



Understanding the Drivers of Public School Performance and Efficiency in the Philippines

Introduction

After a long period of stagnation, public spending on education in the Philippines has increased significantly. Between 2005 and 2015, education spending more than doubled in real terms, with much of it being devoted to increasing the number of teachers and improving school infrastructure. As a result, student-teacher and student-classroom ratios have improved significantly. For example, the average student-teacher ratio in high schools fell from 40:1 in 2005 to 27:1 in 2014.

Despite increased spending and improvements in key input ratios, improvements in learning outcomes have been relatively modest so far. Studies have shown this to be the case in many other countries as well. Clearly spending is only one of a host of factors that can affect the ability of schools to improve the academic outcomes of their students. Some of these factors fall within the control of the education system and schools such as the provision and quality of education inputs and the effectiveness of school-based management. Others such as the characteristics of students and their households are beyond the control of schools, but all of these factors affect the efficiency of resource use and education outcomes.

This note attempts to identify the factors associated with differences in overall school performance and efficiency. It draws on data from the Philippines Public Education Expenditure Tracking and Quantitative Service Delivery Study (PETS-QSDS), which tracked public education spending and assessed the quality of



This note is part of a series outlining analysis and results from the Philippines Public Expenditure Tracking and Quantitative Service Delivery Study conducted by the Department of Education and the World Bank with the support of the Australian Government through the Australia-World Bank Philippines Development Trust Fund.

Box 1: The Philippines Public Education Expenditure Tracking and Quantitative Service Delivery Study

The aim of the Philippines Public Education Expenditure and Quantitative Service Delivery Study has been to answer four main questions on the use of the public education budget:

1. *Resource flow, management, and control.* What factors prevent resources from reaching their intended destination in a timely and transparent manner?
2. *Existence, use, and financing of inputs at the school level.* Do schools have access to essential inputs and how effective are the systems that govern their use?
3. *Equity.* How do the resources available to schools and the systems that manage these resources differ among regions and socioeconomic groups?
4. *School performance and resources.* How and why does the performance of schools differ and what drives those differences?

The study has tracked over 80 percent of the national government education budget (including teacher salaries and training, school maintenance and operating expenses, construction, and learning materials) as well as local government spending on basic education.

In order to assess how funds flow and how they are used at the school level, the study team conducted a nationally representative survey of government institutions and public schools in the last quarter of 2014. The Autonomous Region in Muslim Mindanao was excluded from the study because government funds for this region are managed separately and flow to schools through a different mechanism. In addition, integrated schools (which offer both elementary and high school education) and schools that did not have final grade elementary and high school students were excluded from the sample, primarily because the study aimed to measure outcomes at the end of elementary school and at the end of high school.

The sample for the survey included all regional offices of the Department of Education (DepEd) and the Department of Budget and Management (DBM), 51 division and 113 district offices of DepEd, 54 district engineering offices of the Department of Public Works and Highways, 74 provincial and city/municipality local governments, 249 public elementary schools, and 200 public high schools. At the school level, interviewers administered a questionnaire to each parent-teacher association, assessed the competencies of approximately 1,500 teachers, and interviewed 2,200 student households.

The data collected were used to explore the systems that govern the use of public funds and to assess how the availability of resources differed among schools. The study team combined information on the flow of funds to schools with information on school characteristics and quality to evaluate how financing and governance affected school performance.

the systems governing the use of these funds (Box 1). The note also draws on the findings from other policy notes in this series to identify the key factors that determine the links between public spending and education outcomes.

The note found that school performance is related to several of these key factors including school governance and school infrastructure. It also found that student and school characteristics, school-level accountability mechanisms, and some teacher characteristics are associated with how

efficiently schools can convert their financial, physical, and human resources into improved education outcomes. However, given the limitations of using cross-sectional data, the findings are not strong, and factors associated with good performance tend to vary a lot according to the level of education and the performance measures that were being analyzed. While more rigorous research is needed, the policy note provides tentative evidence that the factors often associated with better performance are not functioning effectively in the Philippines.

Approach to Assessing School Performance

This policy note used the average National Achievement Test (NAT) score for each school as a measure of its performance.¹ Specifically, it used a school aggregate of the different subject tests that individual students took in 2014 at the end of elementary school (Grade 6) and high school (Grade 10). The NAT scores of municipal schools tended to be higher than those of schools in urban areas (Table 1). For example, the average NAT score for Grade 6 students in municipalities was 75 percent compared with 66 percent in highly urbanized cities.²

Student attendance was used as an additional measure of school performance. The data on attendance were collected as part of the PETS-QSDS survey directly from student atten-

dance registers. The specific measure used in this note was average attendance in all grades on four specific dates in the last six months of 2014.³ The school averages showed that student attendance is generally high in the Philippines with relatively little variation between rural and urban schools (Table 1).

