the hourly cost of teachers, then Argentina's teachers are more costly than South Africa's. An adult is three times as likely to be a teacher in Argentina as in South Africa. Perhaps the most prominent policy implication of the analysis is the importance in South Africa of training teachers to teach large classes, given the relatively inescapable nature of this phenomenon, at least in the medium term.

Section 5 discusses briefly how economics of education (and research in general) does, or could, contribute towards better policy formulation processes. A recent Argentinean Ministry of Education assessment of the effectiveness of the research-policymaking link in the country is discussed, as is that MoE's ongoing efforts at maintaining a publicly available education research database. Important hurdles in both countries have been the difficulty of accessing official statistical datasets, and the absence of an official MoE education research agenda.

Section 6 provides a review of education production function studies from the two countries. Key methodological challenges are discussed, including the need to incorporate data on the human capital of teachers in the production function (as has been done in some other countries), the importance of exploring class size threshold effects, and ways of gauging the impact of decentralisation of powers to schools (a growing phenomenon in both countries) on pupil performance. Clearly, better use could be made of the vital

ONE (in Argentina) and Systemic Evaluation (in South Africa) datasets. Moreover, a challenge for the analysts is to devise ways of packaging production function findings in such a way that they become more digestible in the policy formulation process, and become more useful in identifying policy priorities and trade-offs.

In section 7 ways of using economics of education to inform the expansion of the secondary schooling sub-sector are explored. This is partly in view of the recent decision in Argentina to make schooling up to Grade 12 compulsory for all pupils, and the fact that arguments to this effect have been made in South Africa. Studies on rates of return to education from both countries are discussed, and it is argued that these statistics would be strongly influenced by the absence of standardised qualifications below the Grade 12 level. This absence, which is unusual for an education system, gives rise to inefficiencies in both the labour market and within the education system. Five variables relating to secondary schooling, including a secondary school completion rate that is calculated, are used to gauge the situation in South Africa and Argentina in a global context. It is found that the completion rates for the two countries seem not to be problematically low (though the proportion of South Africa youths who successfully graduate from Grade 12 is probably too low). However, in both countries pupil performance at the secondary level is below what it should be (this is especially so in South Africa), and repetition is not declining as fast as it should.

The conclusion in section 8 argues why it is important to remain very focussed on the quality of schooling at all levels, given its clearly demonstrated importance for economic growth and the development of society. In practical terms, both South Africa and Argentina should expand and make more public their sample-based quality monitoring programmes, and should fill the qualifications gap below the Grade 12 level.

The question of what to include within the schooling system, typically the bulk of any education system, is subject to definitional flux. For the purposes of this paper, the optimal definition seemed to be the primary level (ISCED level 1) plus the general secondary level (ISCED levels 2A and 3A). Moreover, most of the focus is on public institutions within the system. In the case of South Africa, this means that the approximately 25,200 schools in the 'public ordinary schooling' system receive most of our attention. This system covers twelve grades – Grades 1 to 7 are referred to as primary schooling, and Grades 8 to 12 are referred to as secondary schooling. In the case of Argentina, our main focus falls on the approximately 16,800 public schools offering primary and secondary schooling, which since the 2006 National Education Law, may follow either a 7 plus 5 grade combination (as in South Africa) or a 6 plus 6 grade combination. Provinces have the right to select one of the two options, either of which results in twelve grades of schooling.

2 An accounting framework for schooling systems

Equation 1 below is more or less Mingat and Tan's (1998: 22) accounting framework. The equation represents an identity in the sense that most terms cancel each other out. It is an educational development model insofar as key ratios are expected to change in line with the level of development of the country. We use it due to its ability to highlight the relationships between key variables that describe an education system. Our discussion of the model in this section pays special attention to how the relevant statistics may be obtained in the developing country context.

$$\frac{G_e}{GDP} = \frac{P_e}{P_{sa}} \cdot \frac{P_{sa}}{P_t} \cdot \frac{TS}{GDP/P_t} \cdot A \cdot \frac{1}{P_e/T} \qquad (1)$$

For our purposes, the term $\frac{G_e}{GDP}$ refers to public spending on the schooling system (and not other aspects of the education system), over the country's GDP. We can call this ratio **relative (public) investment in schooling**. The values are easily obtained from official statistics (GDP tends to be more easily obtainable than GNP, which Mingat and Tan use, and this explains our divergence from their paper here). To some degree, we will also examine the schooling system in its entirety, which includes private spending and private institutions, and in doing this it is useful to replace G_e with all spending, whether public or private, in public and private schools (remembering that public spending on private schools and private spending on public schools may exist). Information on private spending on schools has to be obtained from household data, and this can be problematic, especially if the household survey does not separate out expenditure on schooling from expenditure on pre-schooling and tertiary education.

The **gross enrolment ratio** is represented by $\frac{P_e}{P_{sa}}$, which is the population enrolled in schools (of whatever age) over the population considered to be of school-going age. Here the public plus private ratio is more meaningful for planning purposes, though the ratio for just public schools allows us to compare the importance of the public system across countries. Typically, the gross enrolment ratio is calculated by using official Ministry of Education (MoE) enrolment statistics for the numerator and official population statistics from the country's statistical agency for the denominator. This approach, however, may result in considerable errors, because the two values are collected from different institutions which may go about their data adjustment and finalisation processes completely independently of each other. The extent of the problem may be gauged by comparing MoE enrolment figures with the corresponding number of household members enrolled in schools. It may be preferable to calculate the gross enrolment ratio from one source, an annual sample-based household survey (or the census, in a census year). This is likely to yield a more reliable ratio, though questions about what the numerator and denominator values should be would remain. McMeekin (1998) and UNESCO (2004) provide a discussion of these and other education statistics problems.

Here we shall refer to $\frac{P_{sa}}{P_t}$, or the population of school-going age over the total population, as the **demographic demand for schooling**. As Mingat and Tan (1998: 24) point out, the lower this demand, the greater the ability of the country to invest in the education of each child. Both the numerator and denominator values are obtainable from the statistical agency.

We can refer to $\frac{TS}{GDP/P_t}$ as **relative teacher pay**. *TS* is the average teacher salary in the sense of the average cost of each teacher (benefits should be included). The denominator represents the average income per capita, and so the whole term tells us the degree to which the income of teachers is higher than per capita income. Mingat and Tan (1998: 10) make the point that the value of this ratio can be expected to fall as the country develops, and as well paying jobs other than teaching become more common in the labour market. Cost per teacher can either be obtained from an analysis of payroll records, by examining the official teacher salary scales, or by dividing the total annual salary bill for teachers by the total number of teachers. Preferably, all three methods should be used to ascertain the accuracy of the *TS* value.

The term *A* in equation 1 is inserted by us, and is referred to as the **inflator for non-teacher costs**. This inflator takes into account that to the cost of each teacher, we should add the cost of the items that allow a teacher to be productive, where these items include, for instance, non-teacher support personnel such as cleaning staff, textbooks, other teaching materials, and the basic running costs of the school building. We shall be limiting our use of equation 1 to costs incurred within schools themselves, so *A* does not take into account the cost of the administration of the system occurring outside the schools. Moreover, we consider managers based in schools as teachers, so their cost is incorporated in *TS*, and not in *A.* A value of *A* of 1.10 would indicate that non-teacher costs come to 10% of the cost of teachers. Generally, the value of *A* is obtainable from an examination of the relevant financial statements of the education authorities.

Finally, P_e/T refers to the **pupil/teacher ratio**, where *T* is the total number of teachers. The value of *T* may be obtained from payroll systems, or from annual school census data.

It is likely that every value in Equation 1 will be obtainable, so the equation can serve as a means of verifying that the values one has obtained are correct.

Equation 2 below decomposes the pupil/teacher ratio in terms of the relationship between contact hours received by pupils, contact hours put in by teachers, and average class size. The equation provides a framework for examining matters that lie at the heart of the organisation of any schooling system.

$$\frac{P_e}{T} = c \cdot \frac{H_T}{H_P} \cdot CS \qquad (2)$$

Ideally, the pupil/teacher ratio should be pupils over teachers who spend at least some time teaching classes. Teachers who manage full-time (but are schools-based) or who provide support services such as counselling to individual pupils on a full-time basis should not be counted. Hence our denominator in the pupil/teacher ratio should ideally not be *T*, but *Tc*, where *c* is the proportion of teachers who actually teach. We call these teachers 'classroom teachers'. The value of *c* may be obtainable from annual school census data.

H_T is the average annual hours of contact time put in by each classroom teacher. This may be obtainable from annual school census data, or from a special census of teachers, if one exists. However, given difficulties around obtaining this value, the best option may be to solve for H_T using equation 2, assuming that all the other values are obtainable. H_P is the average contact time offered to each pupil in a year. Importantly, it is not the contact time actually received by each pupil, which would be less than H_P and would take into account the fact that the pupil is absent on some days due to illness or other reasons. The objective here is to establish how much contact time the schooling system offers to pupils. Calculating H_P could involve taking the official contact hours that pupils should receive in a year, and subtracting an estimated number of hours lost in a typical year due not to pupil factors but to systemic or environmental factors such as strikes, bad weather, and the cancellation of classes due to festivities, sporting events, and so on. Data in this regard are commonly collected from schools in some form or another. Where H_P has a different value for different sub-sections of the schooling system (for instance different grades), hours should ideally be weighted by number of classes for equation 2 to balance, but weighting hours by the number of pupils is sufficiently accurate. The ratio H_T over H_P can be thought of as an indicator of the **intensity of teacher utilisation**. If teachers put in as many hours as pupils are expected to receive, then the value of this indicator would be 1.0. However, the value is invariably less than 1.0 as teachers may be given free hours during the school day, and teachers take leave. *CS* is the average class size in the system. This is generally obtainable from annual school census data.

Calculating H_P involves multiplying the average daily hours of contact time offered to pupils, H_{Pd}, by the average actual teaching days per year, *D*, giving us the following:

$$H_P = H_{Pd} \cdot D \qquad (3)$$

Lastly, we can calculate the hourly cost, or hourly wage, W_T, of classroom teachers by dividing teacher salary *TS* by the average contact hours put in by classroom teachers in a year, H_T . *TS* is thus decomposed as follows:

$$TS = H_T \cdot W_T \qquad (4)$$

3 The values for the two schooling systems

In Table 1 the variables and ratios of the accounting framework described in the previous section are listed, and the 2006 values for the two schooling systems are filled in (as background, in row 2 we have included the figures for public spending on the entire education system, given how much attention these figures enjoy). In the case of each country, the 'All' column refers to private and public schooling combined, and the 'Public only' column refers to public schools only. With respect to funding, 'All' includes public funding of private schools, private funding of public schools, and private funding of private schools. These three categories of funding are all excluded from the 'Public only' column, which refers only to the public funding of public schools. Most of our focus was on obtaining values for the public system, as this is the sector we are primarily concerned with in our comparison.

