PRODUCTIVITY IN WELFARE SERVICE DELIVERY

MEASURING PRODUCTIVITY IN HEALTH AND EDUCATION: AN EXPLORATORY STUDY OF SELECTED APO COUNTRIES

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Productivity in Welfare Service Delivery
Measuring Productivity in Health and Education:
An Exploratory Study of Selected APO Countries

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FOREWORD

Raising productivity within public sector matters more now than ever, particularly due to the expected rise in service delivery costs and decrease in public revenues. These two are the multitude forces shaping the productivity agenda for government.

Improving productivity in the public sector may benefit governments with resource savings in the form of productivity gains, which can then be reinvested to achieve greater efficiency in delivering services. To take advantage of productivity gains, public-sector organizations need comprehensive strategies, including better ways to measure productivity and its gains, priority areas for improvement which are expected to provide significant leverage to overall productivity efforts, and the identification of models in which effort in institutionalizing productivity culture can be implanted.

Difficulty in defining the production costs for government operations underlines the exclusion of public sector from conventional productivity measures. Although the neglect does not degrade the level of importance of measuring efficiency in public organization, there is an increasing tendency for policymakers to delve into public-sector productivity measurement. A mounting pressure to increase the performance of public sector which is usually gauged by "doing less for more" necessitates adequate knowledge on the costs to assess productivity performance, to justify the use and allocation of resources for the production of public services as well as to contain the costs amid the challenge to halt the downward trend of public revenue faced by most governments post-economic upheaval of 2008.

This present publication is an effort to fill in the gap of practical discourse on measuring and assessing productivity in government sectors. It is also a first step to test the feasibility in pursuing public-sector productivity measurement in a concerted way involving five APO member governments at two sectors namely health and education. This current research project is a follow up from previous APO study of the public sector productivity of government agencies delivering tax and passport services.

The APO hopes this publication will be useful in understanding further the performance of public-sector organizations.

Dr. AKP Mochtan
Secretary-General

CHAPTER 1

OVERVIEW OF MEASUREMENT FRAMEWORK AND RESULTS

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This chapter sets out the framework that was used to measure productivity in the public-sector provision of hospital and education services in the Asian countries studied. In practice, limitations in the available data constrained the country experts in the implementation of the framework. Some measurement innovations have been introduced. Despite data limitations, a pattern of decline in productivity in hospital services and schooling has emerged. The main reason lies in the policies of governments to improve access to services and to improve their quality. Consequently, inputs have grown more rapidly than outputs. While productivity has declined, community well-being is likely to have been enhanced by greater access and quality of service. The study has generated useful and interesting results. However, further data development work is needed if firmer conclusions and comparisons are to be made.

Introduction

Productivity growth matters because it is *the* major source of improvement in a country's living standards over the long term. Productivity growth means ways have been found to generate more outputs of goods and services from a nation's resources. Importantly, generating more outputs also generates more income and prosperity for the nation.

Measuring productivity also matters. Productivity measures are vital high-level indicators of the performance of an economy - how efficiently resources are being used to generate outputs and income. They provide warning signs when things are getting tougher for the community and governments, and they provide feedback on measures governments take to improve productivity performance.

The public sector, however, is normally excluded from conventional productivity measures. The oversight is due to difficulty in measurement, rather than lack of importance. After all, public-sector production costs typically account for around a fifth to a quarter of a nation's economic activity [1].

Despite the measurement difficulties, commentators and policy makers want to know more about public-sector productivity performance. Part of their interest reflects a desire to fill in the gap in national productivity measures and provide a better economy-wide measure of economic growth and performance. Another part of their interest lies in the performance of the public sector itself - to assess productivity trends, to improve accountability for use of resources, to assist better allocation of resources between areas of government activity, and to provide feedback on policy initiatives to improve performance.

Public-sector productivity measures can assist governments to find better ways of containing costs. Governments have often resorted to across-the-board or arbitrary cuts to agency budgets as a way of spurring efficiency and containing costs. But not all agencies can cut costs as easily as others and not all agencies generate as much value to the community from a given budget. Properly-constructed productivity measures could help indicate where budgets could be reset with least loss of value to the community. As Lau et al [2] put it,

> "The term productivity is often misused as a synonym for austerity program, rather than searching for strategic agility, improving the mix and use of inputs, and enhancing the quality of outputs for better public outcomes."

Concerted efforts to measure public-sector productivity are relatively recent. The Atkinson Review [3] is a seminal study from 2005. It provided a foundation for expanding the scope of national accounts estimates of national productivity to embrace the public sector [4]. Other studies have been directed at measuring productivity in major subsectors of government activity; for example, health and education [5–7]. Systematic measurement of productivity has also been attempted at the level of individual government agencies [8–10].

It is fair to say that measurement of public-sector productivity is still problematic, given that a mixture of conceptual and data-related challenges remains. Recognizing both the difficulties and the growth of interest in the area, the OECD [11] and Eurostat [12] have provided focal points for efforts to improve public-sector productivity measurement and to enhance consistency across countries.

This Study

The Asian Productivity Organization (APO) initiated this current project to further the ability of its member countries to measure and assess productivity trends in their government sectors. The project follows on from an earlier APO study of the public-sector productivity of government agencies delivering tax collection and passport services [9].

This study examines the provision of health services at government hospitals and education services at government schools. Primary and secondary schools are covered, but not tertiary institutions. Because private sector involvement is excluded, the measures do not cover the whole hospital and school systems.

Specific objectives of the study have been to:

- Identify and, as far as possible, assemble key indicators to measure public-sector productivity in the areas of health and education services
- Identify indicator gaps and make recommendations for collection of future data that will provide a more complete picture of productivity in target areas
- As far as possible, identify factors that may have contributed to productivity trends, including policy factors

Eight countries were involved in the initial stages of the project - India, Indonesia, Islamic Republic of Iran (IR Iran), Malaysia, Pakistan, the Philippines, Sri Lanka, and Thailand. National experts from each country were asked to follow a common framework, as far as possible, to enhance the potential for international comparisons. IR Iran, Sri Lanka, and Pakistan were unable to complete the productivity studies because of difficulties with access to suitable data. This report covers the five countries that completed productivity studies.

The study should be viewed as exploratory and as a first step to test the feasibility and value in pursuing public-sector productivity measurement in a concerted way. The time and resources available for the study were very limited in comparison to approaches that have been adopted in some OECD countries[1]. Consequently, the estimates assembled for this study have had to rely on readily available data and a pragmatic approach. They should be considered as experimental. Some should only be used with considerable caution.

While it is an objective of the study to link policy contributors to observed productivity trends, analysis of the effectiveness of a range of possible and best ways to improve public-sector productivity is outside of scope. Improving public-sector productivity can be improved over time through the combination of policy reform and performance measurement. This study focuses primarily on the measurement.

An overview of the measurement framework and the results generated is provided in the remainder of this chapter. The detailed studies by country experts of public hospitals and schools in their countries follow in subsequent chapters.

Productivity and Measurement in the Business Sector

The methodology for measuring public-sector productivity is meant to draw on, if not mimic, the principles of private-sector productivity measurement. An outline of productivity measurement in the private or business sector is therefore a good starting point[2].

[1] For example, the Office of National Statistics in the UK set up and staffed the Centre for the Measurement of Government Activity to implement the recommendations of the Atkinson Review over several years.

[2] The OECD Productivity Manual [13] provides a detailed guide on business-sector productivity measurement.

Productivity is about the efficiency of production. It is the rate at which outputs of goods and services are produced from the inputs used in their production. Labor and capital (such as buildings, plant and machinery) are the major inputs identified in productivity measures. In some contexts, the use of intermediate inputs (components, materials, and purchased services, such as energy) are also included.

