



GLOBAL INFRASTRUCTURE

PFI in school building – does it influence educational outcomes?

KPMG's Infrastructure Spotlight Report
2009 Edition

ADVISORY

The debate continues:

Do last year's results prevail?
Does PFI influence student achievement?
Is student motivation affected?
What are the possible policy implications?

We are pleased to introduce the 2009 Edition of *KPMG's Infrastructure Spotlight Report* focusing on the interaction between the UK Private Finance Initiative (PFI) and school building and their relation to educational outcomes. PFI is a form of Public Private Partnership (PPP or P3) used in the United Kingdom.

We were thrilled with the reception of our first report, published in 2008, and by the willingness to engage in open debate on this issue.

In this 2009 edition we have used your feedback to further focus our research and specifically look at the performance of schools rebuilt under PFI, compared with schools rebuilt conventionally.

The headline from our research is that the performance trend identified in 2008 appears to persist. Educational performance in newly rebuilt PFI schools improves faster than in conventional ones. We believe this finding to be underpinned by analysis on the most substantive dataset available and as such serves as a basis for informed debate. We have used a dataset that is both larger and of better quality than the one we analysed last year.

We do, nevertheless, hope that the analysis presented provides governments around the globe with new insights into their investment strategies as the market continues to evolve.

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Important notes

1. In this publication Private Finance Initiative (PFI) is used to refer to a specific form of Public Private Partnership (PPP or P3) used in the United Kingdom.
2. In this publication conventional school is used to refer to school projects paid for by the public sector, through grants or borrowing, in the course of the construction phase. Such projects are often procured using design-bid-build, design-and-build or other non-project-finance based methods.
3. Educational attainment is expressed as the percentage of students in a school obtaining five or more A* to C grade results in GCSE (General Certificate of Secondary Education) exams.
4. Unauthorised absence is measured as a percentage of half-days missed by students. An absence is unauthorised if permission for it has not been given by the school or its representative. Unexplained and unjustified absences are also classified as unauthorised.
5. A rebuilt school is one that has been reconstructed in its entirety either on the existing site or on a new site. Rebuilt schools are thus different from refurbished schools.
6. A percentage point (pp.) is best understood as a single unit on a scale of 1 to 100.
7. Rounding differences may occur as figures in Table 1 and Table 2 have been presented to two decimal places for ease of interpretation.

The method we have used to arrive at our findings is detailed on the last pages of this report.

Introduction: progressing with modernisation

This *KPMG Infrastructure Spotlight Report*¹ presents analysis into the use of PFI in school building and its impact on educational outcomes in England.

The main findings of this 2009 edition are:

- The rate of improvement in educational attainment is 44 percent faster in schools rebuilt using PFI than those rebuilt conventionally. This shows that our findings from last year persist.
- Unauthorised absence in schools rebuilt using PFI is reducing, whereas in a comparable set of conventional schools it is increasing. We believe unauthorised absence to be an indication of lack of student motivation, which is often argued to make a major contribution to student performance.

The above findings are noteworthy, as the data samples include all secondary schools rebuilt in England with the information necessary to meet our

inclusion criteria. The datasets for the first and second findings consist of 89 and 81 schools respectively. They both represent an increase in the number of schools when compared to the dataset we analysed in 2008.

On the following pages the report takes a closer look at educational attainment followed by a look at unauthorised absence. We have refrained from commenting on the mechanism through which we think PFI influences performance in these areas in the main body of the report. This is because we are unable to prove which factors are at play and can merely speculate. We have, however, included a stand alone comment from an infrastructure practitioner on the possible causes.

¹ *KPMG's Infrastructure Spotlight Report* draws on research conducted under the supervision of Graham Ive of the Bartlett School of Graduate Studies, UCL (University College London).



PFI versus conventional schools

Does PFI have an educational attainment impact that differs significantly from conventional rebuild methods?