Table 1: Values for the two schooling systems in 2006

Variable		South Africa		Argentina	
		All	Public only	All	Public only
GDP*	GDP	505,356		578,023	
Annual current expenditure on education*			25,761		29,479
Relative investment in education			5.1%		5.1%
Annual current expenditure on schooling*	G_e	18,825	16,084	25,635	21,512
Relative investment in schooling		3.7%	3.2%	4.4%	3.7%
Population enrolled in schooling	P_e	11,808,377	11,495,812	8,095,978	6,095,401
Population of school-going age	P_{sa}	10,816,511		8,195,145	
Gross enrolment ratio		1.09	1.06	0.99	0.74
Total population	P_t	47,390,900		38,970,611	
GDP per capita		10,664		14,832	
Demographic demand for schooling		0.23		0.21	
All teachers	T		350,452		475,857
Pupil teacher ratio			32.8		12.8
Average annual teacher salary*	TS		41,770		40,686
Relative teacher pay			3.92		2.74
Inflator for non-teacher costs			1.10		1.11
Proportion of classroom teachers	c		0.96		0.78
Average class size	CS		47.3		26.0
Daily hours of contact time offered to the average pupil	H_{Pd}		5.2		4.4
Average actual teaching days per year	D		194		165
Annual hours of contact time offered to the average pupil	H_P		1,003		727
Annual hours of contact time put in by the average teacher	H_T		725		458
Intensity of teacher utilisation			0.72		0.63
Hourly wage of classroom teachers*	W_T		58		89

Sources: A variety of education and finance ministry reports, and household data (for private spending).
Note: Values marked with * are in 2004 USD PPP (GDP and annual current expenditure are in million USD PPP).

Certain details regarding the derivation of the values deserve mention. Obtaining private household spending on schooling was facilitated in the case of South Africa by a household survey commissioned by the MoE to gather education-related information from households not collected in the regular household surveys of Statistics South Africa. This allowed for household spending on schooling to be separated from household spending on pre-school and tertiary education. Such data was not found for Argentina, and here a more indirect method using various sources was used. Both countries displayed substantial disparities between the enrolment figures of the MoE and the enrolment figures of the national statistical agency. However, whilst in South Africa the Statistics South Africa figures exceeded the MoE figures, in the case of Argentina, the MoE figures exceeded those of the INDEC (the Argentinean statistical agency). In the case of each country the values used for the gross enrolment ratio were decided on after consideration of the country's statistical peculiarities by the two authors. Obtaining the number of teachers in the case of South Africa was a relatively simple matter involving an examination of annual school census data and payroll data. In South Africa, it can safely be assumed that virtually all teachers counted in the school census teach in one school only. However, in the case of Argentina, this assumption does not hold. Here use had to be made of data from a special MoE teacher survey, which collects the unique national identity numbers of teachers surveyed in each school, so that the double counting of teachers can be avoided. A nationally standardised payroll system in South Africa allowed for a relatively easy calculation of the average teacher salary, which was then verified in terms of overall expenditure and headcount data. However, in the case of Argentina, where the payroll systems are completely provincial, the approach taken was simply to divide the teacher salary item in the budgets by the number of teachers. In the case of both countries the contact hours worked by each teacher were derived using Equation 2 above given the absence of reliable data in this regard in South Africa, and problems around using the existing data in the case of Argentina.

4 The policy architecture of the two schooling systems

In this section we describe what one could refer to as the overall economic policy architecture of the two schooling systems. This description serves as an important backdrop to the issues-focussed policy discussions in sections 6 and 7 below. It is structured along the lines of the accounting framework referred to in the last

two sections. In a sense, we ask what features within each country's policy make-up might explain the key values we see in Table 1.

South Africa

Public spending on schooling. The level of public spending on schooling in the case of South Africa depends on both national and provincial factors. The national government is responsible for most tax collection in the country, and it is moreover obliged to fund provinces with respect to services that they must deliver. The effect of this arrangement is highly redistributive, with poorer provinces experiencing a level of funding by the national government that far exceeds the tax base. Though provincial governments have some scope for their own tax collection, the revenue based on this mechanism is on average just 3% of total provincial revenue. The remaining revenue of provinces comes from the national level. The bulk, around 84%, of this revenue takes the form of a block grant whose size depends on the size of the overall fiscus as well as political decisions. The remaining 16% of the revenue received from the national level comes in the form of conditional grants tied to specific national priority programmes. However, only 1% of revenue received from the national level is in the form of conditional grants dealing with education priorities, making the education sector, relative to some other sectors, strongly subject to the provinces' own budgeting decisions. The education conditional grants are focussed mainly on the school nutrition programme. The distribution of the block grant across provinces is driven by a formula that weights each province according to variables describing the demand for the services that provinces must deliver. Importantly, there is no costing of services in absolute terms in the distribution process, though introducing such absolute costing has been the subject of intense debate. All pre-tertiary education is a provincial responsibility, and here enrolments in both public and private schools and the size of the school-age population are the variables used in the distribution formula – both variables are equally weighted. Although the national formula lacks any absolute costing of services, it is possible to use the formula to arrive at theoretical budgets per province and per sector and these provide useful benchmarks against which to measure actual provincial spending on education. However, provinces are in no way obliged to divide the provincial budget up according to the weights in the formula, and differing understandings on how much funding ought to flow to education, and within education, to each of the education programmes, is a constant source of political tension between the national and provincial education authorities. With respect to education, however, provinces have funded the sector more or less at the level implied by the formula, deviating from it in general by no more than 10% either way. Public schooling accounts for around 85% of total provincial spending on education. The percentage of the total flowing towards public subsidies for private schools is extremely low, at about 0.5%, and almost half of this funding occurs in one province. Uniformity across provinces with respect to average per pupil spending on schooling is promoted, though by no means guaranteed, both through political persuasion (currently the same political party governs the national government and all the nine provincial governments) and through national spending policies, for instance with respect to non-personnel recurrent funding per pupil and the crucial national salary scales for teachers, which we shall discuss shortly.

Private spending on schooling. The country's national teacher allocation policy and the non-personnel school funding policy, are to a large extent aimed at equalising spending across all pupils within one province's public schooling system. However, their design also contributes towards keeping the private funding of school education relatively low through two important mechanisms. Firstly, the non-personnel funding policy has allowed affluent communities to supplement public funding of public schools through the charging of school fees, without any maximum limitations. Currently, in the 10% most advantaged segment of the schooling system – this corresponds more or less to the schools that served white communities under apartheid – private revenue amounts to around 50% of public revenue. In order to reconcile this arrangement with the government's poverty alleviation commitments, poor households have the right to be exempted from the payment of school fees if they pass a means test designed nationally but administered by the school. The school carries the cost of these exemptions, a fact that tends to result in both dissatisfaction amongst fee-paying parents and pressure on poor parents not to exercise their exemption rights. In spite of appearances, the policy of allowing considerable private funding in public schools serving affluent communities has arguably had the effect of suppressing private spending on schooling. Without this policy, it is likely that rich households would have left public schools spending below a level to which they were accustomed historically (apartheid public spending was not equal), and would have moved to private schools where the bulk of costs would have had to be covered through private revenues. The South African schooling system would have been less public, and more like a typical Latin American schooling system. In a sense, the government subsidises more affluent communities to stay in the public schooling system in the interests of social

cohesion. It is noteworthy that currently black pupils, largely from middle class households, make up about half of enrolments in formerly white schools, and that the proportion of pupils in private schools remains low at 3%. The second way in which private spending on schooling has been regulated has taken effect after 2006, and involves the banning of school fees in the poorest 40% of schools. In 2006, these schools were charging relatively low fees amounting to around 2% of public funding. The policy that bans school fees for the poor is linked to national semi-binding public spending targets aimed at ensuring that non-personnel public funding per pupil by provinces is sufficient to cover the basics, including textbooks, stationery and building maintenance.

Enrolment levels. Enrolment levels are partly driven by a national policy that has made nine years of schooling compulsory since 1996. Thus a pupil who does not repeat any grades should continue to the end of Grade 9. Currently, around 5% of youths do not complete nine years of schooling, so the aims of the policy are to a large degree fulfilled (South Africa: DoE, 2008). However, grade repetition levels are relatively high, and just under 20% of youths do not enter Grade 9. High repetition levels lie behind the greater than 1.00 gross enrolment ratio seen in Table 1. In fact, only around one-third of youths successfully complete Grade 12, in the sense that they obtain the Grade 12 qualification, though about 50% of each cohort gets to participate in Grade 12. With regard to the pre-school level, current policy aims to universalise the one year preceding Grade 1 by 2010.

Teacher pay. In South Africa, despite the fact that provinces employ teachers, a single set of national salary scales maintained through national bargaining with unions is applied. Crucially, teacher unions succeeded immediately after 1994 in setting the salaries for all teachers at the advantageous level enjoyed by white teachers under apartheid (white teachers comprised around 13% of all teachers). This largely explains South Africa's relatively high teacher cost with respect to teacher pay over GDP per capita. It is noteworthy, however, that whilst the value for this indicator exceeds that for Argentina by far (3.92 against 2.74), teacher cost per contact hour is considerably higher in Argentina than in South Africa (this is examined in more depth below).

Quantity of teachers. In the late 1990s, the national government attempted to promulgate overall pupil/teacher ratio norms for the provincial schooling systems. It became clear, however, that provinces could not reconcile simultaneous constraints with respect to budgets, teacher salaries and pupil/teacher ratios. One of the three factors had to be left as a function of the other two. It was accepted that the pupil/teacher ratio would have to be left unconstrained. This had the unintended effect that the ratio, and the related question of class sizes, was left as a relatively un-monitored aspect of the schooling system. Only recently has policy attention been re-focussed on the matter, and in particular on class sizes, which in many schools are clearly excessive. It is estimated that around 10% of pupils are in classes with more than 65 pupils. The difference between class size and the pupil/teacher ratio is of course linked to the difference between the contact time of teachers and that of pupils.

Contact time. The hours of teaching to be received by each pupil is specified in policy, and works out to an average of 1,003 hours per pupil per year, as indicated in Table 1. The hours that each teacher should teach, on the other hand, is somewhat ambiguous in the policies, and is subject to differing interpretations by school principals and teachers themselves. It is to some extent this policy uncertainty that lies behind the great inequality in class sizes. Teachers are to a large degree equitably distributed across schools relative to enrolled pupils. However, poor practices with respect to the utilisation of teacher time in many schools result in class sizes being much more unequal than they could be.

Argentina

Public spending on schooling. In Argentina, as in South Africa, the overall amount of public spending on schooling is the result of a mix of national and provincial factors. In Argentina, however, provinces play a larger role, partly because provincial own tax revenue is higher, at an average of around 25% of total revenue, though this varies greatly from one province to another. Most funding for provincial public services comes in the form of a non-earmarked grant for each province from the national government. In general, this national funding is divided across provinces in a highly redistributive manner, so in general poorer provinces receive a larger amount per capita than do the richer provinces. However, this pattern does not always hold true as the distribution formula is not systematically based on service demand data, as is the case in South Africa. Instead, the formula is based on a mix of political decisions taken many years ago, and some fairly dated

analysis of historical data. The formula does not provide a basis for estimating theoretical education budgets in provinces, as is the case in South Africa. Nonetheless, as in South Africa, the topic of the 'right' level of funding for education in each province is a contentious matter that provokes intense national-provincial debates (see for instance Morduchowicz, 2002). Though most funding from the national level is not earmarked, a limited amount is. Mostly, this pertains to a national programme, FONID, aimed at topping up teacher salaries in those provinces which pay below cut-offs set by the national government. This programme was started in 1999 in response to major union pressure relating to inter-provincial pay differences. Smaller earmarked amounts are used to supplement regular provincial funding of a variety of items such as textbooks and IT in schools. The FONID programme accounts for about 6% of total provincial spending on education, and the other earmarked amounts account for a further 2%.