Improved production efficiency - productivity growth - can come about either by using fewer inputs to produce the same volumes of output or by using the same input levels to generate more output. Over the long term, the latter channel is more significant as, for example, various technological advances enable businesses to produce a lot more output without raising their use of inputs to the same degree.

While there are several ways to measure productivity, the ratio of outputs produced to inputs used is a simple way to capture its essence. That is:

$$productivity = \frac{outputs}{inputs}$$

Outputs and inputs are measured in quantity terms. The number of vehicles produced from a factory per person per hour worked and the number of tons of rice produced per hectare farmed are examples of quantity-based productivity measures.

Output

But how is output measured across numerous firms and industries? The number of vehicles cannot be added to tons of rice to get a meaningful total output measure.

Statisticians use prices to obtain a weighted sum of different outputs. Price multiplied by the quantity of output equals value and the value of vehicles produced can be added to the value of rice produced and so on to get a total output measure. (Statisticians also use price deflators that remove the effects of inflation, so that values become 'quantity-like', real, or volume measures.)

Products with a higher price receive a higher weight in adding together the production of different goods and services. As a vehicle has a much higher price than a ton of rice, the number of vehicles produced will receive a much higher weight in adding up the combined production of units of vehicles and units of rice.

The use of output prices means that the productivity measures cover the production of goods and services of value. If customers do not value a good or service, its price will be zero and it will effectively be excluded from a group output measure - even if, technically, it is produced very efficiently.

An improvement in the quality of goods and services will also be reflected in a higher price. A producer will charge a higher price for a good or service of better quality and, if customers value the quality improvement, they will be prepared to pay that higher price.

Two output measures can be used:

- A *gross output* measure, which is based on the value of goods and services produced, using the prices of the completed outputs
- A *value-added* output measure, which is based on the value of gross output produced less the value of all expense items, such as components and energy consumption - the value a producer adds to all things purchased (apart from labor and capital items)

Inputs

Labor

A labor input measure is based on the number of hours worked by all persons directly and indirectly involved in the production of the goods and services measured. The number of employees can also be used but is considered a less suitable measure, as it does not reflect changes in labor input if there are changes in the degree to which employees work part time.

The simple addition of all hours worked by different occupations is the usual approach to deriving a total labor input measure. However, this effectively treats an hour worked by different occupations and skill groups as

being equally productive. For example, an hour worked by a highly skilled surgeon is taken to generate as much output as an hour worked by a nurse.

An alternative approach is to give different weights to growth in the hours worked by different skill groups - a larger weight to hours worked by surgeons than hours worked by nurses. The weights used are the relative wages of the skill groups, based on the assumption that wage relativities reflect productivity relativities.

Capital

The measure of capital input is meant to represent the flow of services from the available capital stock. The flow is assumed to be proportional to the stock. The net capital stock is usually measured through the perpetual inventory method, whereby real investments are treated as additions to the stock and depreciation and retirements are treated as deductions from the stock.

In relatively recent times, some statistical agencies have introduced a 'productive capital stock' measure [13]. In the main feature of this approach, growth in stocks of different assets are added together using weights based on the rental price (or cost of capital) of the different assets. In parallel with the labor example, relative rental prices are assumed to reflect the relative productivities of asset types.

Intermediates

Intermediates are all the nonlabor and noncapital inputs to production. They are usually measured as the value of all intermediates used, deflated to remove the effects of price inflation.

Measurement of Public-sector Productivity

The absence of output prices is the key problem in the measurement of public-sector productivity. As discussed earlier, prices are fundamental to the measurement of productivity as a way of capturing the value of goods and services produced, capturing improvements in quality, and allowing the summation of outputs of different products. But, in most cases, public-sector goods and services do not have market prices. Goods and services are provided free or at highly subsidized prices that do not reflect costs of production.

A Broad Framework

Figure 1.1 displays a framework for assessing performance in the public sector[3]. The figure shows, as expected, productivity as the relationship between inputs and outputs of public-sector goods and services. (From this point, reference will be made only to public-sector services and reference to public-sector goods will be dropped.) Other important relationships, beyond inputs and outputs, help to link productivity to public value.

First, there is a distinction between outputs and outcomes. Outputs are the services a public-sector agency provides. Outcomes are the effects or consequences of the public-sector outputs. For hospitals, for example, the outputs might be surgical operations, while the outcomes might be improved quality of life and longer life expectancy. The improvement in outcomes is the public value generated.

Second, desired outcomes are defined by reference to broader objectives. These might include, for example, to aim for a healthy, safe, and educated community. Objectives can have economic, social, and environmental dimensions.

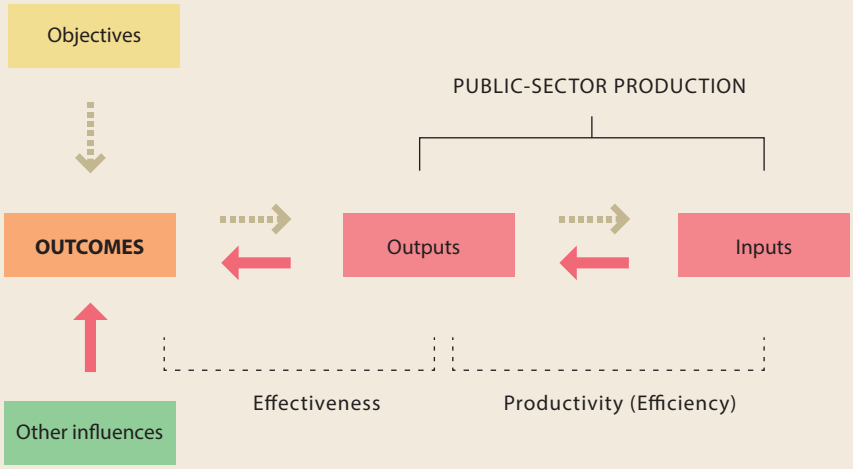
Third, productivity measures should focus on the outputs that are most relevant to achieving desired outcomes. Public value is not just a matter of producing outputs for their own sake or because producing them is what an agency has done for a long time. It is a matter of identifying and producing outputs that have a positive, value-generating effect on desired outcomes. Focusing productivity measurement on those outputs - the ones linked to desired outcomes - brings an element of value into the consideration of productivity.

As shown in Figure 1.1, the productivity analysis should start by identifying objectives. Objectives determine the nature of the desired outcomes. The desired outcomes then determine the most relevant outputs to consider in the productivity measurement[4].

[3] The figure is an adaptation of a framework set out in many papers and reports.
[4] The importance of working backwards from objectives, through desired outcomes to identify relevant outputs was stressed by Dunlevy and Carrera [8].

FIGURE 1.1

THE FRAMEWORK FOR MEASURING PUBLIC-SECTOR PRODUCTIVITY



To illustrate the concepts:

- One objective of a health program might be to reduce the death rate from heart attacks
- Which indicates a desired outcome of increasing the heart attack survival rate
- A relevant output indicator might be successful delivery of emergency treatments for heart attacks at hospitals

Fourth, it needs to be recognized that other factors, apart from the public-sector outputs, influence outcomes. Life expectancy, for example, is influenced by genetics, nutrition, tobacco and alcohol use, and lifestyle, and not just the delivery of hospital services.

Finally, it should be stressed that productivity measurement is not the end of performance assessment of the public sector. Effectiveness in achieving desired outcomes (see the 'Effectiveness' link in Figure 1.1) also forms part of a full performance assessment[5].

Improvements in public-sector productivity could come in several ways. It could come on the input side - using fewer inputs to generate outputs. Cutting back on agencies' budgets is often used to drive improvements in productivity. On the output side, productivity can be improved if agencies handle more clients or provide a wider range of services. Productivity is also improved if the quality of service improves - more reliable and accurate service, shorter waiting times, more convenience, and so on.