In order to develop a framework for understanding the factors affecting the performance of individual schools, the study team consulted several international studies.⁴ These studies broadly looked at three main categories of factors associated with school effectiveness and good education outcomes (Figure 1).

1. *Household and Student Characteristics.* The early childhood care received by children, their development history, and the investments made by their household in their education influence the performance of the schools that they attend. The level and type of financial and academic

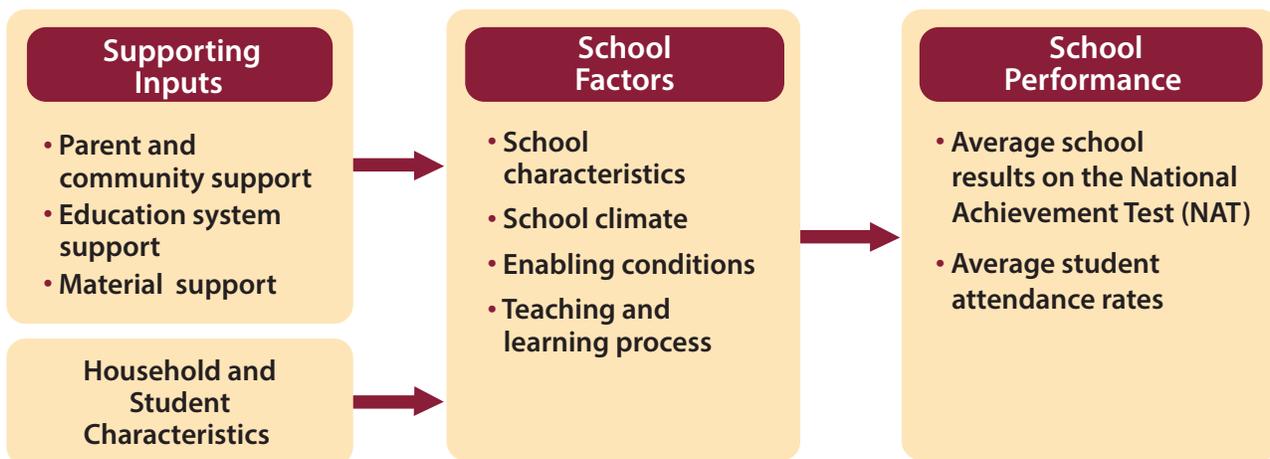
Table 1: School National Achievement Test Results and Student Attendance Rates, 2014

	Elementary Schools				High Schools			
	High Urbanized Cities	Other Cities	Municipalities	All schools	High Urbanized Cities	Other Cities	Municipalities	All schools
National achievement score (%)								
Average (mean)	66.2	70.6	75.4	74.3	54.5	57.7	57.6	57.3
Variation (standard deviation)	11.9	13.8	13.6	13.7	7.7	8.4	12.6	11.7
Minimum	38.8	36.7	32.1	32.1	41.5	41.7	34.8	34.8
Maximum	83.4	91.5	94.2	94.2	72.6	80.8	85.9	85.9
Student Attendance (%)								
Average (mean)	87.5	93.8	88.4	89.0	88.5	92.9	89.3	89.8
Variation (standard deviation)	14.1	4.4	12.7	12.2	9.4	3.3	10.3	9.6
Minimum	19.7	78.1	34.8	19.7	39.6	81.4	56.6	39.6
Maximum	99.0	100.0	99.6	100.0	99.6	99.4	99.6	99.6

Source: PETS-QSDS national survey – school level. NAT scores of PETS-QSDS sampled schools – National Education Testing and Research Center of DepEd.

Notes: Attendance rates were calculated using the average of student attendance on four specific days in the second half of 2014. NAT scores were calculated as the averages of all subjects for Grade 6 (elementary) and Grade 10 (high school) students in PETS-QSDS sampled schools who took the national examination in 2014.

Figure 1: A Framework for Understanding School Performance



support that children receive outside of school depends crucially on the socioeconomic status of their parents.

2. *School Factors.* How the school itself is organized to provide learning opportunities for its students critically affects their academic achievement. This includes the motivation, attitudes, and competency of teachers, the quality of the teaching and learning process, the amount of learning time that the school provides, and the systems used for student assessment. The quality of school leadership is another important school-level factor that affects the school's performance.
3. *Supporting Inputs.* In order for schools to perform well, they need the appropriate inputs and resources to operate effectively. This includes sufficient classrooms of good quality to teach children in groups that are not too large and the availability of other education inputs such as textbooks and discretionary funds to support school improvement plans. They also need support from parents, the community, and, in the case of the Philippines, local school boards (LSBs). Schools in the Philippines also depend on the DepEd division and district offices for support on administration, financing and teaching.

The PETS-QSDS study team compiled a large number of variables from the PETS-QSDS survey data for each of the categories in the framework. They then reduced this list to a smaller group that they judged to be the best measures of each particular factor and that had been identified as important in the other policy notes in the PETS-QSDS series (Table 2).