Apart from the fact that Argentinean provinces enjoy more own provincial tax revenue than South African provinces, there are a number of other factors that cause public spending per pupil in public schools to diverge more across provinces in Argentina than in South Africa. Just the fact that there are more sub-national units in Argentina (23 provinces plus the capital territory) makes it more difficult for the national government to standardise provincially offered public services. Considerable party political diversity across provinces also complicates national alignment efforts. Enrolment rates are relatively uniform across provinces. What varies much more is the public funding going to each pupil in the public system. This is largely attributable to the fact that the teacher salary is determined at a provincial level. To some degree the FONID programme does reduce teacher salary differentials, but the overall picture is still one of large inter-provincial differences. As in South Africa, the pupil/teacher ratio is subject to provincial decision-making. In one respect this is even more so in Argentina than South Africa. In South Africa, a national school staff establishment policy defines the kinds of teaching posts schools require, and lays down parameters for an equitable distribution of posts across schools within a province. However, as we have seen, it stops short at establishing inter-provincial equity in the staffing of schools. In Argentina, whilst a core nomenclature of teaching post types exists at a national level, the actual staff establishment policy is promulgated by each province.

Unlike South Africa, Argentina has placed substantial emphasis on setting a norm for the overall amount of public spending on the education sector, as a proportion of GDP. These efforts culminated in the 2005 Education Funding Act, which lays down in some detail how the national and provincial governments should increase the funding of education so that an overall level of 6% of GDP is attained by 2010. Historically, this figure has fluctuated around 4%. The bulk of the additional funding is expected to be derived from revenue collected nationally. The impetus behind the new law is partly the fact that Argentina's public expenditure on education over GDP figure has tended to be below the Latin American average.

Around 15% of provincial funding of schools flows towards private schools, which accommodate about 25% of all school pupils. This funding is primarily directed at financing the teaching staff of private schools. Approximately half of these schools receive sufficient public funding to cover the salaries of all their teaching staff, meaning that at least 80% of their running costs are covered by the state. It is telling to contrast these private schools with the South African public schools serving the high income decile of that country. The South African schools see only about two-thirds of their running costs covered by the state. Clearly, the classification of a school as a private school often has little to do with the amount of public funding received. In this instance, South Africa's unique history and current political interest in seeing all schools, no matter how divergent, as part of an all-inclusive public system appear to be the overriding factors. However, it is also a question of conditions attached to public funds. All public funding to all public schools in South Africa is subject to the same public accountability rules, whilst in Argentina public funds directed to public schools are subject to different, and generally more detailed, accountability rules than public funds directed to private schools.

Private spending on schooling. The high proportion of private schools in Argentina, in particular the high number of private schools receiving little or no public funding, results in more private funding of schooling in Argentina than South Africa. However, even in Argentinean public schools there is some private funding, of both a direct and an indirect nature. Direct private contributions may occur into a school fund that is established, according to provincial policy, to deal with smaller costs relating to such things as building maintenance and minor building repairs. Provincial policy specifies that parents and school management may jointly determine a small annual sum to be collected from households for each pupil, though payment of this sum of money is voluntary. Although national statistics on the extent to which parents pay the annual sum are

not produced, it is generally believed that a majority of parents do make the contribution. The end effect is thus similar to that of South Africa's school fees, though the problems in South Africa associated with the compulsory nature of the fees is avoided. However, the annual contributions in Argentina are not without their own problems, relating largely to occasional community dissatisfaction with the way the school administration manages and uses the school fund. Traditionally, indirect household contributions to the schooling process in the form of household purchases of textbooks and stationery has been the norm. These contributions have been regarded as compulsory, and are hence also comparable to the school fees of the South African system. In recent years, and especially in the case of socio-economically disadvantaged areas, the responsibility for the direct and indirect contributions have increasingly been shifted from the household to the state. Certain provinces (and even the national level) transfer public money into the school fund, and in kind provisioning of textbooks, stationery and even school uniforms to the school have become common. These interventions have focussed in particular on primary and junior secondary schools. A key question is obviously the extent to which the interventions have succeeded in relieving poor households of financial burdens which could undermine their access to public schooling. There is currently insufficient research to answer this question conclusively, but the available information suggests that most poor households continue to carry a financial burden with regard to inputs such as textbooks which is unacceptably high.

Enrolment levels. Up until 2006, one year of pre-school, and the first nine years of schooling were compulsory, giving a total of ten years of compulsory education. In 2006, schooling up to the twelfth grade was declared compulsory, giving thirteen years of compulsory education. Despite this ambitious policy goal (most developed countries require considerably fewer than thirteen years of compulsory education), Argentina's enrolment profile is typical for a middle income country, and only slightly better than that of South Africa. Around 15% of youths do not enter Grade 9 (according to the pre-2006 policy, all should), though very few youths, fewer than 3%, leave school before age 14, the age that more or less corresponds to Grade 9 (these figures refer to both the public and private sectors). Around 50% of all youths obtain the Grade 12 qualification, which is considerably more than the one-third in South Africa. Clearly, attaining the new 2006 policy goal in Argentina will require a massive expansion of the post-Grade 9 schooling system. Below, we will discuss the economics of this, taking into account, for instance, the fact that unlike South Africa, Argentina applies less stringent criteria for determining who obtains the Grade 12 qualification. The fact that the gross enrolment ratio is somewhat lower in Argentina than in South Africa (0.99 against 1.09), despite a slightly higher Grade 12 completion rate, is almost certainly attributable to higher repeater rates in South Africa (absolute certainty would require some rather detailed analysis of the repeater figures, which for most developing countries, including the two countries considered here, are fairly unreliable). The new policy targets in Argentina imply a major increase in the gross enrolment ratio (assuming that repetition rates remain more or less constant), a change that would undoubtedly have a knock-on effect on other values in Table 1.

Teacher pay. As we have seen above, teacher salaries in Argentina, which are negotiated between provincial unions and provincial governments, differ considerably from one province to another. The highest provincial average is over three times greater than the lowest provincial average. Three factors facilitate such large differences: the proportion of provincial revenue derived from own provincial taxes, the province's budgetary prioritisation of education relative to other sectors, and the degree to which certain provinces, in particular poor ones, receive a grant from the national level that is above average relative to the size of the school-age population. The complexities are such that there is not a clear correlation between a province's level of poverty and the provincial teacher salary. In some cases poorer provinces enjoy above average teacher salaries, but this is not always the case. The national federation of teacher unions in Argentina has for long attempted to bring some standardisation across provinces in teacher salaries, and has to some degree been successful with the national government's adoption of the FONID equalisation fund. However, inter-provincial salary differences are only part of the reason why teacher income in Argentina is considerably more unequal than in South Africa. The way teacher labour is organised in Argentina results in considerable inequality. Whilst in South Africa, virtually all teachers are employed full-time to work in one school, in Argentina teachers working above the Grade 6 level are paid by the hour, and these hours may be taught across several schools. Thus around 20% of teachers in public schools report teaching less than 20 hours per week, whilst 25% report teaching 40 or more hours per week. Around 20% of teachers work in more than one school, and 6% work in more than two schools (Argentina: MdE, 2006a, and own analysis of Argentina: MdE, 2006). This diversity of hours and number of schools is more pronounced at the senior secondary level. It is facilitated by the fact that the great majority of public schools, at the primary and secondary levels, offer a morning and an afternoon shift to different groups of pupils.

Quantity of teachers. Relative to the number of pupils, Argentina is 2.5 times better endowed with teachers than South Africa, at least in quantitative terms. The figures in Table 1 provide an idea of how this is possible: an Argentinean teacher costs three-quarters as much as a South African teacher (relative to GDP per capita), and GDP per capita is 1.4 times as high in Argentina as it is in South Africa. Moreover, the design of the policies that determine the staff establishments of schools in Argentina is more likely to encourage the hiring of new teachers than the design of the corresponding policy in South Africa. (The staff establishment in Argentina is referred to as the POF, an abbreviation of *Plantas Orgánico Funcionales*). Firstly, in Argentina the policy is entirely provincial, so the setting of absolute pupil/teacher ratios in the policy is a possibility and indeed a logical thing to do. In South Africa the policy, which is national, cannot do this as budgets are not controlled nationally, and the alternative of province-specific pupil/teacher ratios established either within the national policy or in separate provincial policies has up till now not been explored. Though Argentinean provinces are obviously subject to the normal budgetary constraints, the existence of absolute pupil/teacher ratios in their teacher allocation policies creates a propensity towards prioritising the hiring of new teachers whenever enrolments rise. Secondly, the provincial policies in Argentina dealing with teacher allocation cover an extraordinarily large variety of post types, up to around 300 in the case of one province. This encourages specialisation in the teaching profession, but not a culture of multi-tasking. This tends to result in a perceived demand that is higher than what would have been the case if job descriptions were more open and flexible. Lastly, it is relatively common in Argentina for provinces to grant posts in excess of the norm in the policy.

Contact time. In Argentina, a lower average daily contact time for pupils (partly a result of the double shifting of schools) and a shorter school year result in a total annual contact time for the average pupil that is around three-quarters of what it is in South Africa. The shorter contact time experienced by Argentinean pupils, combined with the fact that the 'intensity of teacher utilisation' (the ratio of the pupil's contact hours to the teacher's contact hours) is lower than in South Africa, results in an average cost per teacher contact hour that is considerably higher than that in South Africa (89 versus 58 USD in purchasing power parity terms). But the cost per contact hour figure is obviously a rather limited indicator of the unit cost of the teacher service because it assumes that this service is only provided through contact hours. What it does not take into account is the educational value offered by the 22% of teachers who do not teach (in South Africa this figure is a mere 4%). It should be remembered that we are only referring to teachers who are attached to institutions. Teachers attached to administration offices are excluded. In Argentina, around 4% of the around 475,000 schools-based teachers are in school management positions (this percentage is thus the same as in South Africa). A further 11%, approximately, are on various forms of paid leave at any one point in time. Leave policies are considerably more generous in Argentina than in South Africa, for instance there are separate allowances for leave days relating to personal illness, and for leave days relating to the illness of a family member (together these two allowances come to around 45 days per year, against an average of 13 days of sick leave per year in South Africa). A further 7% of Argentinean teachers occupy support functions providing, mainly, classroom-based support (in the lower grades) and counselling and social support outside the classroom.

Despite the fact that the intensity of teacher utilisation is lower in Argentina (0.63 against 0.72 in South Africa) and the fact that such a high proportion of teachers in Argentina do not teach, the sheer size of the teacher workforce in Argentina allows for the average class size to be almost half of what it is in South Africa (26 against 47). In Argentina, 1 in 27 adults aged 15 to 64 is employed as a teacher of some kind (in public or private service) – in South Africa the ratio is 1 in 72. Such a large difference reflects a fundamentally different approach in the two societies towards the teaching profession.