Attuning outputs to deliver better outcomes, however, may have an ambiguous effect on productivity. For example, an agency may increase its outcome effectiveness by changing its mix of outputs. Productivity would increase if the change in mix was toward services that were cheaper to produce. But it would decline if the change in mix was toward more expensive services. (The best thing for an agency to do in this case is not determined by what happens to productivity, but by what has greatest effect community outcomes.)

Specifying Outputs

With that broad framework in mind, the specification of outputs (this subsection) and inputs (next subsection) are now discussed. The discussion includes suggestions from the literature on measurement variables. With the pragmatic approach adopted for this study, the specifications of variables outlined are not necessarily intended to be a blueprint to be followed by countries in their own productivity measurement exercises[6].

[5] The relationship between inputs and outcomes is usually taken to be 'cost-effectiveness'. As an example of the fuller performance reporting, Australia's Productivity Commission [14] presents a range of indicators under major headings of headings of 'Efficiency', 'Effectiveness', and 'Equity'. Goderis [15] provides international comparisons of inputs, outputs, and outcomes in public-sector activities.

[6] A few member countries have already set out to measure productivity in the public sector of their own economies, including in health and education. While the approach here is broadly similar, there is room for differences in the details of how they are implemented.

Identifying Relevant Services

The public sector provides many different services that deliver progress on desired outcomes. For example, improved health outcomes require a mixture of preventative health care, remedial care, and emergency treatment. Just the hospital component can include outpatient services, emergency treatment, trauma care, maternity care, surgery, and other specialist treatments.

How many different outputs should be identified as relevant to public-sector operations, such as hospitals and schools? There needs to be balance between being detailed and comprehensive, on the one hand, and keeping the calculations practical and manageable. But, generally, a small number of outputs is enough.

Specific services (the outputs of various production centers) can be grouped when they have similar costs per unit of production. For example, there may be little point in separating years 3 and 4 of schooling because their costs of provision are similar. On the other hand, where the unit costs of production of different services or production centers are very different, ideally, the outputs should be kept separate. It would be desirable, for example, to separate elementary and secondary schooling as the unit cost of providing secondary schooling is much greater than the unit cost of elementary schooling.

However, a wide tolerance on what constitutes 'similar' unit costs within a group can be applied. Identifying only a few representative service types were recommended, as the calculations soon become unwieldy when more and more types of output are included [8]. Diminishing returns also set in. That is, there is unlikely to be enough payoff from trying to identify more and more detail in the set of service outputs.

Turning specifically to the cases of public hospitals and schools, the service types usually identified by national statistical offices are [16]:

- Hospitals
  - Services in Diagnostic Related Group (DRG) classifications (that is, treatments of different medical conditions)
- Schools
  - Preprimary education
  - Primary education
  - General secondary education
  - Technical and vocational secondary education[7]

The service types identified and measured by the country experts for this study are presented in Table 1.1. The absence of detailed data, for example on treatments according to DRG category, meant that only a high-level service categorization of hospital services was possible. The categorization for schooling services was broadly in line with recommended practice.

Measuring Outputs

Measuring public-sector outputs is difficult, as already discussed. While the value the provided services create is often not well-defined or measurable, something well-defined and measurable is needed in productivity measurement to capture the scale of services produced.

Fortunately, the measurement task is made easier by the need to capture only *growth* in output, and not the *level* of output. While the adopted output measure may not be an accurate reflection of the 'true' value of output, the adopted measure will accurately represent true output growth if it grows at the same rate as true output. For example, the nature and value of education services provided to students is difficult to quantify. However, if it is assumed that all students receive the same education services on average, then growth in the number of students, which is measurable, will equal growth in the output of education services.

[7] See Schreyer [11] for detailed discussion of measurement of health and education outputs.

TABLE 1.1

SERVICE TYPES IDENTIFIED AND MEASURED IN COUNTRY STUDIES

	Hospitals	Schools
India	i. Inpatient services ii. Outpatient services a. Mother and baby care b. Birth control c. Immunizations	i. Elementary schooling ii. Secondary schooling
Indonesia	i. Inpatient services ii. Outpatient services	i. Elementary schooling ii. Secondary schooling iii. Middle-high schooling
Malaysia	i. General hospital services ii. Health clinic services iii. Dental clinic services	i. Preprimary schooling ii. Primary schooling iii. Secondary + Form 6
Philippines	i. Inpatient services ii. Outpatient services	i. Elementary schooling ii. Secondary schooling
Thailand	i. Inpatient services ii. Outpatient services	i. Elementary + lower secondary i. Upper secondary

Consequently, public-sector outputs can be measured in many cases by simple measures of the number of services provided.

However, monitoring changes in quality is a vital accompaniment to this approach. If the quality of service has improved and is valued by the customers, true output would have grown more than the growth in measured output (number of students in this case). Equally, it is important to check that measured output has not increased at the expense of the quality of service.

Not all areas of the public sector can be measured by counts of services provided [3, 17–18]. It works where services are provided to individuals, such as health, education, and welfare. But some public-sector services are provided collectively, for example, defense services are provided on a national basis, and irrespective of individuals' demands. These areas must be measured by other means.

Many countries have implemented measures of health and education services. Output indicators commonly used or recommended [16][8] are:

- Hospitals
  - o Number of hospitalizations in DRG categories

TABLE 1.2

OUTPUT MEASURES USED IN COUNTRY STUDIES

	Hospitals	Schools
India	Number of treatments	Number of students
Indonesia	Number of treatments	Number of students
Malaysia	Number of patients treated	Number of full-time equivalent students
Philippines	Number of patients treated	Number of students
Thailand	Number of patients treated	Number of students

[8] See also the Appendix to [2].

  - o Number of bed days
  - o Number of consultations or visits
- Schools
  - o Number of pupils
  - o Number of pupil hours

The output measures used in this study are based on the number of patients who have been provided hospital services in a year and the number of students who have been provided education services in a year (Table 1.2). These are quite reasonable and often-used output measures. More details, such as length of stay in hospital and numbers of pupil hours were not available.

The number of patients and number of students are treated as gross output measures. That is, the production of the services includes the use of intermediate inputs.

It is important to include the use of intermediates when a gross output measure is used. Otherwise, a shift in the degree of outsourcing from an agency can show up as a step change in the agency's productivity. For example, labor use would decline if activities previously performed in-house were contracted out. However, since output would remain essentially the same, labor productivity would rise because fewer employees are engaged in-house. The counterbalance - the fall in intermediates productivity (and the overall effect on multifactor productivity) would not be seen.

Average unit costs could be calculated in the country studies where data on outputs and costs were both available. Table 1.3 shows that average unit costs are quite different for different categories of hospitals and schools. In the table, the unit cost of the first-mentioned category is set to 1.0 and unit costs in other categories of hospital or school services are determined as multiples of that value. For example, providing one student-year of secondary teaching in India is two and a half times as costly as providing a year of teaching to an elementary school student. Generally, unit costs are higher at higher education levels (although Thailand appears to be an exception) and the costs of an in-patient treatment are much higher than an out-patient treatment.

These differences in unit costs in various categories of hospitals and schools vindicate the approach used here of building up total productivity measures from component areas of the public hospitals and schools systems.