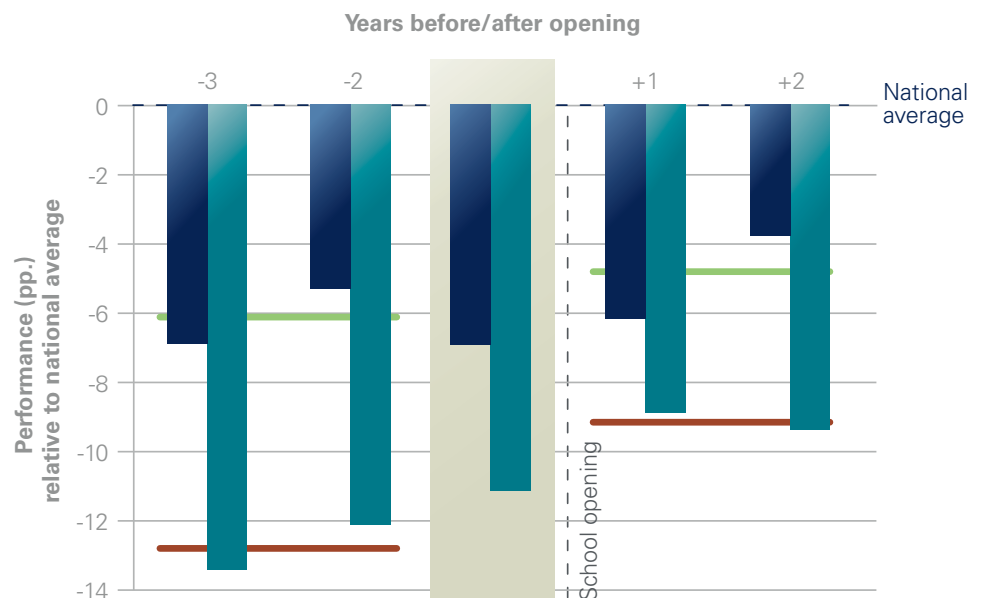
Student attainment

Graph 1 shows attainment in rebuilt schools. Student attainment is expressed in percentage points (pp.) relative to the national average in England. The period shown is three years before and the two years after schools have opened following a rebuild. The data for each school was added to the dataset with reference to the date that teaching in the new facilities commenced. There are 32

conventional and 57 PFI schools in the dataset.

The year immediately prior to opening has been excluded from the analysis. Inclusion of the year prior to opening could distort the findings due to either negative impacts caused by ongoing construction work, or positive motivational effects arising from the imminent opening of a new school building.

Graph 1: Educational attainment in rebuilt schools relative to England average



Data sources: UK Department for Children, Schools and Families; Her Majesty's Treasury
 Analysis: KPMG LLP (UK) 2009

Key: ■ Conventional ■ PFI — PFI schools' two-year average — Conventional schools' two-year average



Table 1 is a numerical representation of Graph 1. They both show an upward trend in educational attainment for all rebuilt schools, whether PFI or conventional.

The improvement in the two-year averages can be interpreted to occur over a three-year period. This information is used to arrive at the annual rate of improvement. The average rate of

improvement for all schools in England is 1.54 pp. per annum.

The rate of improvement in student attainment in rebuilt PFI schools (2.75 pp. per annum) is 44 percent higher than that in conventional schools (1.91 pp. per annum).

Table 1

Student attainment relative to national average (pp.) 32 conventional schools					
Year	Before			After	
	3	2	1	+1	+2
Rebuilt schools	-6.89	-5.27	-7.17	-6.20	-3.76
Two-year average	-6.08		excluded	-4.98	
Before v. after improvement				1.10	
Annual improvement				0.37	
Annual improvement including national average				1.91	

Student attainment relative to national average (pp.) 57 PFI schools					
Year	Before			After	
	3	2	1	+1	+2
Rebuilt schools	-13.44	-12.08	-10.91	-8.93	-9.36
Two-year average	-12.76		excluded	-9.14	
Before v. after improvement				3.62	
Annual improvement				1.21	
Annual improvement including national average				2.75	

Data sources: UK Department for Children, Schools and Families; Her Majesty's Treasury
Analysis: KPMG LLP (UK) 2009

What effect does rebuilding schools have on unauthorised absence?