The comparison in a nutshell

There are key similarities between the two countries with respect to their schooling systems. Both are characterised by national-provincial tensions over how resources should be allocated to the education process. Both spend a similar percentage of GDP on schooling, and both experience a similar demographic demand for schooling (though both of these variables display slightly more favourable values in the case of Argentina). However, two structural differences result in strongly divergent approaches to the production of schooling. The first key difference, put simply, is that South Africa has fewer highly paid teachers, whilst Argentina has more not-so-highly paid teachers (here we are referring to teacher pay relative to GDP per capita). This difference is rooted in the histories of the two societies. In South Africa, teacher pay became standardised at the highest existing level in the strong drive for national unity following the fall of apartheid.

This, in a sense, forced the post-apartheid government to continue with the rather unfavourable aggregate pupil/teacher ratios that had existed under apartheid. In Argentina, a long history of relatively powerful provinces has fragmented the teacher labour market, the result being a highly inequitable distribution of teacher pay. This inequity is not necessarily undesirable. Higher teacher salaries in provinces with a poor human capital endowment can help to bring about greater equity in the distribution of pupil performance. The second key difference relates to physical infrastructure, specifically the phenomenon of multi-shift schools in Argentina (this phenomenon is widespread in Latin America). This places a very real constraint on the length of the school day for pupils.

These structural differences have implications for where the schooling systems need to place their emphasis if quality schooling is to be offered. Relatively large classes and relatively long working days (in addition to a long working year) in South Africa imply that administrative and logistical support by non-teacher staff (who are paid considerably less than teachers) to support teachers seems important. Teaching time simply costs society too much, and is too scarce, to allow for the use of teaching time for non-teaching tasks. Clearly, pedagogical methods need to be strongly focussed on how to educate large classes. To some extent, the problem of large classes could be reduced through Argentinean-style double-shifting of classes, especially at the secondary school level where the curriculum is more subject-oriented. However, much would depend on the interest amongst teachers to exchange extended teaching hours for lower class sizes.

In Argentina, on the other hand, the challenge lies in compressing quality learning into fairly limited pockets of time. Some of this need for compression could be removed if the school year were longer – the alternative of lengthening the school day is clearly difficult. Opportunities for addressing these challenges need to be found in the very low overall pupil/teacher ratio in Argentina, which allows, for instance, for remedial support to smaller groups of pupils.

5 Promoting a more empirically informed policy process.

The extent to which economics of education is used as a tool to improve policy design and implementation depends strongly on the status of research in general within the policymaking cycle. Current thinking can be summed up as follows. Financing of research into education must be adequate – as an example of developed country practice, in the United Kingdom this financing is estimated to be around 0.5% of overall spending on education. Institutional arrangements should be such that a research monopoly by one organisation is avoided, and should promote multi-disciplinary work within a medium to long-range framework developed or endorsed by the government, and linked to data collection cycles. Considerable emphasis needs to be placed on bridging the divide between researchers and policymakers, through intermediary institutions that can quality assure and synthesise the range of research outputs, and through a better focus within much of the research on the policy specificities of the education sector (Argentina: DiNIECE, 2006).

DiNIECE, a unit of the Argentinean Ministry of Education responsible for education statistics, evaluation of the education system and research coordination, has evaluated the education research situation in the country and recommended a number of strategies for improving the use of research in policymaking. On the side of research production, the Ministry should improve the accessibility of official data, should promote more active participation by teacher unions, and should make its research needs clearer. With regard to research dissemination, the point is made that planners and managers in the public system often find it easier to access foreign texts than locally produced texts, partly because foreign texts are more readily accessed in traditional formats such as books, whilst local texts are often disseminated by the less familiar medium of the internet. Poor skills in the use of the internet, and poor packaging of information on the internet, rather than the availability of the technology itself, appear to be the key problems. Moreover, insufficient focus on concrete policy solutions, and inaccessible jargon in many research texts also stand in the way of better use of research in policymaking (Argentina: DiNIECE, 2006). Though the South African Ministry of Education has not published its own account of the research in policymaking challenges, it seems safe to say that the South African challenges are similar to the Argentinean ones, though the challenge of building sufficient individual and institutional research capacity is perhaps greater in the case of South Africa, given how recently obstacles such as race-based exclusions in universities were removed.

There appear to be valuable institutional lessons emerging from both countries. DiNIECE has started making whole datasets available to researchers as downloads off its website, notably the dataset of the 2004 Teacher Census. DiNIECE's online database of references to and summaries of around 600 locally produced research

texts, based on periodic surveys of research institutions across the country, also deserves mention (though extremely few texts deal with the economics of education). In South Africa, the Education Labour Relations Council (ELRC), which brings together government and the teacher unions, has devoted a considerable portion of its funding (derived both from government and union membership fees) towards research projects designed jointly by both parties and focussing on teachers.

6 The challenge of improving educational quality

The outputs of schooling in South Africa are well below what could be expected, given the levels of spending on the sector. This problem has become particularly evident in the regional SACMEQ programme, which has indicated that with respect to primary schooling South Africa performs considerably worse, in terms of standardised test scores, than countries with much lower per capita education spending, and poorer populations, for instance Kenya and Tanzania (Ratsatsi, 2005). Whilst average pupil performance in the Argentinean schooling system is undoubtedly better than that in the South African one (we shall see this below), quality problems are evident in the Argentinean system as well. Argentina's 15 year olds performed substantially worse than those of Chile in the 2006 PISA science test, and the same as those in Brazil, despite the fact that spending per pupil at the public secondary level is about twice as high in Argentina as it is in Brazil (OECD, 2007, UNESCO, 2007: 350). Outputs in both systems are notably unequal, with both countries displaying exceptionally high between-school inequalities relative to their regional counterparts, and relative to the rest of the world (Van der Berg, 2005; OECD, 2007: 171).

Economics of education has proven to be most useful within the policy process in areas where, firstly, the education policy challenge lent itself to economic theory and, secondly, there was sufficiently relevant data available within the education sector. One such area has been the productivity of the school, where theories of production and sample-based data collections covering both background variables (relating to schools, pupils and teachers) and pupil test scores have converged into the so-called education production function, which attempts to assess the internal efficiency of schooling. Specifically, the efficiency of increasing the level of different inputs as a means to improving outputs is assessed.

Education production function studies have tended to yield less policy information than was expected. Partly, this is due to the fact that, especially in developing countries, the available datasets were not designed for this kind of study, and are far from ideal. Specifically, cross-sectional data, as opposed to time series data, impose considerable limitations on the analysis, and typically the available data lack important information regarding school management practices and teacher human capital (though with regard to this last point, there are exceptions, as we shall see below). To some extent the methodological rigour of available studies is questioned, and very often there is a problem in packaging the findings of these studies in such a manner that they make sense to a wider audience, including policymakers. Despite these difficulties, there is keen interest within the education planning community in taking this type of analysis forward (see for instance UNESCO, 2005: 64 and OECD, 2007: 264), partly as a result of recent findings of how important schooling quality, relative to schooling quantity, is for country development (Hanushek and Woessman, 2007). In South Africa, the Ministry of Education was actively involved in a production function analysis undertaken by Bhorat and Oosthuizen (2006) (though, as the researchers themselves pointed out, the availability of just school-level and not pupil-level data seriously limited the study).

To what extent have production function studies succeeded in shedding light on the school production process, and in shaping policies dealing with educational quality, in our two countries? A number of studies have taken place using data from both countries. With regard to the teacher input, Santos (2007), using Argentina's 2000 PISA data, concludes that teacher qualifications exert no significant impact on pupil performance, though positive teacher behaviour in the form of less absenteeism and more professional commitment (as described by the school principal) does. Gustafsson (2007), using data from UNESCO's regional SACMEQ programme, draws similar conclusions for South Africa. SACMEQ offers an exceptional opportunity to examine the role of teacher human capital in producing pupil learning as the programme includes a teacher testing element. Unfortunately, union opposition to the teacher test resulted in South Africa being one of two countries (the other is Mauritius), out of the total of fourteen participants, which did not carry out this test. Analysis of the countries that did include the teacher test reveal that in the four SACMEQ countries where the teacher test results did display a significant and positive association with pupil performance in a production function, these results were more significant than teacher resources (Lee, Zuze and Ross, 2005). A rather crude production function model was run by us for Namibia (a country which to a

large degree shares South Africa's educational history), and the teacher test score variable was found to display the second-greatest association (after the school infrastructure variable), as measured by standardised slope coefficients, with the pupil test score (see Appendix for details). This confirms the problematic nature of production function studies that exclude the teacher competency variable, and the importance of having unions onboard important research programmes, especially in countries with politically powerful teacher unions (such as South Africa and Argentina).

Class sizes beyond certain threshold points can be expected to have a negative impact on pupil performance. Santos (2007) identifies the threshold class size for Argentina, in around Grade 9, as being 32 (the methodology behind this finding is not explained however). South African studies have tended to find class size a weak lever for performance improvements, though one suspects this is more due to problems around the specification of class size in the models (specifically, the failure to explore threshold values) as opposed to the inherent non-significance of class size. Here South African analysts may have been overly trusting of findings from other systems, with far lower average and high-end class sizes, indicating that class size is not a problem. It seems improbable that having more than, say, 60 pupils in a class at the primary level will not have a detrimental impact on learning. The largest classes in South Africa are large even by regional standards – the 2000 SACMEQ dataset indicates that 10% of South Africa's Grade 6 pupils were in classes with more than 58 pupils, whilst the corresponding value was 36 in Botswana, 50 in Zambia, Kenya and Uganda, and 52 in Namibia (but 60 in Tanzania) (own analysis of IIEP, 2004). Reducing the average class size is often unaffordable (and the benefits often do not justify the costs), so this often verges on useless policy advice. However, where between-school teacher distribution problems (despite equity-oriented policies in this regard) and poor within-school allocation of teacher time seem to be the problem (our own analysis suggests this is true in South Africa), this is certainly worth pointing out to policymakers.

Table 1 indicated that the contact time offered per pupil is around 25% lower in Argentina than what it is in South Africa. The 2006 international PISA report (OECD, 2007: 260) points to Argentina's contact time being below the international average. On the basis of a multi-country production function analysis, the same report (OECD, 2007: 271) suggests that Argentina stands to gain more in terms of pupil performance than all other countries (save one) from an increase in the level of contact time. However, our foregoing discussion of Argentina's schooling policies indicated that increasing pupil contact time is problematic due to the dependence of the system on the double-shifting of schools. The political will to remove double-shifting, at least at the primary level, is strong, as evidenced in the 2006 National Education Law, but the physical infrastructure cost of this would be immense (though, as we mentioned before, lengthening the school year is a more viable option). Gustafsson (2007) finds that an increase in contact time is likely to improve pupil performance in South Africa too. In South Africa, this is perhaps more feasible as an immediate policy option due the virtual absence of double-shifting.

In her production function, Santos (2007) isolates the effects of books in the home, and points to their significant positive association with pupil performance as a justification for better investments in the media collections of schools, in particular those schools serving poorer pupils. This seems to be a useful treatment of this home background variable, which in many production function studies is simply subsumed into the socio-economic status index.