Aggregating Growth in Different Outputs - Output Cost Shares

Growth in total or aggregate output must be formed from the component areas in a specific way. It is formed as a weighted sum of growth in outputs of the identified service areas. For example, the growth in school

TABLE 1.3

UNIT COST RATIOS IN PUBLIC HOSPITALS AND SCHOOLS (FROM COUNTRY STUDIES' DATA)

	Hospitals	Schools
India (2015–16)	Not available	1.0 - Elementary 2.5 - Secondary
Indonesia (2016)	1.0 - Outpatients 8.3 - Inpatients	1.0 - Elementary 1.5 - Secondary 2.3 - Middle high
Malaysia	1.0 - Primary healthcare 0.7 - Dental clinics 1.1 - Health clinics 4.2 - Secondary healthcare	1.0 - Preprimary 2.6 - Primary 2.7 - Secondary + Form 6
Philippines	Not available	Not available
Thailand (2015)	1.0 - Outpatients 12.9 - Inpatients	1.0 - Elementary & lower secondary 0.5 - Higher secondary

outputs is formed as a weighted sum of growth in the number of students enrolled in primary school and growth in the number of secondary school students.

The weights for the aggregation reflect the relative costs of providing a unit of each service type. They are calculated as the share of each service type in the total costs of production across all services. This is a departure from the private-sector case, where output prices form the basis for the weights and reflect the relative value generated by outputs.

To illustrate the aggregation for the case of three service outputs A, B, and C, total output growth ($\hat{Y}$) is given by:

$$\hat{Y} = s_A \cdot \hat{Y}_A + s_B \cdot \hat{Y}_B + s_C \cdot \hat{Y}_C \qquad \text{Equation 1-1}$$

where $\hat{Y}_A$, $\hat{Y}_B$, and $\hat{Y}_C$ refer to the growth in outputs of service types A, B, and C; and s_A, s_B, and s_C refer to the costs of producing the outputs of A, B, and C as a proportion of total costs of production. The latter are called output cost shares and are calculated from raw cost data (not deflated).

There are several possible specifications of the weighting scheme in the domain of index numbers. A Laspeyres formulation, which is used in this study, uses base-period weights. To illustrate, equation (1-1) is implemented with the growth between years 1 and 2 weighted by the cost share in year 1. For the calculation of growth between year 2 and year 3, the base year is year 2.

One alternative would be to use a Paasche formulation, which uses end-period weights[9]. That is the year 2 share is applied to the growth between year 1 and year 2.

The use of output cost shares means outputs that are more numerous or are costlier to produce receive a greater weight[10]. That becomes important if, for example, the proportion of costlier cases in hospitals increases. Measured output growth will be greater, in that case, than the growth in the total number of cases[11].

The lack of data on the costs of production of different service types limited the ability of some country experts to calculate more-accurate total output measures, based on cost weights (Table 1.3). Without relative cost data, growth in total output can only be measured as the growth in the total number of services provided.

Quality

As noted above, an assessment of the quality of service should accompany the productivity calculation.

Nature of Quality Indicators

Quality is important in two senses. The first relates to the standards of service and whether there has been any change in the basic quality of service, such as accuracy and delay in provision. The second relates to the effectiveness of outputs in promoting desired outcomes and, therefore, whether outputs have generated greater value.

While the distinction is ultimately fuzzy, it matters from a point of view of accountability. A public-sector agency can be held accountable for the standards of delivery of its service - for the characteristics over which it has control. On the other hand, the agency is unlikely to have full control over changes in outcomes and may not be reasonably held accountable for them.

While indicators of both types of quality are important to monitor, the output standards indicators should be given more emphasis in considering whether measured output growth is to be qualified or modified in *productivity* estimation[12].

To illustrate, the output standards in the case of hospitals might be indicated by the proportion of operations performed successfully (for example, without need for readmission). A hospital could be using outdated

[9] The Laspeyres index approach appears common in measuring public-sector productivity. In measuring private-sector productivity, many national statistical offices use geometric averages of base- and end-period weights, in the form of Tornqvist or Fisher indexes.

[10] The use of cost shares also means that the growth in total output as calculated from equation 1-1 will not equal the growth in the total number of services.

[11] For example, take the case of two services, A and B. There were 5,000 and 15,000 services of A and B delivered, respectively, in the first year. If A grows 20% and B grows 10% over the following year, there will be a total number of 22,500 services delivered. That is an increase of 12.5% in total numbers. But if the cost of service - A at USD15.00 per unit and B at USD7.50 - is considered, the weight given to growth in A rises from 0.25 to 0.4 and the weight given to B falls from 0.75 to 0.6. The growth in total services rises to 14%.

[12] Dunleavy [19] provides examples of output standards indicators.

techniques or have unusually high infection rates, which would mean a lower rate of successful operations. On the other hand, outcome indicators, such as life expectancy or reduced mortality rate might show little change because of improvements in preventative care. Yet, any decline in the success rate of operations is something that matters to patients and should be something that qualifies or downgrades the measured growth in operations in productivity calculations.

The country experts in this study have provided a range of quality indicators. These were mostly of the outcome indicator type (see the case studies that follow this overview).

Integrating Quantity and Quality Indicators

There is debate about whether quality indicators should be explicitly integrated with output measures - that is, to downgrade or uplift output growth depending on whether there has been a decline or rise in quality.

Some have done it [20], but others have left quality measures separate. It is fair to say that different studies have adopted different approaches in certain respects and a firm consensus on how to proceed has not yet emerged. Eurostat [21] and others have suggested leaving quality indicators separate because a practical and uniform way of incorporating them into productivity calculations has not been agreed on[13].

In this study, quality indicators have been left separate from measures of the growth in output.

Measuring Input Growth

While measuring public-sector inputs is easier in principle than measuring outputs, there are still data issues. Data are not held to the same extent or in same way as applies in the private sector case.

Labor Input

Labor input in the public sector can usually be measured by numbers employed. The preferred hours-worked measure, which would match the business-sector convention, is not often available. However, the problem of failing to reflect changes in the spread of part-time employment is removed if numbers employed are expressed in full-time equivalent terms.

Another possibility, if numbers employed or hours worked measures are not available, is to use labor costs, adjusted by a suitable deflator, such as a general wage cost deflator.

Labor inputs in various service types need to be aggregated to derive a total labor input. This can be achieved by adding up hours worked or numbers employed across service types. As discussed earlier, however, this makes no allowance for differences in skill levels across service types.

A superior measure can be derived if there is information on the costs of the labor used in each of the service types. The information can be used to form labor input cost shares, and then the growth in total labor input can be formed as the share-weighted sum of growth in labor input in each service type. For service types A, B, and C, the growth in total labor input ($\hat{L}$) can be written as:

$$\hat{L} = w_A \cdot \hat{L_A} + w_B \cdot \hat{L_B} + w_C \cdot \hat{L_C} \qquad \text{Equation 1-2}$$

where w_A, w_B, and w_C are the labor cost shares of A, B, and C in total labor costs (calculated from raw cost data) and $\hat{L}_A$, $\hat{L}_B$, and $\hat{L}_C$ represent the growth in numbers employed (or hours worked) in service types A, B, and C.

Base-period weights are used in keeping with the Laspeyres index approach.

The labor input measures used in the country studies are displayed in Table 1.4. An hours-worked measure was not available in any instance, whereas a numbers-employed measure was universally available. In a few cases, a deflated labor-costs measure was also available.

Alternative measures - numbers employed or deflated labor costs - produced some large differences in the amount and pattern of growth in labor inputs. For example, numbers employed in Indonesian hospitals more than doubled between 2010 and 2016, whereas deflated labor costs rose 35%.

[13] Eurostat changed from its earlier position which advocated incorporating quality into output measures.

TABLE 1.4

LABOR INPUT MEASURES USED IN COUNTRY STUDIES

	Hospitals	Schools
India	Number of medical staff	Number of teachers Deflated labor costs
Indonesia	Numbers employed Deflated labor costs	Numbers employed Deflated labor costs
Malaysia	Number of staff (medical and other) Deflated labor costs (medical and other)	Number of staff (teaching and other) Deflated labor costs (medical and other)
Philippines	Deflated labor costs Number of medical staff	Number of teachers - Elementary, Secondary Deflated labor costs - Total
Thailand	Numbers employed	Numbers employed

There is no reason to think movements in the direct measure (numbers employed) and the indirect measure (deflated labor costs) should necessarily be the same. The indirect measure, for example, could pick up changes in the degree of part-time work and in the composition of skills in the workforce, if higher skills are paid at a higher rate than average.