This note explores the association between these important explanatory factors and school performance in a number of ways. First, the note compares differences in these factors between high-performing and low-performing schools. Schools with scores in the top 20 percent on the NAT were classified as high performers whereas schools with scores in the bottom 20 percent were classified as low performers. A similar definition was used to rank school performance in terms of student attendance rates. Second, the note explores the extent to which the factors in Table 2 explain differences in efficiency.⁵ Finally, it looks directly at the relationship between the explanatory factors and school performance using a multivariate regression approach.⁶

While this exercise highlighted some important associations, the approach had a number of limitations. Given the cross-sectional nature of the data and the lack of any strategy for addressing selection bias, it was not possible to establish causality between the explanatory factors and the selected performance measures. School performance is also not only determined by the current status of household characteristics, school factors, and supporting inputs but also by how those factors have evolved over time. It is unlikely that the current state of the education system is a good reflection of its past, given the large amounts of money that have recently been invested. The lack of any information on the status of key indicators in earlier years will affect the overall results. Also, the analysis focused on performance at the school level, which did not take into account any possible variations between different classes and teachers

Table 2: Characteristics Used to Measure the Key Aspects of the Performance Framework

Household Characteristics	School Factors	Supporting Inputs
Average per capita household consumption	<p>Material support: Revenue per student by source, MOOE funds received per student, textbooks per student, adequacy of classrooms, days of teacher training, infrastructure and condition of classrooms.</p> <p>Parent and community support: Frequency of meetings of the school governing council and the PTA, parental participation in school decision-making, transparency board available in a public space.</p> <p>Effective support from education system: frequency of supervision visits from the DepEd Division office.</p>	<p>School characteristics: the school’s location, enrollment rates, school feeding program, the principal’s years of experience, time spent by the principal in the classroom observing classes, the school’s SBM self-assessment level, whether the principal develops a school plan for professional development.</p> <p>Capable teaching force: teacher competency test scores, teacher attendance, teacher qualifications.</p> <p>Teacher learning process: the percentage of parents who receive a report card for their child’s performance, proportion of students that report doing homework.</p>

within the schools. These issues were compounded by the small sample of teachers and households for each school that was used in the study, which may have introduced some measurement error. In addition, while the PETS-QSDS survey collected information on many important areas related to school performance, there were some important gaps. For example, very little information was available on the amount of real learning time available in schools or on the quality of classroom teaching. This may have led to biased estimates of the importance of the measured factors where they were correlated with omitted variables. It is important to keep these limitations in mind when interpreting the results presented in this note.

Characteristics of School Performance

This section summarizes the study team’s findings on all of the explanatory factors outlined in Table 2.⁷

Household Factors

Students who attend higher performing schools tended to be from slightly better-off families than those who attended low-performing schools, but these differences were not large

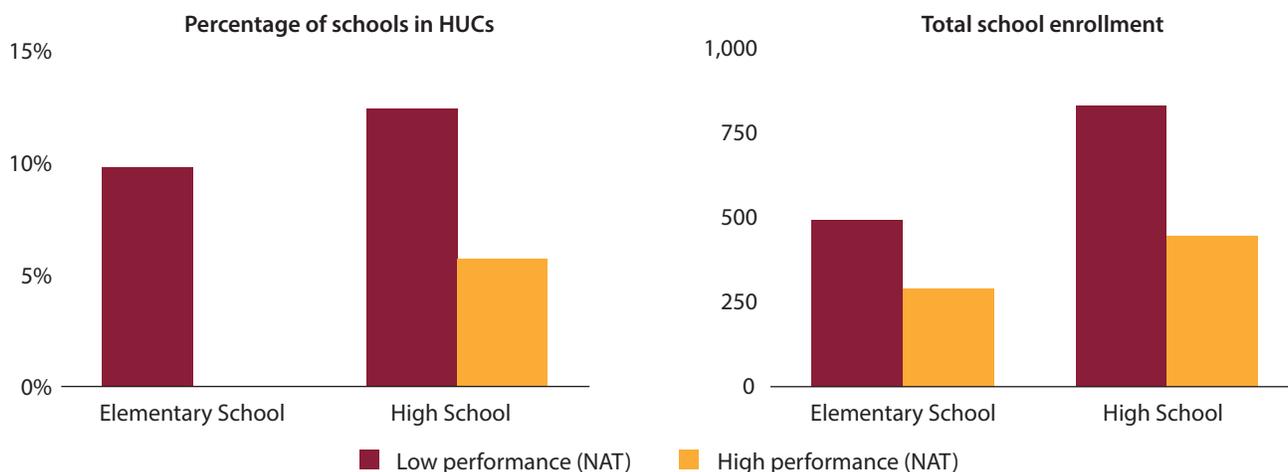
and were rarely statistically significant. For example, annual per capita household consumption was approximately PHP 16,300 for students in those elementary schools ranked in the top 20 percent for student attendance compared with PHP 14,700 for students in schools ranked in the bottom 20 percent. Schools that had better average NAT scores also tended to include students who were slightly wealthier than average, but again the differences were relatively small and not statistically significant.