Turning to the governance of the schooling system, Eskeland and Filmer (2002) use data from the Argentinean Ministry of Education's *Operativo Nacional de Educación* (ONE) monitoring programme to explore, through the use of a production function, the role of school autonomy and community participation in improving pupil performance. Even when controlling for province and whether a school is public or not, they find that autonomy and participation, when combined, enhance performance significantly. The policy conclusion is both that greater school autonomy amongst public schools, with respect to such matters as textbook selection and the evaluation of teachers is valuable, and that for the value to be realised, autonomy should be combined with community empowerment in the governance of the school. Eskeland and Filmer's model is well suited for analysing South African policy issues, especially given the strong policy emphasis since 1994 on, firstly, community participation (school governing bodies are elected every three years in a highly publicised national process) and, secondly, the granting of management autonomy after schools have requested this, and proven that they have the requisite management capacity. The quality effects of these prominent interventions have as yet not been analysed.

Crouch and Mabogoane (1998), on the basis of their production function analysis of South African school-level data, implicitly warn policymakers against attaching too much importance to policy reform, relative to better management practices within the existing policy architecture. They emphasise that from a planning perspective, what the production function does not tell us could be as important as what the model does tell us, and appropriately title their paper 'When the residuals matter more than the coefficients'. Their warning is a necessary and insufficiently repeated reminder for authors of policy recommendations, and one that is likely to be supported by teachers and school managers suffering from policy reform fatigue. As an example of a potentially fatigue-inducing policy change, the grade definitions of what constitutes a primary and a secondary school have changed twice in Argentina in the last 15 years, once in 1993, and again in 2006. In South Africa, the new post-apartheid curriculum introduced in 1997 had to be revised in 2002. One is not saying that inappropriate policies should not be changed, but rather that the policy formulation process should be sufficiently rigorous to minimise the risk of declaring new policies that require revision after just some years.

One obvious limitation with respect to the supply of relevant studies is that so little use is made of what is arguably the datasets most suited for production function analysis, namely the national datasets emerging from the sample-based pupil performance monitoring programmes ONE (in Argentina) and Systemic Evaluation (in South Africa). These datasets are derived from pupil tests and background questionnaires which, unlike those of the international programmes, are tailored for the national situation. Moreover, though they do not provide a time series (different schools and pupils provide the data in each run), they are more or less consistent over time in terms of their structure, thus facilitating an analysis of changes in the production function over the years. Though Eskeland and Filmer (2002) use a single ONE dataset to examine autonomy and participation (they do not examine the school production process in its entirety), in general the potential of the ONE datasets to reveal new policy information through the simultaneous consideration of a range of explanatory variables, as is done in the production function analysis, remains unrealised. In South Africa, the official reports of the Systemic Evaluation have included some input-output analysis, but not the application of the typical production function approach (see South Africa: DoE, 2005).

A further limitation has been a lack of policy specificity in the available studies, or separate and complementary policy analyses that translate the production function findings to specific recommendations regarding policy changes (or policy retention) and budgets. To some extent, Gustafsson (2007) provides budget specificity, but in general policy is either not dealt with at all, or is dealt with at a level that is too superficial to allow for direct inroads into the policy debates.

What are the policies that economists (and other researchers) may hope to influence with regard to pupil performance? Ideally, perhaps, there should be a national policy that outlines the precise strategies that should be followed to improve performance, based on the findings of research from a variety of disciplines. Such a policy is lacking in both our countries, and is in fact rare elsewhere. Instead, Argentina lays down a general strategy in its 2006 National Education Law (Argentina: MdE, 2006a) for achieving quality education that includes, for instance, additional funding from the national level for schools serving poor communities and incentives for teachers to teach in such schools. South Africa's quality enhancement strategy is largely centred around its Integrated Quality Management System (IQMS) programme (South Africa: ELRC, 2003) aimed at promoting schools-based professional appraisals of teachers. The Ministry of Education's strategic plan also outlines a variety of quality enhancement interventions (South Africa: DoE, 2007a). What is absent in the policies of both countries in a sense of magnitudes and trade-offs, matters that economics of education is reputedly good at dealing with. Instead, the policies tend to follow a 'wishlist' approach of mentioning all (or a large variety of) conceivable interventions, without a sufficient sense of hierarchy and inter-dependencies. The opportunities for economics of education (as well as other disciplines) to contribute more concretely to policies on improving educational quality seem wide open.

The way in which information on school quality is disseminated through society has important implications for the extent to which human capital development debates, and hence debates about country development and poverty alleviation, can be popularised, and school accountability loops can be strengthened. Politically, South Africa and Argentina have both shown signs of being committed to sufficient dissemination of this information. However, in both countries realities lag behind the political commitment. South Africa's Systemic Evaluation has, in its eight-year history, only had three runs, each covering one grade. With respect to frequency, Argentina's ONE is better, with four grades (3, 6, 9 and 12) being covered every second year. However, when it comes to packaging and information dissemination, both monitoring programmes lag

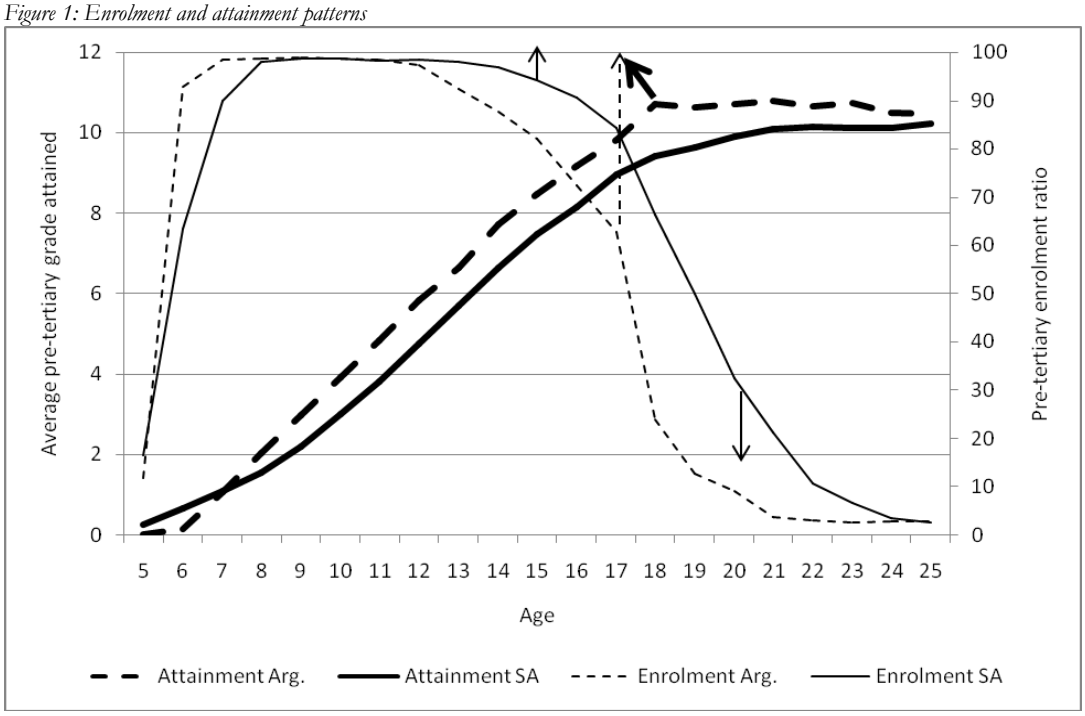
behind, for instance, Brazil's SAEB/Prova Brasil, which has begun to disseminate user-friendly school-specific report cards (see http://www.inep.gov.br).

7 The challenge of expanding secondary schooling

In both countries there is political interest in broadening participation in secondary schooling, both as a means towards greater social equity, and to improve productivity in the workforce. The speed with which to expand the education system at the secondary level, and the type of secondary education to focus on, are specific policy questions where it is reasonable to seek at least a part of the answer in economically-focussed analysis of the data. Regrettably, models that can assist in this area have been hard to come by, and despite the obvious importance of the policy area, there is much less economics of education guidance than there is in the area of school productivity. Part of the explanation for this state of affairs lies in the need to take into account country-specific institutional and labour market factors, making the universal models economists are fond of elusive. Hoenack (1996: 332), in an overview of the state of economics of education in developing countries refers to policy advice on the relative prioritisation of different education programmes as 'our field's most difficult task'. Here we attempt to deal with some of this difficulty.

It is worth first sketching the enrolment and attainment picture for Argentina and South Africa in some further detail. In Figure 1 below we focus on average years of schooling completed (left-hand vertical axis) and percentage of the population enrolled in school (right-hand axis) by age across all schools, public and private. The picture across the two countries is not that different, but South Africa's curves lie to the right of Argentina's. This reflects the fact that the policy-stipulated age of entry into schools is one year later in South Africa than in Argentina (age 7 against age 6). What is also notable is that although overall there is more enrolment relative to the population in South Africa (compare the areas under the two enrolment curves), attainment amongst those aged 20 and above falls short of Argentina's by just under a year. This is partly indicative of inefficiencies in the South African system in the form of higher levels of repetition. But partly this is the result of lags: South Africa's secondary level enrolment has increased by 12% in the 2000 to 2006 period, against just 4% in Argentina. A data problem deserves mention. Whilst South Africa's intra-census and sample-based General Household Survey (GHS) covers the entire country, and is thus sufficient for the monitoring of key education trends, the equivalent survey in Argentina, the Encuesta Permanente de Hogares (EPH) covers only around 60% of the population, namely that part considered to be urban, and one is therefore forced to turn to census data to obtain a full and reliable picture of enrolment ratios.

Figure 1: Enrolment and attainment patterns

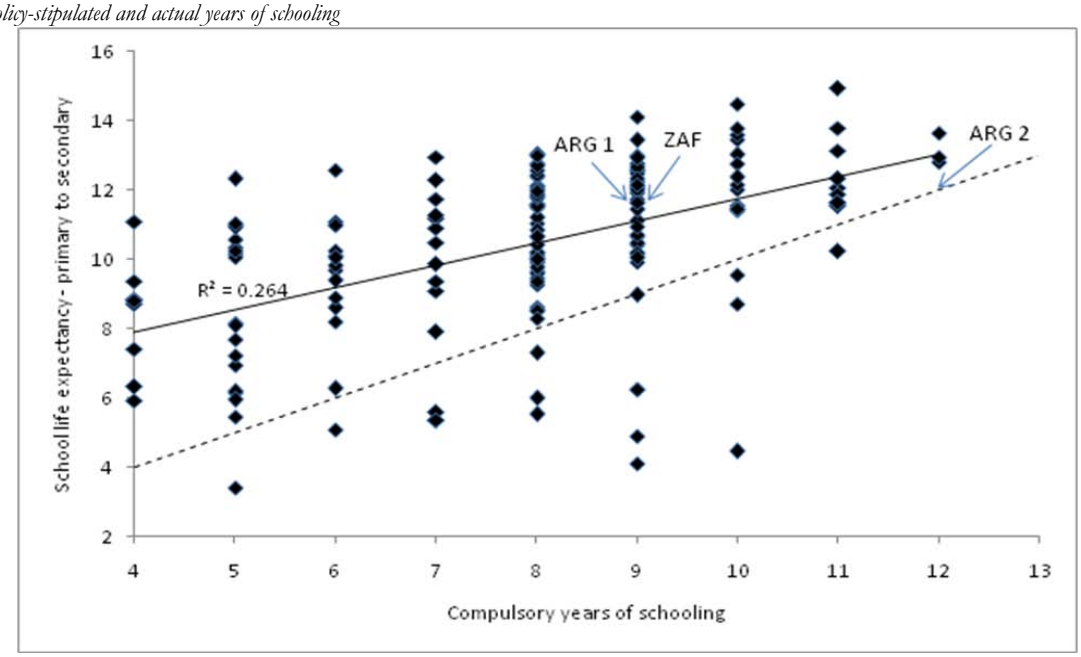


Source: GHS 2006 (South Africa) and Censo 2001 (Argentina). Note: The average attainment curves should be read against the left-hand axis, and the enrolment curves against the right-hand axis.