However, the differences in direct and indirect measures point to problems with the deflated labor costs variable. One problem could lie with the wage deflators used in various country studies. Usually a general deflator, such as a GDP deflator or CPI, has been used rather than a specific wage-cost deflator. The latter is difficult to find. Especially in circumstances in which there is strong wage inflation, the use of general deflators can generate biased accounts of the quantities of labor inputs.

In these circumstances, the direct numbers-employed measure seems more satisfactory than the indirect deflated labor costs measure of labor input.

Capital Input

As with the private sector, the measure of capital input in the public sector is meant to represent the flow of services from the available capital stock. The flow of services is assumed to be proportional to the stock.

Unfortunately, however, information that would assist the measurement of public-sector capital inputs is generally not kept. While information on investment expenditure is often recorded and made publicly available, information on capital stocks is generally not.

Consequently, unless there is a major measurement exercise to generate estimates of capital stocks, some other proxy measure is required. The consumption of fixed capital - depreciation and the retirement of assets - is also broadly proportional to the stock of capital and can therefore be used to approximate movements in capital inputs. Depreciation or the consumption of capital must be deflated (preferably by an index related to capital prices) to form a real or volume measure. The only depreciation-related measures available was for both hospitals and schools in Malaysia and for schools in the Philippines study (Table 1.5).

Since capital information has been very difficult to obtain in this study, other measures have been used (Table 1.5). Capital expenditure was used in some cases. However, this measure carries the qualification that movements in investment do not necessarily move in similar ways to the capital stock. Some other physical measures were used. For hospitals, the number of beds was used to indicate the growth in capital used over time. The implicit assumption is that all other assets, including buildings and machines, grow at the same rate as the number of beds. For schools, the number of classrooms or number of schools was used to indicate the growth in the scale of capital used.

As with labor inputs, direct capital input measures, such as number of beds and number of classrooms seem to show more regular and credible patterns than indirect deflated costs measures.

TABLE 1.5

CAPITAL INPUT MEASURES USED IN COUNTRY STUDIES

	Hospitals	Schools
India	Number of beds	Number of classrooms
Indonesia	Deflated capital expenditure	Deflated capital expenditure
Malaysia	Deflated capital consumption	Deflated capital consumption
Philippines	Bed capacity Number of hospitals	Number of schools, classrooms - Elementary, Secondary Deflated depreciation - Total
Thailand	Capital expenditure	Capital expenditure

Intermediate Input

The use of intermediate inputs can be measured from data on procurement costs. The figures need to be adjusted by a general production price deflator, such as the GDP price deflator.

Intermediates costs could be identified for all countries included in this study, except for India (Figure 1.6).

TABLE 1.6

INTERMEDIATE INPUTS MEASURES USED IN COUNTRY STUDIES

	Hospitals	Schools
India	Not available	Not available
Indonesia	Deflated intermediate costs	Deflated intermediate costs
Malaysia	Deflated intermediate costs	Deflated intermediate costs
Philippines	Costs of goods sold, maintenance, and other operational costs	Maintenance and other operational costs - Total
Thailand	Deflated expenditure	Deflated expenditure

Aggregating Input Growth - Input Cost Shares

A total inputs measure is needed to calculate multifactor productivity (MFP) for a sector or for a service type within the sector. The growth in combined inputs ($\hat{I}$) is taken to be a weighted sum of growth in labor ($\hat{L}$), capital ($\hat{K}$), and intermediates ($\hat{N}$):

$$\hat{I} = c_L \cdot \hat{L} + c_K \cdot \hat{K} + c_N \cdot \hat{N} \qquad \text{Equation 1-3}$$

where the weights are the shares of the different inputs in the total costs of production - that is, c_L is the labor cost share, c_K is the capital cost share, and c_N is the intermediates cost share. These shares are calculated from raw cost data that have not been deflated.

Base-period weights are used, in accordance with the Laspeyres formulation.

Some of the data needed to calculate input cost shares are difficult to access. Capital costs data are particularly difficult. In principle, capital costs are the units of capital multiplied by the rental price of capital (or cost of capital). As noted before, capital stock information for the public sector is rarely available and imputing a rental price is vexed (Diewert [18]).

The use of the amount of depreciation to measure the costs of public-sector capital is the common practice in national accounts. It incorporates a sense of the scale of capital stock and it incorporates a sense of the rate at which capital is used up. Unlike the business-sector practice, however, it does not incorporate a sense of the opportunity cost of the funds tied up in holding the assets [18].

Capital expenditure data can be found in some cases. This is new investment, rather than the costs attributable to the input of all capital and is unlikely to be reliable as an indicator of the scale of capital costs relative to the costs of other inputs.

The availability of cost data in the country studies to calculate the input cost shares is displayed in Table 1.7.

TABLE 1.7

AVAILABILITY OF INPUT COST DATA IN COUNTRY STUDIES TO ENABLE COST-WEIGHTED AGGREGATION

	Hospitals	Schools
India	No cost data	Labor costs
Indonesia	Labor, capital, intermediate costs for outpatients and inpatients	Labor, capital, intermediate costs for Elementary, Secondary, Middle-high
Malaysia	Labor, capital, intermediate costs for Primary, Health, Dental, Secondary	Labor, capital and intermediate costs for Preprimary, Primary, Secondary
Philippines	Labor, intermediates - Total	Labor, capital, intermediates - Total
Thailand	Labor, capital, and intermediates costs - Total patients	Labor, capital, intermediates costs - for Total students

Forming Productivity Measures

Estimates of annual growth in output and inputs can be generated by following the above procedures.

Index number series can then be formed from these estimates. A base period is selected and the level is set equal to 100 in that period. The estimated growth rate over the next year is applied to that base value to calculate the index value in the next year. The next growth rate is applied to that value, and so on. In symbols,

$$X^{t+1}=X^{t}\cdot(1+g^{t+1}) \qquad \text{Equation 1-4}$$

where X^{t+1} is the value of a variable, X, one year after year t, X^{t} is the value in year t, and g^{t+1} is the growth in X between years t and $t+1$.

The calculation of productivity indexes is straightforward, once the output and input indexes have been formed.

$$labor\ productivity\ index = \frac{output\ index}{labor\ input\ index} * 100$$

$$capital\ productivity\ index = \frac{output\ index}{capital\ input\ index} * 100$$

$$intermediates\ productivity = \frac{output\ index}{intermediates\ index} * 100$$

$$multifactor\ productivity\ index = \frac{output\ index}{combined\ input\ index} * 100$$

Proceeding with Incomplete Information

It may not be possible to calculate an MFP index because of the absence of capital input data or complete cost data (for the calculation of input cost shares). In such cases, labor productivity may be the only measure that can be calculated.

This would be a reasonable measure of efficiency so long as the degree of contracting out was small or stable over the period measured. As noted above, a shift toward more contracting out can have effects on labor productivity that do not represent the extent of improvements in production efficiency. The number of services delivered could remain the same, while the labor input from the public sector declines due to contracting out.

Dunleavy [19] recommends persisting with MFP measures in the absence of capital cost information. He advocates the use of a labor-plus-intermediates measure of productivity because it still provides useful information about the combined efficiency of labor and intermediates. He refers to it as an 'almost-MFP' measure. It will be referred to in the Results section below as 'LN-MFP', taking 'L' for labor and 'N' for intermediates.

The range of productivity measures that could be calculated in the country studies is shown in Table 1.8.