School Factors

It is clear from looking at differences between high-performing and low-performing schools that schools in urbanized areas tended to perform less well than those in municipalities. For example, a higher proportion of poorly performing elementary and high schools were located in highly urbanized cities than in municipalities, whereas good performing schools tended to be located more frequently in municipalities (Figure 2).⁸ Related to this finding, schools with higher enrollments also tended to have lower levels of student achievement than smaller schools.⁹ For example, the high schools ranked in the top 20 percent in terms of NAT scores had an average of 446 students compared with an average of 833 students in schools in the bottom 20 percent.

Figure 2: Lower Performing Schools Tend to be Bigger and Are More Likely to Be Located in Highly Urbanized Cities

Average student enrollment and location for schools ranked in the bottom and top 20 percent of NAT scores, 2014



Source: PETS-QSDS national survey – school-level data.

More elementary schools with high student attendance rates had school feeding programs than schools with the lowest rates of student attendance. For example, 25 percent of elementary schools in the bottom quintile of student attendance had a school feeding program compared with 71 percent of schools in the top quintile of student attendance. This suggests that school feeding programs may provide families with an incentive to send their children to school.

The quality of school leadership also appears to be associated with better school performance. Indicators associated with school principals and the processes for which they are responsible tended to be better for high-performing schools (Table 3). High-performing schools tended to have principals who spent more time in classrooms and who were more likely to have developed teacher professional development plans. However, these differences were not generally statistically significant.

Simple comparisons of high-performing and low-performing schools did not reveal any statistically significant differences in the capacity of the teaching force.¹⁰ The PETS-QSDS study tested a sample of Grade 6 and Grade 10 teachers in all sampled schools. However, there was no clear or consistent pattern in the relationship between the performance ranking of the sampled teachers in a school and the performance ranking of the school itself.

Supporting Inputs

Simple comparisons between high-performing and low performing schools yielded some differences in terms of the quality of school infrastructure. Only 6 percent of elementary schools in the highest quintile in terms of NAT scores operated multiple shifts compared to 9 percent of schools in the bottom quintile. However, a similar pattern was not observed for high schools, which may reflect the differences in shift patterns between elementary and high schools. For example, it is more common in elementary schools to operate independent shifts, which may reduce the amount of instructional time received by each student. Subject-based teaching is implemented in high schools, so shifting is more likely to be associated with the organization of timetables and to have less impact on each student’s learning time.

The availability of key facilities such as electricity and water supply and the quality of classrooms (their state of repair) also tended to be positively related to school performance. Thus, schools with better facilities tended to have better attendance and NAT scores, although this was significant only for elementary schools and in the case of attendance for high schools.

Table 3: School Performance and Leadership Indicators

	Elementary Schools				High Schools			
	Attendance		NAT scores		Attendance		NAT scores	
	Low perf.	High perf.	Low perf.	High perf.	Low perf.	High perf.	Low perf.	High perf.
Number of hours principal observes classes	2.6	7.1	2.9	4.8	3.7	5.5	3.8	5.8
Principal's number of years of experience	2.6	3.3	3.7	3.0	2.7	3.6	2.9	2.7
School plan for teacher professional development exists	54.0	97.3	61.3	84.5	53.5	67.8	72.3	82.5
SBM self-assessment level	1.4	1.6	1.5	1.4	1.5	1.8	1.6	1.7

Source: PETS-QSDS national survey – school level.

Notes: Hours of observation are over a typical school week. School based management self-assessment is based on a three point scale (Level 1 = developing, Level 2 = maturing, and Level 3 = advanced).

Student-teacher ratios also tended to be lower in schools that had better NAT scores although the differences were not very large. High schools that ranked in the top quintile of NAT scores had an average student-teacher ratio of 24:1 compared with an average of 26:1 in schools in the bottom quintile of NAT scores. In contrast, schools with low student attendance tended to have lower student-teacher ratios than schools with better student attendance. This may have been a function, in part, of differences in attendance between rural and urban areas, which also had large differences in student-teacher ratios. School attendance tended to be better in municipal schools, which also tended to have lower student numbers and lower student-teacher ratios.