A graph such as the one above allows us to gauge the gaps between actual enrolments and enrolment targets in the policy. South Africa is close to achieving its aim of schooling for all children up to age 15. The enrolment curve should move up at the age 15 point to 100% (currently it is around 5% short of this target). From an efficiency perspective, the enrolment curve for older youths (of, say, 20 and above) should move down considerably, through better controls of grade repetition. Argentina's 2006 National Education Law establishes a highly ambitious enrolment target of compulsory schooling up to the last grade of secondary schooling, in other words up to the twelfth grade. The law does not lay down a timeframe for achieving this target, however. Figure 1 illustrates how ambitious the Argentinean policy is. Assuming there were no repetition, the enrolment curve would need to move up at the age 18 level by 35 percentage points. However, if we make the assumption at least some grade repetition will be permitted, then the enrolment curve might need to move up at ages beyond 18 as well.

The following graph provides a cross-country view of the compulsory schooling situation. Each point represents one of 173 countries. The horizontal axis represents the compulsory years of schooling required by law. For most countries, this means that children must attend school within a certain age range, for instance ages 7 to 15 in South Africa, giving nine years of compulsory schooling. However, for some countries, such as Argentina after 2006, this means compulsory attendance for a number of grades (Grades 1 to 12 in Argentina). Clearly, if repetition is allowed, then the second approach implies more pupil years of compulsory schooling on average than the first approach. The vertical axis represents school life expectancy for primary to secondary schooling, as calculated by UIS. School life expectancy is the number of years that the average pupil is expected to attend school – to calculate this, the age-specific enrolment ratios in a recent year are used, meaning that if attendance is improving over time, then the school life expectancy will to some degree be an under-estimation of true expectations. One would expect school life expectancy to increase in line with a country's compulsory years of schooling, though school life expectancy cannot serve as a precise measure of policy compliance here, as it is an average, and does not tell us how many children do not complete the compulsory number of years.

Figure 2: Policy-stipulated and actual years of schooling



Source: UNESCO: UIS (2008). Note: As far as possible, values corresponding to 2006 were used.

Figure 2 indicates that most countries in fact offer more years of schooling on average than what their policy stipulates is the minimum – all the countries above the dotted line belong to this group. Argentina (until 2006 – see 'ARG 1') and South Africa were moreover slightly better than the norm (see the solid trendline) when it came to exceeding their minima. In both countries school life expectancy is just under twelve years. In moving to 12 years (at least) of compulsory schooling, Argentina (see 'ARG 2') has in 2007 joined the set of just three countries with such a target – the three countries are Netherlands, Germany and Belgium.

The logical point of departure if we want to deal with these policy issues from an economic perspective, is the human capital model. Very briefly, according to this model the returns to investments in education are

sufficiently high to make it worthwhile for all households to invest in education privately. However, because many, in particular the poor, are not able to raise the finance for the educational investment on a private basis, and for a number of other socio-political reasons, the state takes on the role of principal financier of the education system. In the last decade, the empirical demonstration of the human capital model has undergone some dramatic changes, largely due to improved availability of comparable statistics on the quality of schooling. A number of analyses, and notably that of Hanushek and Woessman (2007), have overturned the more traditional notion that a country benefits economically from investing in more years of education for its citizens. Instead, the *quality* of schooling, which is relatively independent of years of education, is the key determinant of economic growth. This evidence is vital for education planning, though translating this knowledge into policy specifics, for instance the optimum growth path of secondary schooling, is not easy.

With respect to the level of human capital in general terms (as opposed to knowledge and skills relating to specific occupations) the greatest analytical challenge lies on the side of the supply of human capital. The demand for higher levels of human capital in the labour market seems sufficiently unbounded to not be a key concern for the analyst. In any event, human capital is so intrinsically difficult to grow that it is unlikely that a sudden over-supply would exceed demand. Though this is an over-simplification of the demand for human capital, it seems safe to assume that our attention should be focussed on maximising the supply of human capital.

On the supply side, there are three key factors: number of educated individuals, the quality of the education received, and the cost of providing the education. Importantly, generating new human capital has been shown to depend strongly on the existing human capital (essentially parents and teachers), and only weakly on expenditure per pupil. Expenditure is thus a variable that acts largely as a constraining factor on quantitative expansions to the education system, and only to a lesser degree as a factor linked to quality. Quality improvements, especially beyond certain expenditure thresholds, are to a large degree dependent on the kinds of process and managerial improvements discussed in a previous section. There is in other words not a strong argument for the existence of a trade-off between quality and quantity in education. All of these assertions are to some extent debatable, but at least for countries such as Argentina and South Africa, this appears to be broadly how the human capital model works.

One line of research that seems to offer a bridge between the theory of the human capital model and the specifics of expanding the secondary school system is that dealing with the rates of return to different levels of education. In South Africa, considerable effort has gone towards the calculation of Mincerian rates of return. Keswell and Poswell (2002) provide a summary of recent studies, as well as their own rate of return estimates. They find that income returns to additional years of schooling below Grade 12 are negligible, and that the South African data consistently contradict findings from elsewhere (and disseminated prominently by the World Bank) that returns diminish the higher the level of education, and in particular that primary schooling displays the highest returns (see especially Psacharopoulos and Patrinos, 2002). Interestingly, Coatz and Woyecheszen (2007), in their analysis of Argentinean data, also find the reverse of the generally accepted pattern, with rates of return being greatest at the tertiary level, and lowest at the primary level. These are crucial empirical matters in education planning, partly because a higher rate of return for primary schooling has been used as one justification (though by no means the only or even the strongest justification) for the Education for All (EFA) focus on expanding primary schooling. There are a number of complications, some widely acknowledged, some less so, with rates of return to education analyses. Amongst the better known is the fact that rates of return estimates mostly do not take into account externalities – benefits to society as a whole, beyond the benefits to the individual – or the upward effect on the rates of the abilities of individuals. Moreover, rates of return estimates are based on historical education and income trends, which might not accurately reflect the situation in the future or (in the case of education) even in the present. What is often less clear in these analyses is whether the estimates are meant to throw light on the behaviour of households, or provide direction to public policy dealing with the prioritisation of education levels or programmes. For the former, private rates of return are relevant, and for the latter social rates of return. The distinction is often not sufficiently clear in rates of return analyses. Whilst the two sets of estimates may often display similar trends, completely blurring the distinction, as is often done, makes drawing policy conclusions difficult (Powdthavee and Vignoles, 2006, provide a brief discussion of the problem).

The finding of exceptionally low returns to primary schooling and (particularly in the case of South Africa) to most of secondary schooling needs to be interpreted in relation to how the two schooling systems issue qualifications. In both countries, qualifications with currency in the labour market are only issued at the end

of Grade 12. In South Africa, the qualification is issued after the pupil passes national examinations. In Argentina, examinations set by the school, and subject to only limited national standardisation, are used. An international comparison such as that permitted by the World Education Indicators (WEI) programme (UNESCO, 2002) reveals that both South Africa and Argentina are unusual in the fact that they issue qualifications only at the end of the schooling process. Most countries (in the WEI) have at least one other qualification issued at a level below the Grade 12 level. In Argentina around half and in South Africa around two-thirds of youths leave the schooling system and enter the labour market with no qualification, and in the case of Argentina the qualifications from different schools are not fully comparable. This suggests that by world standards qualifications, of any type, would be relatively scarce in the Argentinean and South Africa labour markets. This is likely to produce some unusual rates of return patterns. Specifically, education below the Grade 12 level is unlikely to be valued highly, given that employers depend on qualifications as a signal of the value of the prospective employee.

But even if we bring institutional factors to bear on our interpretation of rates of return, the question remains how these estimates could be used to plan quantitative expansions in the education system. One approach, used by Verspoor and Bregman (2007: 62) with respect to secondary schooling in Sub-Saharan Africa, is to use increases over time in the rate of return to secondary schooling as an indication of the need to expand this sub-sector. However, this requires rates that are comparable over time, something which we seem not to have in the case of our two countries.

It appears as if a more fruitful line of analysis to deal with our secondary schooling policy issue is to examine cross-country patterns with respect to the quantity, quality and expenditure variables at the secondary level. We acknowledge that this approach comes with its own limitations, including the temptation to regard trends relative to level of development as being in some sense normal and optimal. However, we still believe it offers some key policy insights.

A crucial data challenge if one wants to compare secondary schooling across countries is finding appropriate indicators of the quantity of secondary schooling offered per country. Mingat and Tan (1998: 11) use school life expectancy, and find a noticeable correlation between this variable and GDP per capita. However, because school life expectancy includes years repeated, and because repetition is high in many schooling systems, this variable does not lend itself to policy analyses where the concern is the proportion of pupils who complete secondary schooling – this concern is explicit in Argentina's 2006 National Education Law, and it is also a concern that is often expressed in South African policy debates. In fact, the school life expectancy variable is of limited value even if the concern is keeping pupils in school up to a certain age – here age-specific enrolment ratios are needed.

Ideally what we needed was the percentage of youths who at some point successfully complete the final grade of secondary school. However, there is no cross-country dataset which includes information on successful graduation. We therefore had to settle for a fairly close proxy to this, namely the percentage of youths who get to participate in the final grade of secondary school. The UIS dataset does allow us to calculate this[4], using the following formula (we are not aware of this statistic, often referred to as a completion rate, having been calculated on the basis of UIS data and for secondary schooling elsewhere):