TABLE 1.8

PRODUCTIVITY MEASURES THAT COULD BE CALCULATED IN THE COUNTRY STUDIES

	Hospitals	Schools
India	LP - Midwives, Inpatient medical staff KP - Total (hospitals)	LP, KP - Elementary, secondary, total
Indonesia	LP, KP, NP, MFP - Outpatients, Inpatients, Total	LP, KP, MFP - Elementary, Secondary, Middle-high
Malaysia	LP, KP, NP, MFP - Primary, Heath clinics, Dental clinics, Secondary	LP, KP, NP, MFP - Preprimary, Primary, Secondary + Form 6
Philippines	LP, NP, LN-MFP - Total	LP, KP, NP, MFP - Total
Thailand	LP, KP, NP, MFP - Total	LP, KP, NP, MFP - Total

Inferring Something About MFP Growth

It is also possible to infer something about MFP growth when there is no cost information to calculate input cost shares. MFP growth $(\hat{MFP})$ is a weighted sum of labor productivity growth $(\hat{LP})$, capital productivity growth $(\hat{KP})$, and intermediates productivity growth $(\hat{NP})$, where the weights are the input cost shares:

$$\hat{MFP} = c_L \cdot \hat{LP} + c_K \cdot \hat{KP} + c_N \cdot \hat{NP} \qquad \text{Equation 1-5}$$

Even if the input cost shares are unknown, it can be inferred that MFP growth is between the lowest and the highest rate of growth in the partial productivities. The range can be narrowed down if something is known, or can be inferred, about the structure of production. For example, the more labor-intensive production is, the closer the rate of MFP growth is to the rate of labor productivity growth. The input cost share of intermediates is normally low.

Results

Measures of productivity in public hospitals and schools were estimated in some form for five countries (Table 1.8). An overview of results is now presented with the important qualification that, because of data limitations, strong conclusions cannot be drawn at this stage. The estimates are not robust enough to be precise about the magnitudes of change or to enable definite international comparisons.

Productivity Estimates

MFP Measures

MFP estimates are shown in Figure 1.2. The measure for the Philippines is labor plus intermediates productivity (LN-MFP). There was insufficient data to enable MFP estimation for India.

These estimates mostly suggest a decline in productivity in public hospitals and schools since 2010, except for hospitals in Malaysia and schools in Indonesia. Apart from those two exceptions, the estimates suggest a decline in hospitals MFP of around 10% or more per year, while the declines in schools productivity were up to 5% per year.

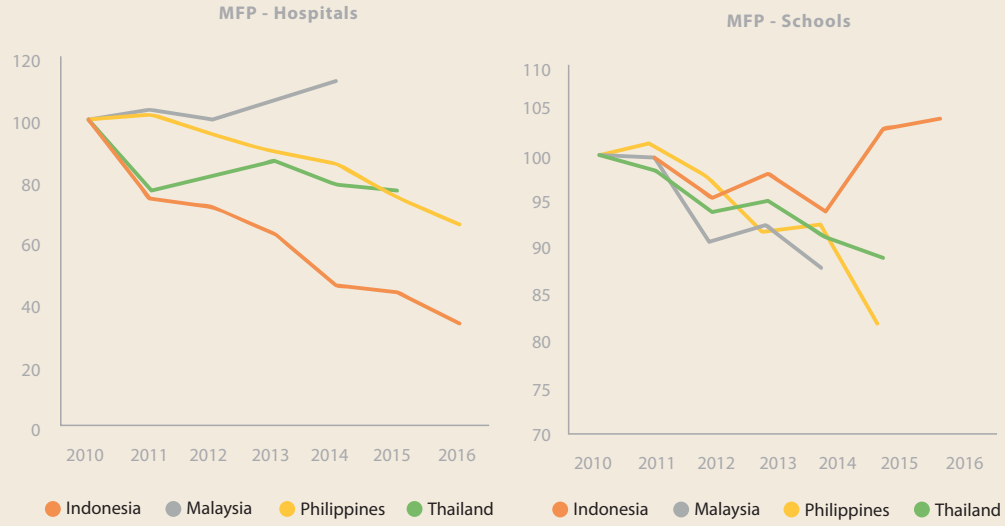
The reasons for the productivity declines are discussed later.

Partial Productivities

The study highlighted the importance of forming a comprehensive MFP measure. MFP can be viewed as a weighted average of labor, capital, and intermediates productivities. A potential problem is that partial productivity measures (such as labor productivity), when viewed in isolation, could reflect changes in operational arrangements, rather than changes in overall production efficiency. A prime example is an improvement in labor productivity that coincides with a decline in intermediates productivity because the degree of outsourcing has increased. The effect on overall productivity is better indicated by MFP.

FIGURE 1.2

MFP INDEXES (2010=100) DERIVED IN THE COUNTRY STUDIES



With this limitation in mind, the indicators of labor productivity, capital productivity and intermediates productivity as calculated by the country experts are shown in Figure 1.3A. Again, these should be examined for broad directions, rather than precise magnitudes.

The figure suggests widespread falls in labor productivity, except in India, and a more mixed pattern of rise and decline in capital productivity and intermediates productivity.

See the individual country studies for closer examination of these trends.

Explaining Productivity Trends

Why did productivity mostly fall?

Difference Between Output and Total Input Growth

Rises and falls in productivity can be explained in immediate or proximate terms as differences in the growth in output and inputs.

The general decline in productivity across the countries studied was because inputs grew more rapidly than output (although, as explained below, there is some concern about the calculation of input growth). For example, the rapid falls in MFP in Indonesian hospitals and Filipino schools (Figure 1.2) were associated with very strong growth in inputs (Figure 1.4), compared with much milder growth in outputs (Figure 1.3B).

While it was commonly the case that input growth exceeded output growth (compare Figures 1.3 and 1.4), there were also instances of declining output (schools in Malaysia and Thailand), combined with relatively mild growth in inputs.

The outputs of hospitals grew in all countries over the period, whereas the picture for schools was mixed.

Sources of Input Growth

Where did the growth in inputs come from? It can help to know whether there was similar growth in all inputs or whether one or other input contributed more to growth in total inputs.

Two factors influence the extent of growth in total inputs:

FIGURE 1.3A

LABOR, CAPITAL, AND INTERMEDIATES PRODUCTIVITY INDEXES (2010=100) DERIVED IN THE COUNTRY STUDIES

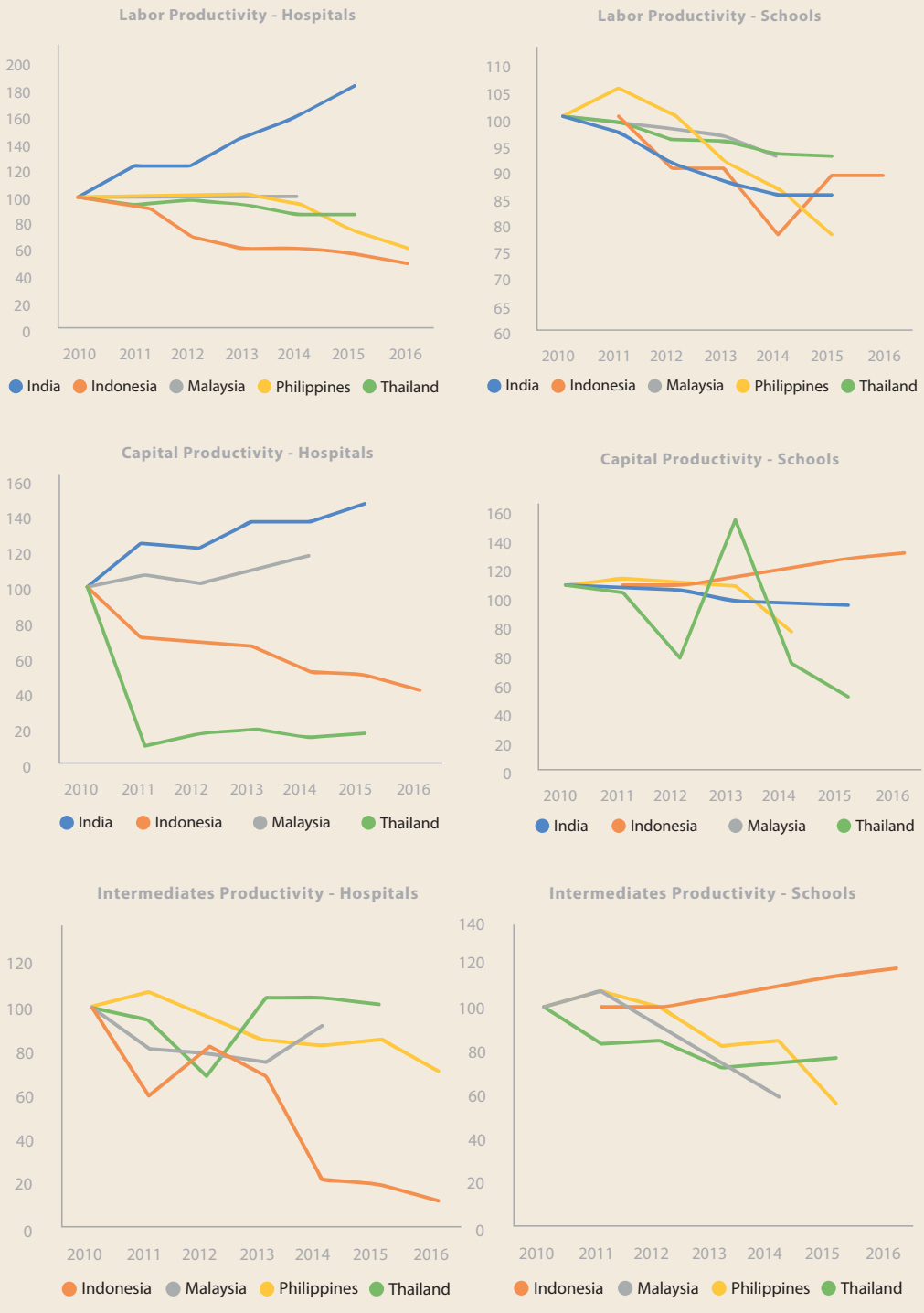


FIGURE 1.3B

OUTPUT INDEXES (2010 = 100) FOR HOSPITALS AND SCHOOLS DERIVED IN THE COUNTRY STUDIES

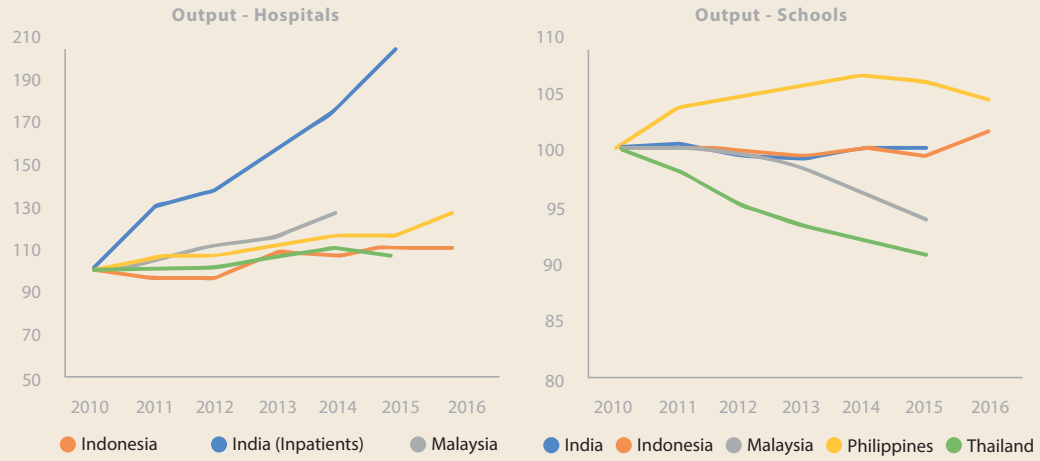
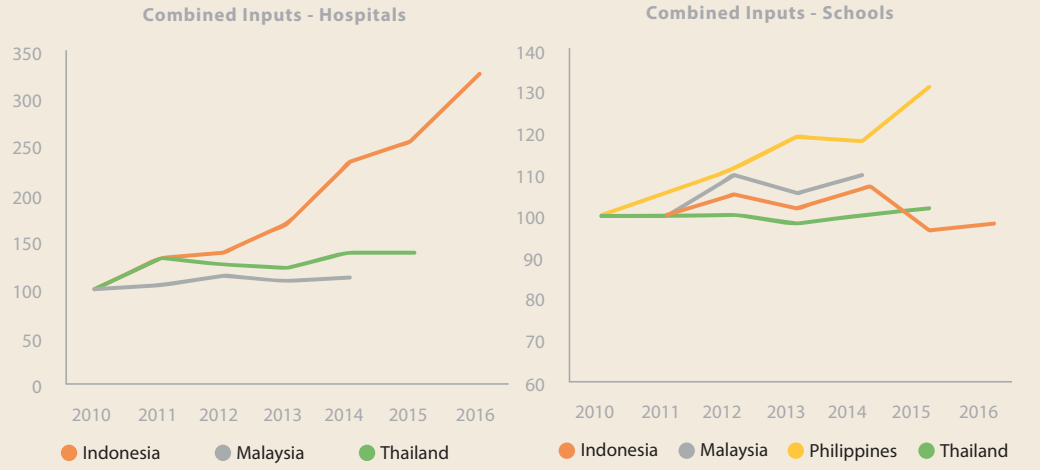


FIGURE 1.4

COMBINED INPUT MEASURES IN THE COUNTRY STUDIES



- The growth in individual inputs - labor, capital, and intermediates
- The relative importance of the most rapidly growing inputs - the shares of labor, capital, and intermediates in total production costs.

Strong growth in both labor (Figure 1.5) and capital (Figure 1.6) is an important factor in explaining the strong growth in total inputs in Indonesian hospitals, noted earlier. According to the data used, capital accounts for about 70% of total costs. The strong growth in schools inputs in the Philippines came from a combination of strong growth in labor (teachers) and a very high share (about 90%) of labor in total costs.

The variation in cost weights raises doubts about the consistency of data definitions across countries. For example, capital costs were a far greater proportion of total costs in Malaysian data than in other countries' data, whereas the opposite was true for Thailand. The differences are so marked in some cases that total inputs can be driven by growth in totally different factors (labor or capital) in different countries. Growth in numbers of teachers receives over 90% weighting in the Philippines and Thailand, but only 8% in Malaysia. There was strong growth in capital in both hospitals and schools in Thailand, but it receives under 10% weighting

Composition Effects

Total productivity measures for hospitals and schools were built up from data on components, such as inpatient services and outpatient services for hospitals and elementary, primary, and secondary education services for schools.

Since productivity levels vary across different components, different rates of growth in the components can be part of the explanation for trends in total productivity. For example, if the productivity level in outpatient services is twice the productivity level in inpatient services, a more rapid acceleration in inpatient treatments, compared with the number of outpatient treatments, would contribute to a decline in total productivity.

Differences in growth rates of subsectors of hospital treatments and school education are highlighted in several of the country studies that are set out in following chapters.