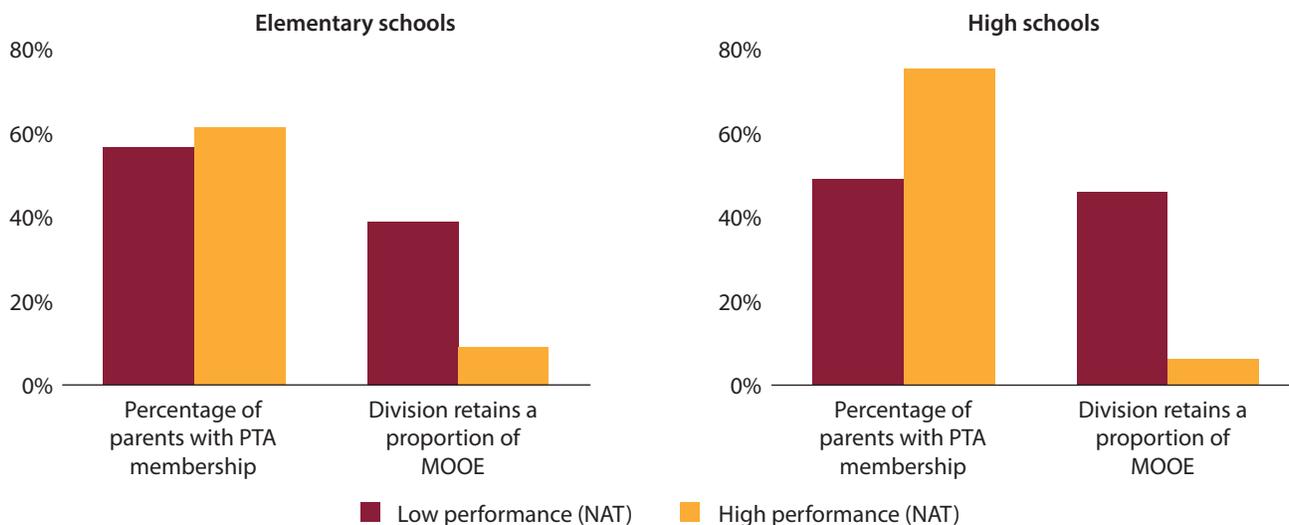
There is some evidence that better performing schools had greater support from the local community and from the education system generally. Participation rates in parent-teacher associations (PTAs) were much higher in better performing schools (Figure 3). A similar pattern was also found between school performance and the frequency of its school governing council meetings. However, differences between high-performing and low-performing schools in terms of SGC meetings were rarely statistically significant. Whether DepEd division

offices provide schools with their full allocations for maintenance and other operating expenses (MOOE) is a good measure of the amount of funds over which schools have discretion to spend on their own improvement plans and a good indicator of the support that division offices provide to schools. If division offices do not fulfill their obligation to download all of a school's allocation of MOOE funds, then it may not be providing much other support. Simple comparisons did show that better performing schools were more likely to be located in divisions that downloaded their full MOOE allocations (Figure 3).

There did not appear to be a consistent pattern between schools' levels of revenue and their performance. As part of the framework outlined in the previous section, the team used a number of different measures of annual school revenue to explore differences in school performance. They found no consistent association between revenue and performance. In some cases, schools with lower than average revenues per student had better than average performance indicators. These results point to the weak relationship between spending and school performance and the likelihood that other factors (such as how well funds are managed at the school level) influence the efficiency of school spending.

Figure 3: Schools with Higher NAT Scores Have More Parental Participation and Receive More of their Funding from DepEd Division Offices

Average proportion of parents who are members of the PTA and percentage of schools that do not receive all of their MOOE funds from the DepEd division offices



Source: PETS-QSDS national survey – school-level data.

Efficiency of School Spending

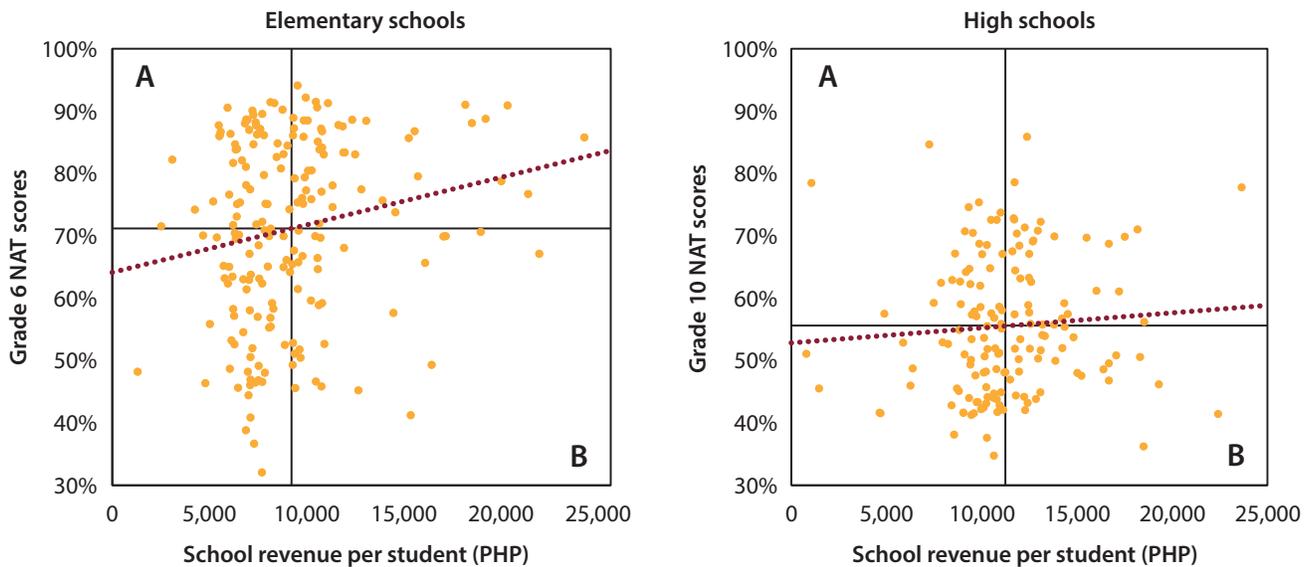
The previous section showed that schools vary considerably in their ability to translate their revenues into positive education outcomes. The PETS-QSDS study collected detailed information on all sources of school revenue from a nationally representative sample of elementary and high schools.¹¹ On the whole, the higher the annual level of school funding, the better the school's performance, but this relationship was not very strong (Figure 4).