$$c = \frac{E_g - R_g}{P}$$

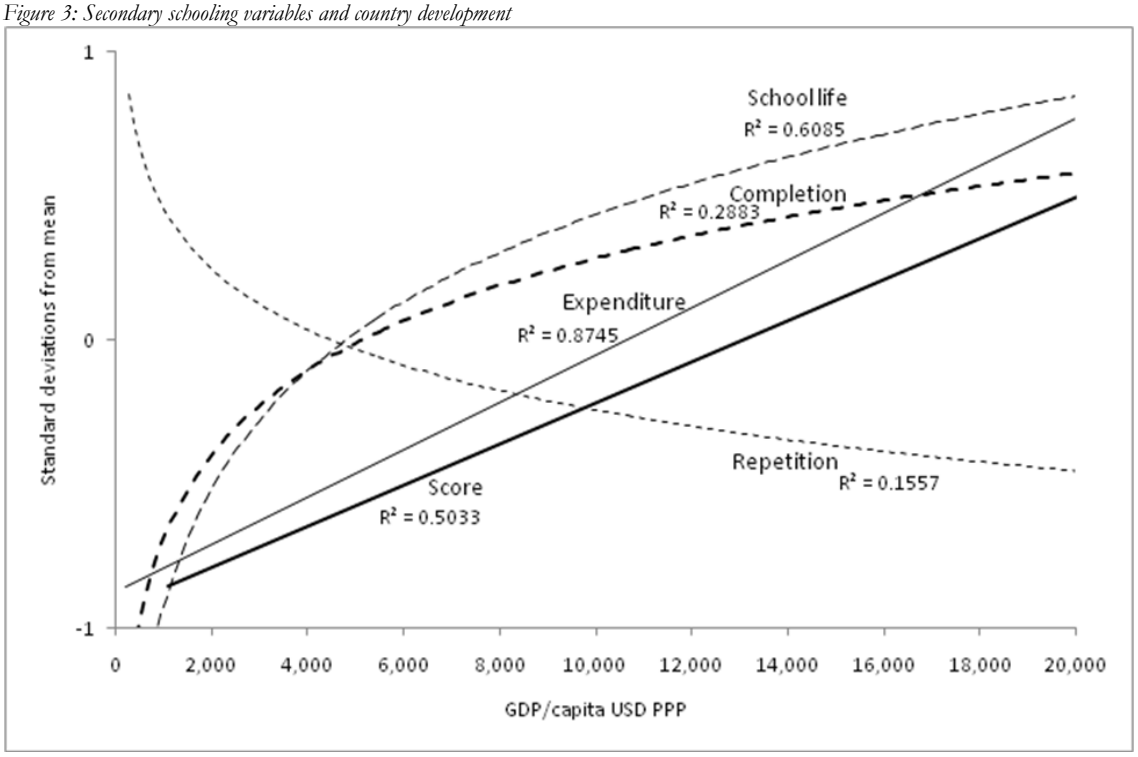
E_g is enrolment in the final secondary grade (specifically, the last grade of ISCED 3A) in a year, R_g is the number of repeaters in the same grade in the same year, and P is the size of the population cohort corresponding to the final secondary grade. To obtain P, we used the UIS population figure corresponding to the whole secondary level, and divided it by the number of grades at this level. In other words, we assumed that all population age cohorts at the secondary level were of the same size. One key problem with the

[4] An alternative to the UIS dataset, which is derived from MoE reports, is the World Bank's collection of education data derived from household sample surveys (see http://www.worldbank.org/research/projects/edattain/). That collection covers 93 countries, of which 51 are low income countries and none are high income countries. The World Bank collection, whilst not as comprehensive in terms of countries as the UIS dataset, may well offer more accurate statistics given that the population and education variables are collected simultaneously. For our study, however, the UIS data appeared more suitable.

secondary completion statistic we obtain is that a few countries have very large technical and vocational education and training (TVET) sub-sectors at the ISCED 3 level which are not taken into account with the above calculation – one notable example is the Czech Republic. As TVET is not as consistently divided across grades as mainstream secondary schooling, the data do not allow an easy incorporation of TVET into the calculation. However, we acknowledge the possibility that further examination of the data might allow one to arrive at a better *c* value, which would improve the accuracy of the analysis that follows.

The next graph illustrates the trend across level of country development for our completion statistic, plus four other statistics describing secondary schooling. School life expectancy is as calculated by UIS, and increases with level of development, in a concave fashion. This occurs despite the fact that repetition decreases. (The low R^2 value for repetition is to be expected, given the considerable measurement and data collection problems with this variable.). What is noteworthy is that the R^2 for the completion curve is less than the R^2 for the school life expectancy curve. This is almost certainly in part attributable to problems with the calculation of our completion ratio. However, it is possible that the difference in the R^2 values is also attributable to the fact that as they develop, countries pay more attention to expanding schooling in a general sense, than to ensuring a consistent increase in the number of pupils who complete school or reach key exit points. Public expenditure per pupil at the secondary level (in PPP USD terms) displays a remarkably strong correlation with GDP per capita, which we can interpret as an indication of the seriousness with which countries expand total enrolments and total expenditure, even if completion of schooling cycles and educational quality are goals reached with less success. Finally, 'Score' reflects the trend with regard to 40 countries (of which 25 non-OECD) for which we were able to obtain reasonably comparable secondary level average mathematics scores, using the TIMSS 2003 (Grade 8), PISA 2000 and PISA 2003 (both fifteen year olds) datasets. We used countries that participated in more than one programme as bridges to adjust all results to the PISA scale. The correlation between the mathematics score and GDP per capita is relatively strong, yielding an R^2 of 0.50. This seems indicative of the strong linkages between human capital development and overall country development.

Figure 3: Secondary schooling variables and country development



Source: UNESCO: UIS (2008); OECD (2001); OECD (2004); IEA (2004); International Monetary Fund (2008). Note: As far as possible, UIS values corresponding to 2004 were used. Number of countries varied from 40 for 'Score', to between 123 and 173 for the other variables. The trendlines are based on all available countries, even countries with GDP per capita exceeding 20,000.

The fact that the enrolment curves, namely 'Completion' and 'School life', display stronger initial growth than pupil performance, as represented by 'Score', seems to reflect the relative ease with which changes to the enrolment patterns can be brought about. Sudden performance improvements would appear to be much less normal (though more on this below).

The above trendlines provide a picture of how one can expect variables relevant to secondary schooling to move. The next table provides figures specific to our two countries, and for middle income countries in general. Both South Africa and Argentina are countries with high school life expectancy values relative to their level of development, partly due to above average levels of grade repetition. They also display above average completion of secondary schooling ('Completion'), though the difference is only marginal in the case of South Africa. The expenditure per pupil level for South Africa stands out as somewhat low. This pattern is to a large degree a product of relatively high equality between primary and secondary level expenditure per pupil (the primary level figure appears somewhat high in an international comparison). Argentina's mathematics score, despite the problems mentioned earlier, emerges as average in this analysis. South Africa's score, on the other hand, is well below what it should be, and reflects a serious human capital problem standing in the way of development. To a large degree, the problem is an inheritance from the apartheid system's undisguised suppression of educational standards (in particular with regard to mathematics) in public schools serving black pupils, though it should be noted that even historically white schools do not fare well in international comparisons. The remarkable disjuncture between South Africa's level of overall development and the level of the country's human capital (as demonstrated by statistics like these) suggest that policy impacts might be abnormal. Specifically, it seems reasonable to assume that more rapid test score improvements should be possible in South Africa than in a low income country with a similar level of pupil performance, given the greater availability of public funding, institutional capital and at least pockets of high-level human capital.

Table 2: Secondary schooling values for both countries

	Middle income	*South Africa*	*Argentina*
School life expectancy	11.1	12.0	11.9
Repeaters	6.3	14.2	11.6
Completion	45.0	45.7	56.0
Expenditure	1,405	1,303	1,729
Score	389	205	389

One should keep in mind that completion figures for South Africa and Argentina in Table 2 indicate the proportion of youths who get to participate in Grade 12, not the proportion of youths who successfully obtain the Grade 12 qualification. As noted earlier, only around 50% and 33% of youths in Argentina and South Africa respectively have been graduating in recent years. (The discrepancy between the 45.7 figure for South Africa in the above table, and the 50% mentioned in an earlier section is partly attributable to the difference in years. The above table refers to 2004.)

The associations between the variables discussed above were examined, and for policy purposes, the most useful regression model appeared to be the one with the following form:

$$Completion = \alpha + \beta_1 \ln(GDPperCap) + \beta_2 Repeaters + \varepsilon$$

The model outputs are as follows:

Table 3: Completion model results

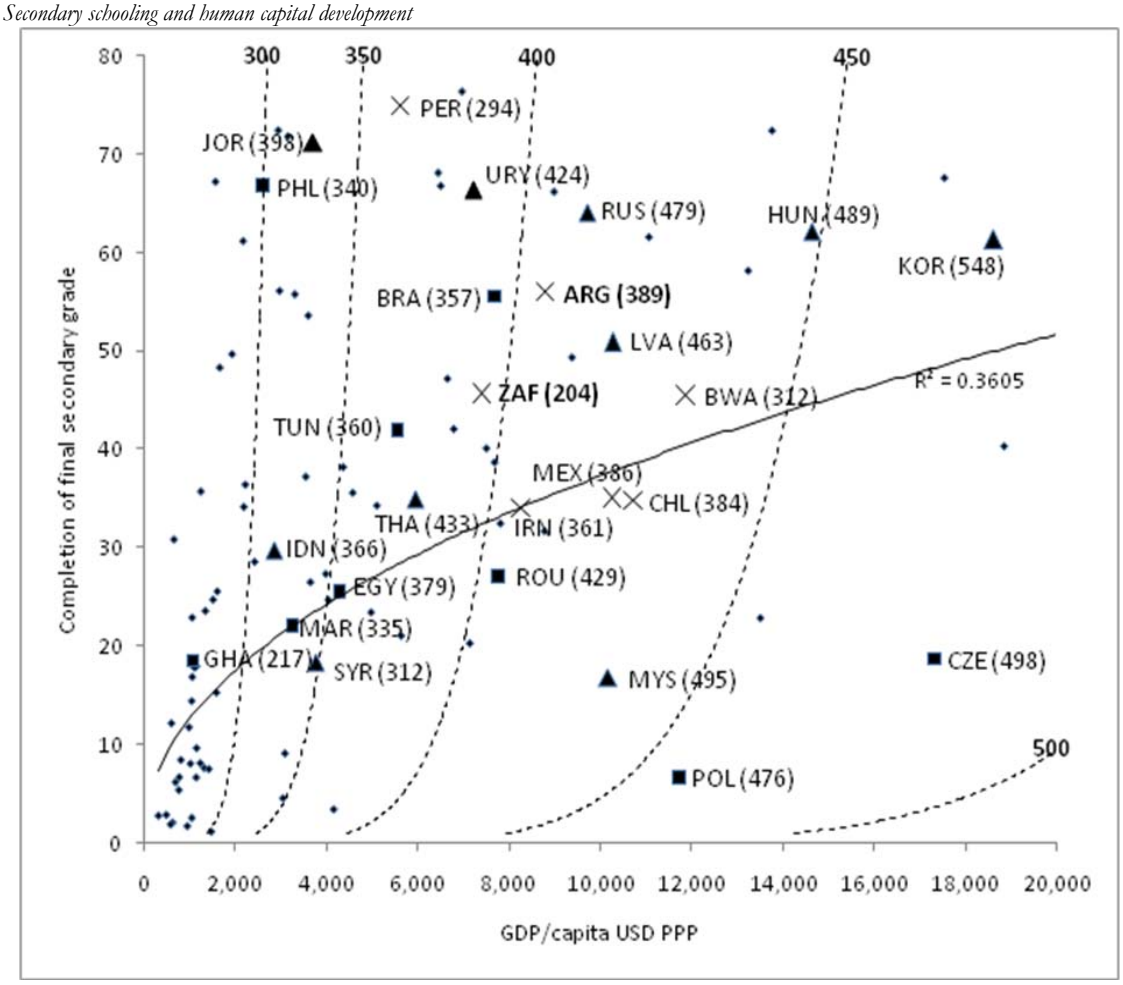
	Coefficient	*t-stat*
ln(GDPperCap)	.0789565**	4.84
Repeaters	-.0106672**	-3.52
Intercept	-.2311544	-1.56
Number of observations		116
F		28
R^2		0.333
Dependent variable		Completion

** indicates significance at the 5% level.

The model allows us to predict the percentage of youths completing the final secondary grade on the basis of two clearly relevant variables, level of country development (as measured by GDP per capita in USD PPP) and level of repetition. As one would expect, the first variable influences the predicted completion statistic positively, whilst the inefficiencies implied by repetition would affect completion negatively. Using this model we obtain predicted completion percentages of 36 and 32 for Argentina and South Africa respectively. However, if we assume zero repetition, we obtain completion ratios of 49 and 47, or ratios that are closer to the actual ones we see in Table 2. This simply confirms that if there is something abnormal about the situation in the two countries, it is that the level of repetition is too high. This problem requires a solution, especially if secondary level completion rates are to be raised. Without such a solution, the cost of expansion would be inefficiently high.