Student motivation

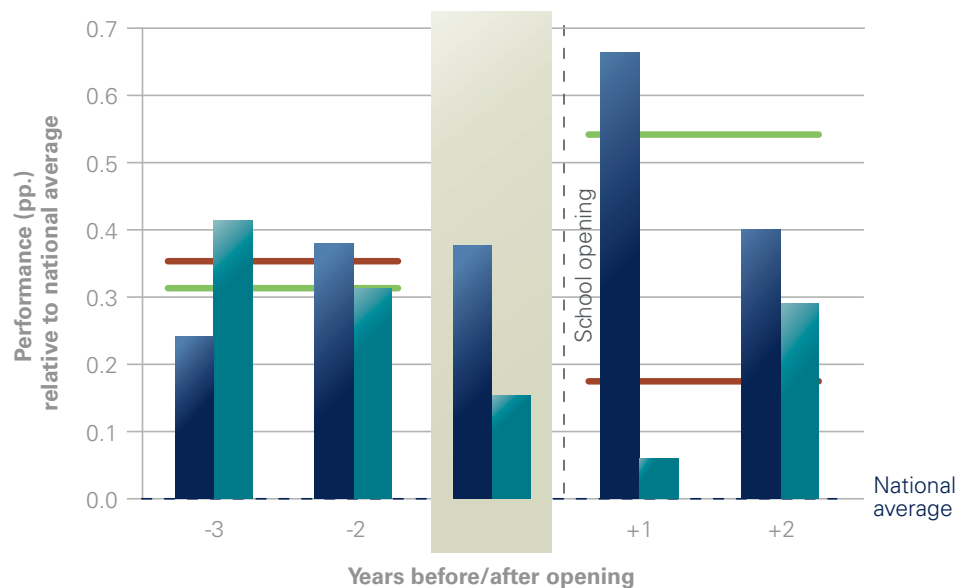
It is often suggested that rebuilding a school improves student motivation, leading to improved educational outcomes.

In our analysis we have used unauthorised absence as a proxy for student motivation. The presumption is that more motivated students are less likely to play truant, resulting in

reduced unauthorised absence.

Graph 2 shows unauthorised absence in the two types of schools. There are 29 conventional schools and 52 PFI schools in the dataset. The illustration is for three years before and the two years after re-opening. The unit shown is the pp. departure from the average level of unauthorised absence across England.

Graph 2: Unauthorised absence in rebuilt schools relative to England average



Data sources: UK Department for Children, Schools and Families; Her Majesty's Treasury
 Analysis: KPMG LLP (UK) 2009



The England average rate of reduction in unauthorised absence is 0.03 pp. year-on-year. Both Graph 2 (below) and Table 2 (overleaf) show that using PFI to rebuild schools corresponds to a reduction in unauthorised absence relative to the national average (0.06 pp. per annum) whereas, quite surprisingly, the use of conventional procurement may increase it (0.07 pp. per annum).

Table 2

Unauthorised absence relative to national average (pp.) 29 conventional schools					
Year	Before			After	
	3	2	1	+1	+2
Rebuilt schools	0.24	0.38	0.37	0.66	0.40
Two-year average	0.31		excluded	0.53	
Before v. after improvement				0.22	
Annual improvement				0.07	
Annual improvement including national average				0.10	

Unauthorised absence relative to national average (pp.) 52 PFI schools					
Year	Before			After	
	3	2	1	+1	+2
Rebuilt schools	0.41	0.31	0.15	0.06	0.29
Two-year average	0.36		excluded	0.18	
Before v. after improvement				-0.19	
Annual improvement				-0.06	
Annual improvement including national average				-0.03	

Data sources: UK Department for Children, Schools and Families; Her Majesty's Treasury
Analysis: KPMG LLP (UK) 2009

Conclusions

The 2009 edition of *KPMG's Infrastructure Spotlight Report on educational outcomes* confirms that the findings from last year do persist when the analysis is repeated on an enhanced dataset.

This year's key findings are as follows.

- The rate of improvement in student attainment is 44 percent higher in PFI schools than in conventional schools.
- Unauthorised absence in PFI schools is decreasing whereas in conventional schools it is doing just the opposite. We have not speculated on the underlying reasons but instead invite discussion on the topic.

The findings presented in this report do raise some interesting issues. The UK is planning to replace all secondary schools in England through its Building Schools for the Future (BSF) programme. Some of the schools are procured through PFI and some using the design-and-build, i.e. conventional, method. The current economic climate is tilting the balance away from PFI. Our findings do, however, suggest that firmer defence of the PFI component of BSF should be considered.

Globally, a number of governments are planning to replace their aging school portfolios with considerable amounts of funding for infrastructure being made available as stimulus packages. Our analysis does support a careful consideration of whether to involve private finance in the rebuilding of schools, and whether stimulus funding should be allocated to areas where private finance appears to have less impact.





A view from an infrastructure practitioner

The reason why our results arise is undoubtedly a topic for debate. Drawing on our experience in the schools markets, I thought that I would kick off the discussion by sharing some of my views on the subject.