Some schools appeared to use their resources more effectively than others to improve student learning outcomes. In Figure 4, each panel is divided into quadrants that show where schools fell in relation to the average achievement score and average annual school spending per student. Schools in quadrant A were the most efficient as they spent less than the average school every year but had better than average outcomes. The schools in quadrant B were the least efficient, with levels of spending that were higher than average but with below average performance. Levels of efficiency varied greatly between schools that had similar levels of either performance or spending.

The team's estimates of school efficiency suggest that education outcomes could be significantly improved without the need for any additional funding. Using data envelopment analysis (DEA), the team estimated efficiency scores for school performance (as measured by attendance and NAT scores) to measure the relative effectiveness of schools in transforming their annual per-student spending into better education outcomes.¹² The results revealed considerable variation among schools in their ability to translate resources into better education outcomes. The estimated efficiency scores can be interpreted as the percentage increase in output that a school could achieve with its current resources. The estimates revealed that school efficiency varied considerably and there is considerable potential for improving education outcomes if schools were able to use their resources more effectively (Figure 5). For example, the average efficiency score for elementary school NAT results was 77 percent. This suggests that Grade 6 NAT scores could be improved by around 23 percent if all schools were able to use their resources as efficiently as the most efficient schools in the system (Figure 5). While not too much should be read into the exact magnitude of these estimated improvements, this exercise does demonstrate the potential benefits that might accrue from more effective resource use.

Figure 4: There Are Large Differences in Performance Even Among Schools with Similar Levels of Funding

National achievement test scores and school annual revenue per student, 2013–14



Source: PETS-QSDS national survey – school-level data.

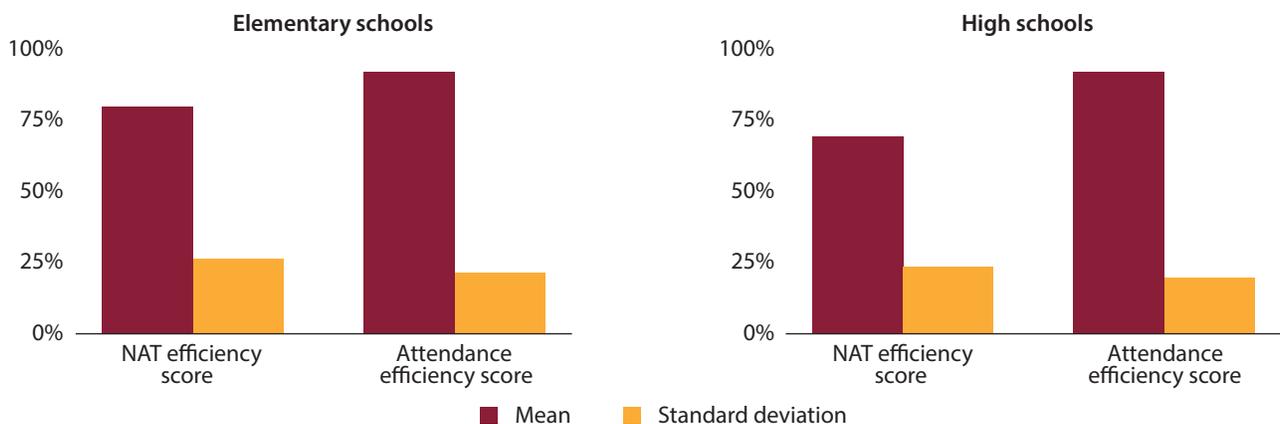
Note: The horizontal line in the figure represents the average school NAT score while the vertical line marks the average school revenue per student.