The following graph seemed to offer a compromise between the need to recognise the inherent complexity of the policy issue (we have kept three of the five variables) and the need for a presentation of the policy-relevant information that is sufficiently readable. Each point (of whatever shape) represents a country. The horizontal axis indicates the level of country development in terms of per capita income. The vertical axis refers to our calculated secondary school completion ratio. The solid trendline captures the trend with respect to per capita income and secondary school completion (this is essentially the 'Completion' curve from Figure 3). South Africa (ZAF) and Argentina (ARG), as one might expect from the foregoing discussion, lie above the trendline, in other words their secondary school completion statistics lie above the world norm. Onto this graph, the global pattern with respect to pupil performance has been superimposed. This is the function of the dotted curves, which represent the points at which countries should pass certain PISA mathematics thresholds. For example, South Africa, given its per capita income and secondary school completion ratio, should have a score of just below 400. Instead, its score is 204. Similarly, Argentina should have a score of just above 400. Instead its score is 389. Both countries emerge as under-performers, though the problem is of a far greater magnitude in the case of South Africa. In a nutshell, the graph allows one to view both the quantitative and qualitative dimensions of human capital development at the secondary level.

Figure 4: Secondary schooling and human capital development



Source: As for Figure 3 above. Note: ISO country codes are used – 'ZAF' refers to South Africa. A square (■) indicates that the PISA mathematics score lies within the predicted range (using ranges that are 50 points wide). A triangle (▲) indicates that the score lies above the predicted range, and a cross (×) indicates that the score is below the predicted range. All other points represent countries for which an average mathematics score was not available. The solid trendline is based on all 123 countries for which GDP per capita and completion data were available (even those countries with GDP per capita exceeding 20,000). The dotted trendlines are constructed on the basis of the coefficients obtained by regressing the average country score (using the PISA scale) on the log of attainment and the log of GDP per capita for the 32 countries for which the data were available (again, these 32 countries include countries with GDP per capita exceeding 20,000 and hence not shown on the graph). This regression analysis yielded an R^2 value of 0.57.

Though the common use of a log scale for GDP per capita has the advantage of making the overall trend (for all developing and developed countries) a bit clearer, we avoided this as log scales are one of those graph elements that non-economist policymakers find particularly difficult to interpret (in our experience). We have limited our view to those countries with a GDP per capita (in 2004 purchasing power parity USD) of 20,000 and less in order to allow a closer examination of developing countries.

What can the graph tell the policymaker in South Africa or Argentina? Firstly, it tells us (once again) that attainment of the last secondary school grade in both countries lies above the norm. From an international comparison perspective, there thus appears no serious problem in this regard (though this is not to say there are no internal socio-political factors that would support a different argument). The cost of maintaining a relatively high level of attainment in secondary schools is high for both countries, given the abnormally high levels of repetition (this is not shown in Figure 4, but our earlier analysis pointed to this). Where both South Africa and Argentina lie below the norm is in terms of their average mathematics scores. The situation in South Africa is far more serious, whilst in Argentina the problem is borderline (in a different year, Argentina could fall within the predicted range, depending on fluctuations, which have been prominent in Argentina, in the GDP per capita variable). Yet the message emerging from the data should be similar for both countries, namely that quality of schooling at the secondary level is a matter that requires focussed policy attention. It seems reasonable to assume that three patterns we have identified are intertwined: below expected learning outputs, high repetition, and having no qualification below the Grade 12 level (and in the case of Argentina, having only limited standardisation of this qualification across schools). In the previous section, we referred to what we perceive to be an insufficient focus on exactly how to raise the quality of education, and insufficient attention to trade-offs, in the high-level policy statements of the two countries. We reiterate that in terms of policy processes, the challenge seems to lie both in improving the focus on specific policy design matters amongst the data analysts, and instilling a more economically-oriented focus into the policy formulation process itself. With regard to the latter, the importance of highlighting how school quality and country development are so clearly interlinked stands out.

Looking beyond our two countries, Figure 4 can point to what other countries might provide indications of better practice. Such other countries should be more or less at the same level of development as Argentina and South. In Latin America, Uruguay provides an example of a country that has reached a high level of secondary level attainment, whilst also reaching a level of pupil performance that is above the norm. Uruguay is in fact the only Latin American country for which we had the required data which performs beyond its range. One should add that the Uruguayan MoE has succeeded in engaging teacher unions on the issue of pupil performance in rather innovative ways. Russia could offer valuable insights into achieving quality schooling. Amongst East Asian countries, Thailand provides an example of a country with a lower per capita income than South Africa and Argentina which nevertheless out-performs both countries.

8 Conclusion

This paper has by no means dealt with all the important economics of education policy topics in South Africa and Argentina. We have selected, to some extent quite subjectively, those topics that seemed most important, and those that presented interesting methodological challenges. Our conclusion should be read in this context.

We begin with the policy conclusions. Much emphasis was placed on pupil performance as measured in standardised tests because recent empirical renditions of the human capital model make it clear how important this indicator is as a predictor of economic and developmental success. But pupil performance also deserves highlighting because education policies are typically not very good at paying sufficient attention to outputs, as opposed to educational inputs such as expenditure and enrolments (areas that often do receive sufficient attention in the policies, if not in practice). The relative invisibility of pupil performance is perhaps

understandable, given difficulties in the past with regard to its measurement. However, many of these difficulties have been removed in recent years with the emergence of better measurement techniques, partly as a result of collaboration between countries within international programmes. The invisibility problem is probably worse in South Africa and Argentina than it should be due to insufficient use of existing quality monitoring datasets, and insufficient across-the-board assessment of pupils at levels of the education system below Grade 12.

So one key policy recommendation would be that there should be more measurement of pupil performance (or, to put it differently, human capital within the enrolled population). Both South Africa and Argentina have monitoring programmes that perform this task: the *Operativo Nacional de Educación* in Argentina, and the Systemic Evaluation in South Africa. However, the rich datasets emerging from these programmes are insufficiently analysed from a variety of perspectives. Ideally, each run of these programmes should lead to a variety of analytical works, some focussing on what policy interventions improve performance most cost-effectively. Moreover, the pupil performance results emerging from these programmes should become a standing topic in the media, and, crucially, in interactions between the state and teacher unions.

With regard to qualifications in the schooling system, in both countries the current situation results in there being insufficient educational currency within the labour market. This creates two inefficiency problems. Firstly, hiring labour becomes difficult and costly as many youths (at least half in both countries) are not able to communicate evidence in an easy format of the human capital they have accumulated from their years of schooling. Secondly, within the education system completing Grade 12 assumes an exaggerated importance, raising the risk of an over-investment of policy attention and money at this level of the system.

Better measurement can incentivise better performance amongst schools, but active quality improvement interventions by the state will still be needed. A second policy recommendation would therefore be the formulation of a clearer statement of how exactly learning outcomes should be improved in schools. It is important for national policy to deal with the whole range of needs in the schooling system, but not all inputs in the education process carry equal importance in improving outcomes. An official statement of what really makes a difference, on the basis of existing evidence, seems like an important policy tool, and a useful ingredient in the contractual relationship between the employer and teachers. In a sense, the formulation of such a statement implies synthesising and filtering the existing literature on production functions and related topics, and commissioning additional analysis where important gaps exist.

Our analysis into the question of expanding the secondary schooling system indicated that both South Africa and Argentina appear to be reasonably successful, in a cross-country comparison, at getting pupils to reach the last grade of secondary schooling. The data do not allow us to make a similar comparison dealing with successful completion of the last grade, but it seems possible that South Africa is behind where it should be in the regard. Clearly, our analysis has viewed this policy problem from a limited perspective – we have not, for instance, considered the demand for qualifications, either general or vocational, in the labour market. Yet two things have emerged clearly. One is that improving the quality of schooling at the secondary level is at least as important as raising enrolments. The other is that repetition is not decreasing in the two countries as fast as it should.

Turning to economics of education methods, we believe we have demonstrated that the Mingat and Tan (1998) accounting framework (with some enhancements to deal with the contact time of pupils and teachers, and class sizes), offers a useful tool for understanding the economic dynamics in a schooling system in the context of the typical constraints faced by developing countries. Analysing just one country within this framework seems informative, but applying it to a cross-country analysis can highlight certain features. For instance, our comparison emphasises how prominently relatively high teacher pay in South Africa (relative to the GDP per capita) forces the system to deal with relatively high pupil/teacher ratios, or how insufficient pupil contact time in Argentina may be a policy problem.

We have tried to throw some light on an analytically difficult area, namely the expansion of secondary schooling. The application of international datasets here is more difficult than it is at the primary level, partly due to inherent complexities of the secondary level of education, and partly because the collection and processing of data at the primary level has understandably received more attention. However, the calculation of new indicators at the secondary level, for instance completion rates, as well as the use of pupil

performance data from international testing programmes, can provide new insights into the relative success of individual countries in delivering secondary education.

Finally, we discussed the importance of some institutional prerequisites for advancing a more empirical approach to policy formulation in education. Two such prerequisites seem to stand out. One is better dissemination of official datasets so that better quantitative policy analysis by research institutions is encouraged. In this regard, Argentina has taken some important steps forward with the publication of its teacher survey dataset on the internet. The other is the formulation by the national Ministry of Education of an official research agenda (including an economics of education agenda) for the country. It should not be the only research agenda, but it is a necessary one. Neither South Africa nor Argentina currently has such an agenda.

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Appendix

The following regression results are based on the 2000 SACMEQ data for Namibia and for mathematics. They refer to Grade 6.

Table 4: Basic production function for Namibia

	Without teacher test score		*With teacher test score*	
	Beta coeff.	*t-stat*	*Beta coeff.*	*t-stat*
Teacher qualifications	0.078**	6.51	0.070**	5.91
Teacher test score			0.128**	10.44
Class size squared	-0.025**	-2.10	-0.045**	-3.70
Contact time	0.025**	2.14	0.026**	2.25
School infrastructure	0.351**	20.08	0.339**	19.49
Ruralness	0.113**	6.54	0.082**	4.70
Pupil repetition	-0.105**	-8.76	-0.100**	-8.41
Teacher latecoming	-0.122**	-10.44	-0.109**	-9.36
Textbook availability	0.050**	4.32	0.042**	3.67
Pupil's meals per day	0.073**	6.39	0.065**	5.69
Parents' education	0.085**	6.99	0.082**	6.87
Pupil age	-0.031**	-2.41	-0.029**	-2.29
Pupil is a girl	-0.033**	-2.82	-0.031**	-2.70
Number of observations		4971		4952
F		233		229
R^2		0.36		0.38
Dependent variable		0.361		0.376

** indicates significance at the 5% level.