Appropriate building maintenance in PFI projects is not optional, but mandated. In the past local authorities could choose whether to spend budgets on teaching or on the school buildings. In some cases this could lead to allocating more to end service provision while neglecting the maintenance of the facility. PFI has emerged partly to address this underinvestment in bricks and mortar. It is not possible to run a PFI school into the ground, given the contractual mechanism in place. If we believe that maintaining the quality of the environment in which the teaching takes place can have a positive effect on teaching outcomes, this rebalancing of expenditures may offer one possible explanation.

The process of approving a potential investment as well as reaching financial close on a PFI deal can sometimes appear laborious, given the procedures involved. This could mean that more thought is given to budget allocation as well as how it is to be spent most effectively. Project financiers scrutinise contractual documentation in depth to ensure that specific risk flow-down structures are embedded in projects.

This prudence might indirectly have an impact on educational outcomes.

Is it also possible that the initial designs of PFI schools are more conducive to learning? The teachers and other stakeholders are consulted extensively leading up to financial close. The input provided in the design stages could be having the desired impact later on. Does this happen in greater depth than it might with conventional design and build schools?

The commercial incentives in PFI should ensure that contractors complete the construction works as scheduled by the contract. There is no payment from the public sector before a school is operational. If conventionally procured construction works have overrun and the teaching has to take place while building operations are still running, this will not help. It might be that PFI construction practices are less disruptive, as such disturbances to the running of the facility incur direct financial penalties.

The arrangements in PFI contracts bring dedicated facilities management staff into the school premises. This allows teachers to focus on teaching,



as they no longer have to worry about blocked drains, etc. This increased focus could explain some of our results. It is also possible that the presence of a third party – for example, the facilities management contractor on site – redefines the relationship between teachers and pupils by introducing a new type of accountability. This may be one of the factors at play.

I do appreciate that all of the above will be hotly debated and that evidence for any of the possible explanations is anecdotal at best. We believe it is useful to have the debate, however, and we look forward to having discussions with you on the topic.

Robert Griggs

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How we did it

We are grateful for the feedback received following the publication of our first report into PFI and its impact on educational outcomes.

One year on

We have considered the feedback and adjusted our method accordingly. The main changes in this second edition are as follows.

- Schools have had to pass more stringent criteria in order to be included in the data sample. No missing or inconsistent data has been tolerated.
- The size of the data sample has increased. In addition to including schools that qualified as a result of there being an additional year of data available, we only required each school to have data for three years before and two years after construction completion.
- The datasets of rebuilt PFI and conventionally financed schools were confirmed, through statistical testing, as being representative of all schools undergoing refurbishment or rebuilding.

Data and its sources

Educational attainment was measured using the proxy of GCSE exam results. This indicator is believed to be the most used, understood and consistent over time, as well as being publicly available. The attainment dataset, covering the period of 1994 to 2007, was obtained from the Department for Children, Schools and Families website (www.dcsf.gov.uk/performance/tables).

Student motivation was quantified using the indirect measure of unauthorised absence. It is believed that this is the best hard metric to approximate students' attitude towards learning. The unauthorised absence dataset, including years from 1994 to 2007, was compiled from the Department for Children, Schools and Families website (www.dcsf.gov.uk/rsgateway).

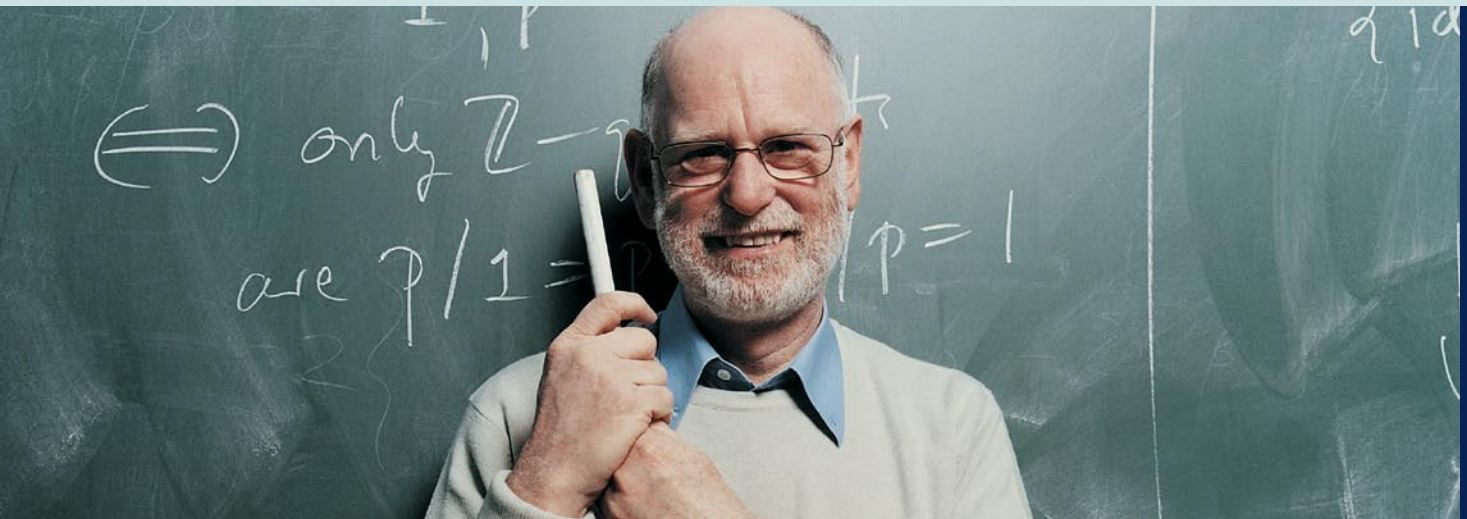
Additional data on school construction was obtained directly from the Department for Children, Schools and Families and PFI data from Her Majesty's Treasury website (http://www.hm-treasury.gov.uk/ppp_pfi_stats.htm). This allowed us to:

- Identify the type of construction works undertaken (i.e. isolate rebuilt schools)
- Classify the school type (i.e. PFI and conventional schools)
- Establish the reopening date (i.e. the teaching in the new building started)

Our approach to analysis

We have carried out a longitudinal analysis on a set of schools that remains the same through time. A common issue raised in the feedback was that external factors, such as student background, have a major influence on educational performance. It was argued that it is, therefore, not possible to draw conclusions on the influence of private finance without controlling for such external factors. The techniques we continued to use to ensure that conclusions can be drawn included the following.

- The sample was the entire population of state secondary schools in England (apart from a small number of randomly distributed exclusions). This ensured that the findings remained representative of the population studied. The representativeness of the sample was also tested as outlined later in this section.
- The focus was on assessing the difference in performance in the same dataset before and after an event. This eliminated the impact of random external variables within the group of schools studied. In other words, the same schools were studied before and after they were rebuilt.



- The data was de-trended against the national average or, put another way, the performance difference was analysed relative to the average in England. This minimised the impact of random external variables in different years of the time-series data.

Data manipulation

The dataset of all secondary schools in England was used as a starting point. The following were excluded from the dataset:

- Independent schools
- Special schools
- Schools with missing data (the minimum requirement was three years before and two years after reopening)
- Schools that had not undergone construction works
- Schools that had been subjected to refurbishment only

This produced a dataset of 89 schools (57 PFI and 32 conventional) and 81 schools (52 PFI and 29 conventional) for the student attainment and motivation tests respectively.

Significance testing – performance

Significance testing on educational outcomes was carried out at the ninety percent confidence level.

Student attainment

- A two-tailed paired-sample t-test confirmed that the difference in the two-year averages before and after for PFI schools is statistically significant.
- A two-tailed paired-sample t-test could not confirm that the difference in the two-year averages before and after for conventional schools is statistically significant.
- A one-tailed paired-sample t-test confirmed that the higher rate of improvement in PFI schools in comparison to conventional schools is statistically significant.

Student motivation

- A two-tailed paired-sample t-test could not confirm that the difference in the two-year averages before and after for PFI schools is statistically significant.
- A two-tailed paired-sample t-test could not confirm that the difference in the two-year averages before and after for conventional schools is statistically significant.
- A one-tailed paired-sample t-test confirmed that the higher rate of improvement in PFI schools in comparison to conventional schools is statistically significant.

Significance testing – representativeness

Significance testing on representativeness was also carried out at the ninety percent confidence level.

Six tests of representativeness were undertaken using 2007 data only. Three tests were carried out each on attainment (GCSE results) and on motivation (unauthorised absence). The reference samples were:

- 141 rebuilt schools
- 331 refurbished and rebuilt schools
- All schools in England

Two-tailed paired-sample t-tests were used to test representativeness. The student attainment sample had 89 schools whereas the motivation sample contained 81 schools. The means of the two samples were:

- Not statistically different from that of fully rebuilt schools, i.e. datasets are representative
- Not statistically different from that of refurbished and fully rebuilt schools, i.e. datasets are representative
- Statistically different from the mean for all schools in England (not representative), i.e. datasets are not representative

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