Schools' levels of efficiency are affected by some factors that they can influence and some that they cannot, such as the characteristics of the communities and households to which their students belong. The team used regression analysis to explore the associations between the estimated efficiency

scores and the explanatory factors in the framework outlined in Figure 1.¹³ The results of this second stage analysis highlighted some of the same explanatory factors that were revealed in the comparison of high-performing and low-performing schools in the previous section.

Figure 5: Increasing School Efficiency Can Improve Education Outcomes

Average estimated efficiency scores and standard deviations for school attendance and NAT results in elementary and high schools



Source: PETS-QSDS national survey – school-level data.

Note: The efficiency score shows the average efficiency of schools relative to the most efficient schools in the system. Efficiency scores were estimated using data envelopment analysis. School attendance and NAT scores were the output measures used, and the input measure was total annual school revenue per student.

Schools in urban areas tended to be less efficient than rural schools in using their resources to deliver better NAT scores. For example, elementary schools located in cities were less efficient than schools in municipalities or in highly urbanized cities. Larger schools, and particularly high schools, also tended to be less efficient even after controlling for school location. This is likely to reflect the difficulties involved in the management and organization of larger schools. However, the differences in efficiency between schools in different locations and of different sizes were not always statistically significant.

While school leadership factors were associated with greater efficiency, the results were not always statistically significant. Similar to the high and low performance comparisons, schools with more experienced principals who spent more time observing teaching and who developed plans for teacher professional development tended to be more efficient. However, these factors were rarely statistically significant on their own.

Teacher characteristics also did not appear to be associated with levels of school efficiency. A number of factors such as qualifications and test results were included to understand whether teacher characteristics were associated with efficiency.¹⁴ However, these factors did not appear to play much of a role in determining the efficiency of either elementary or high schools in terms of either NAT scores or attendance. Meanwhile, better teacher performance on subject matter tests, while statistically significant for efficiency in high schools as measured by attendance, appeared to actually reduce school efficiency in some cases.

Differences in the sources of school funding did not appear to be strongly associated with school efficiency. It might have been expected that schools with more discretionary funding would be more efficient because they were able to use these funds to more effectively address their needs. However, the results did not show this. Frequently, the relationship between the amount of discretionary funds and the source of those funds was not statistically significant. And in some cases, the size of discretionary funds received by a school appeared to be associated with lower levels of school efficiency.

There is some evidence that the availability of key school facilities and the condition of the existing stock of classrooms affected efficiency. For example, better learning environments, measured by an index of classroom conditions such as the state of repair, were positively associated with school efficiency. However, this association was only statistically significant for elementary school NAT scores and high school attendance rates.

Factors associated with greater parental and community participation tended to be related to better efficiency, but the results were rarely statistically significant. More frequent PTA and SGC meetings and greater parental participation were associated with greater efficiency in terms of NAT scores. However, only the frequency of SGC meetings in elementary schools was statistically significant. The frequency of PTA meetings and the proportion of parents participating in these meetings were associated with lower efficiency as measured by attendance. It is unclear what was driving these results.

Schools located in divisions where the DepEd offices provided schools with their full MOOE allocations tended to be more efficient. To the extent that this factor was a proxy for more effective and transparent division-level management, it highlights the important role played by education system governance in increasing school efficiency.

Determinants of School Performance

The team tried taking a third approach to analyzing school performance by extending the simple bivariate approach reported in Section 2 to some simple multivariate regression analysis. School performance in terms of attendance and NAT scores was regressed against the set of explanatory variables outlined in Table 2. The results of this final approach were very similar to the efficiency score results and highlighted similar associations between explanatory factors, levels of school attendance, and national examination scores.¹⁵

Conclusion

This policy note has shown that many schools in the Philippines are not using the resources at their disposal in the most efficient way to improve their performance. The analysis has found that many schools could improve their performance quite substantially by using their existing level of resources more effectively.

Understanding the factors that underlie existing levels of efficiency using the information from the PETS-QSDS survey was more challenging. The cross-sectoral nature of the data and the relatively small sample sizes made it difficult to identify the main factors that could drive improvements in efficiency. And while the study team made considerable efforts to collect information on the broadest possible set of explanatory factors, there were still significant gaps. In particular, the lack of any information on the teaching and learning process within classrooms may have affected the validity of the results.

Notwithstanding these limitations, the note does provide some tentative evidence that participation by parents and community members in school affairs can influence the efficiency with which schools use their resources and overall school performance. The frequency of SGC meetings had a positive and sometimes statistically significant association with school efficiency and performance in the multivariate analysis. However, factors associated with greater participation and support from PTAs tended to be negatively related to efficiency in school outcomes. Further research is needed to understand the factors underlying these results but strengthening the relationships between schools and their local communities, particularly through the institutions (such as the SGCs) and processes (such as the school improvement plans) related to the implementation of school-based management could be beneficial.

The note has shown that school leadership may be a key explanatory factor for differences in performance among schools. Schools where the principals observed classroom teaching regularly and developed professional

development plans for their teaching force were often more efficient and had better performance indicators than schools where this did not happen.

There is also some tentative evidence to suggest that schools within the jurisdiction of the better managed DepEd divisions tended to perform better themselves. Division offices are obligated by DepEd regulations to transfer all MOOE funds to schools, and it can be assumed that those that do not do so are less well managed. The evidence reported in this note has shown that schools that fall within the jurisdiction of those divisions also tended to be inefficient and to perform poorly compared to schools in better managed divisions.

It is surprising that teacher characteristics were not associated consistently with overall school performance. The PETS-QSDS study included a detailed assessment of teacher's subject knowledge, and the results were not associated strongly with school performance. It is possible that this was because only a small proportion of each school's teachers took the test or it may be that levels of teacher competency are universally low in the Philippines and do not vary significantly across schools.

Finally, the note's findings suggest that larger schools in urban areas are inefficient and perform less well than smaller schools in municipalities. Other policy notes based on the PETS-QSDS data have highlighted the fact that large schools in urban areas are under significant amounts of stress. The results presented here tend to confirm that these schools are also less efficient. Schools in highly urbanized cities tended to have higher than average levels of funding but lower than average levels of performance. Given that the socioeconomic status of children in these schools did not appear to be significantly different from the status of those in other public schools, this suggests that the inefficiency stemmed from the challenges associated with managing very large schools and the very intensive use of limited school infrastructure.

Endnotes

- 1 A detailed description of the methodology and the full results are available in World Bank (2016). "Understanding the Drivers of School Efficiency/Performance in the Philippines." Washington, D.C.
- 2 Highly urbanized cities are cities with populations of more than 200,000 and with average revenues of at least PHP 50 million in 1991 prices. Other cities are defined as cities that do not meet the criteria to be classified as highly urbanized. Municipalities are administrative units for all other areas in the Philippines.
- 3 Other performance indicators such as a school's dropout and completion rate were also analyzed, but these school-reported rates did not seem to be very accurate.
- 4 See for example, Glewwe, P.W., E. A. Hanushek, S.D. Humpage, and R. Ravina (2011). "School Resources and Educational Outcomes in Developing Countries: A Review of the Literature from 1990 to 2010" NBER Working Paper No. 17554, National Bureau of Economic Research, Cambridge, MA and Heneveld, W. and H. Craig (1996) "Schools Count: World Bank Project Designs and the Quality of African Primary Education." World Bank, Washington, D.C.
- 5 Data envelopment analysis was used to explore school efficiency. See, for example, Coelli, T. J., Rao, D. S. P., O'Donnell, C. J., and Battese, G. E. (2005) *An Introduction to Efficiency and Productivity Analysis*, Springer Science & Business Media, New York and Herrera, S. and G. Pang (2005) "Efficiency of Public Spending in Developing Countries: An Efficiency Frontier Approach" Policy Research Working Paper. No. 3645, World Bank, Washington, D.C.
- 6 A hierarchical modelling (HLM) approach was used when appropriate to account for the grouping of schools in the PETS-QSDS study under DepEd division and regional offices.
- 7 Average elementary (high) school attendance for the bottom 20 percent of schools was 71 (75) percent and 98 (98) percent for the top performing 20 percent of schools. Average elementary (high) school national achievement test score for the bottom 20 percent of schools was 52 (42) percent and 90 (75) percent for the top performing 20 percent of schools. The full results are available in a set of additional tables accompanying the main PETS-QSDS report.
- 8 The proportion of highly urbanized schools in the poor performing quintile was much higher than the proportion of highly urbanized schools in the population as a whole.
- 9 Differences were statistically significant at the 1 percent level.
- 10 Differences in teacher attendance were also explored but no statistically significant differences were found between high and low performing schools.
- 11 A full description of the information collected and the approach that the PETS-QSDS study took to calculating total school revenue and expenditure is included in additional annexes and tables accompanying the main PETS-QSDS report.
- 12 Efficiency scores were estimated for each of the performance measures. An output-oriented approach that assumes variable returns to scale was used to estimate efficiency scores. Full details of the approach and results are available in World Bank (2016) "Understanding the Drivers of School Efficiency/Performance in the Philippines." Washington, D.C.
- 13 Efficiency scores cannot exceed 100 percent so a Tobit model was used to estimate associations between efficiency scores and explanatory factors.
- 14 Teacher attendance did not have a significant impact on efficiency scores. In the final analysis teacher attendance was dropped because it allowed more school observations to be used.
- 15 The full results are not presented here but are included in additional annexes and tables accompanying the main PETS-QSDS report.