Different Rates of Productivity Growth within Service Components

It can also be instructive to look for different contributions from within different service components to overall trends in hospitals or schools productivity. For example, there could be a more rapid decline in productivity

FIGURE 1.5

LABOR INPUT INDEXES (2010=100) DERIVED IN THE COUNTRY STUDIES

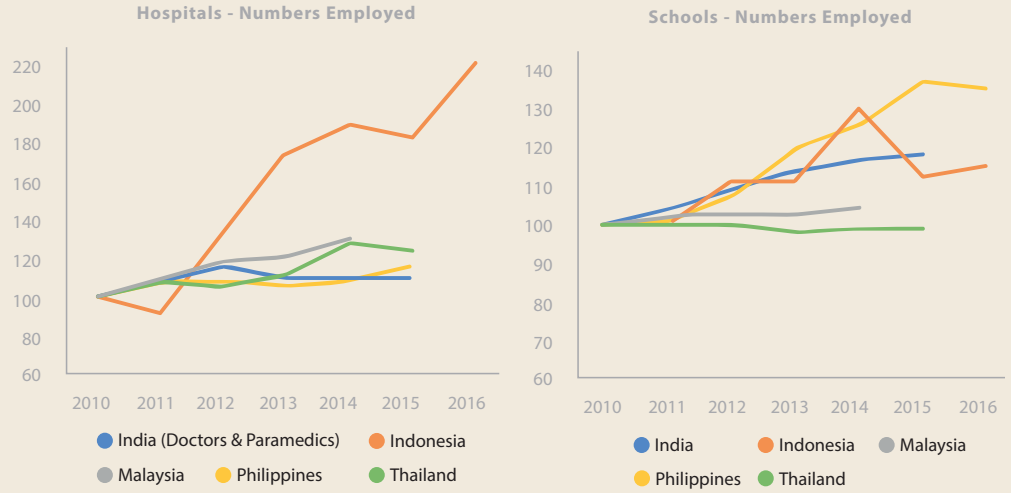
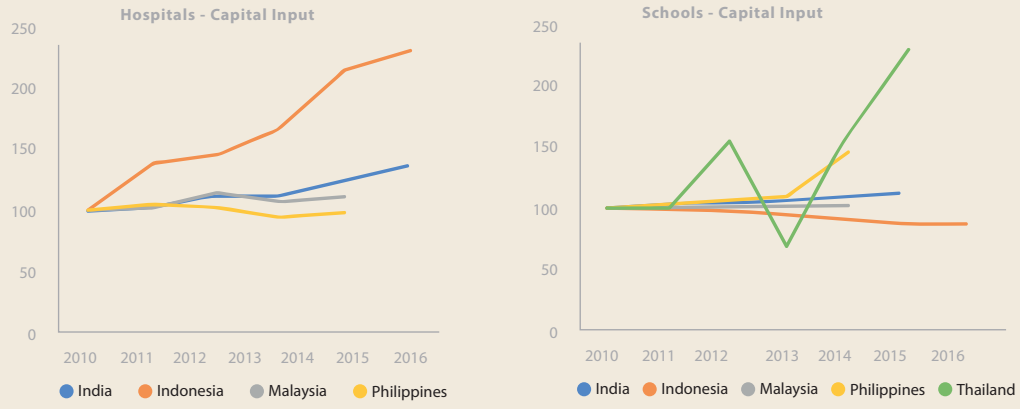


FIGURE 1.6

CAPITAL INPUT INDEXES (2010=100) DERIVED IN THE COUNTRY STUDIES



growth in inpatient services than in outpatient services, which would explain some of the overall decline in hospitals' productivity.

Differences in rates of productivity growth in hospital and schools subsectors are highlighted in several country studies in the chapters that follow.

Policy Contributions

There is a deeper explanation for at least part of the general decline in productivity and the fact that inputs grew more than outputs. Governments made concerted efforts to extend the reach of health and education services more broadly in the population and to improve the quality of services. To extend services and to lift quality standards raises input requirements ahead of growth in numbers of patients treated or students enrolled. For example, the number of teachers were increased and more classrooms were brought into use so as to reduce class sizes and student-teacher ratios. This can raise the quality of education services but, by definition, brings a decline in labor productivity and capital productivity.

The principal efforts of the governments in the countries studied therefore had a generally negative effect on productivity over a period of several years. Importantly, however, this does not necessarily mean the policies should not have been introduced or that they were poorly implemented. An increase in access and quality of services is an important way to improve the well-being of the population.

In such a context of attempts to improve access and quality, the decline in measured productivity should be viewed benignly - at least to some extent. Beneficial outcomes brought by improved access and quality would matter more.

Nonetheless, a drive to improve social outcomes does not preclude simultaneous attempts to improve efficiency. It is important to assess whether increased funding for hospitals and schools leads to additions in labor, capital, and other resources that are used efficiently. Efforts to improve productivity can mean available resources can go further in achieving social outcomes.

More detailed productivity measures are usually needed to provide clear feedback on the effects of policy measures that have been implemented to improve productivity. The effects of policy changes or efficiency drives are easier to identify at the level at which they are applied - in specific policy programs or in specific production centers.

The country studies highlighted the importance of improvements in access and quality and the negative effects they had on measured productivity.

Quality Movements

Especially when there are attempts to increase the reach and standard of service, it is important to monitor not only productivity trends but also quality standards and outcomes. For example, while a decline in the student-teacher ratio would show up as a decline in labor productivity, it could nevertheless be worthwhile in terms of improving learning and education outcomes.

The country experts have included a range of quality measures in their assessments (see following chapters). These tended to show outcome standards were maintained or improved.

Country Sketches

India

M.L. Suryaprakash undertook the study of public hospitals and public schools in India. The complete description of Suryaprakash's study is presented in the next chapter. His analysis is set against a background in which the Indian government has sought to improve the reach, quality, and affordability of health and education services.

A lack of data on costs and intermediate usage meant that total outputs and MFP could not be estimated for public hospitals. Partial productivity measures suggested strong productivity improvement over 2010–11 to 2015–16. Labor productivity (inpatient treatments per doctor or paramedic) increased around 80%, while

capital productivity (inpatient treatments per bed) increased by over 40%. Labor productivity in mother and child care declined slightly. At the same time there were improvements in outcomes, such as mortality rates and incidence of disease.

Data on primary and secondary schools for 2005 to 2015 enabled a cost-weighted growth in total output to be calculated. However, there was no data on intermediates use or capital costs. The growth in total output came from growth in secondary enrolments - primary school enrolments declined. On the other hand, most of the growth in inputs was in primary education. With stronger growth in labor (teachers) and capital (classrooms) than in overall outputs, labor productivity fell nearly 30% and capital productivity nearly 20%. Primary education made the larger contribution to the fall in productivities. While there have also been improvements in outcome quality indicators over the period, it is difficult to identify the role played by the public-school system because a shift toward private schools would have played an important role.

Indonesia

The Indonesian study in Chapter 3 was undertaken by Dr. B.H. Sinamora. The analysis covers a period in which the Indonesian government had increased funding of public health and schools with long-term objectives of improving areas, such as access, quality, and affordability, and achieving standards of other similar countries, as well its own Millennium Development Goals.

According to Dr. Sinamora's MFP estimates, productivity in public hospitals declined by about 60% between 2010 and 2016. Combined inpatient and outpatient outputs increased around 10%, while inputs grew around 250%. Inputs of both labor (numbers employed) and capital (deflated capital costs) grew to similar extents. The decline in overall productivity was associated with roughly equal declines in MFP in inpatients and outpatient treatments. Over the study period, the percentage of the population with a health problem declined a few points.

The MFP estimates for public schools show a mild decline in productivity between 2011 and 2014, followed by a recovery and increase to 2016, representing growth of 5% over the entire period. Output was basically stable, although it did increase more noticeably in 2016. There was little overall growth in total inputs. Growth in labor input was offset by declines in capital and intermediates use.

Malaysia

Dr. Z. B. Hussein undertook the Malaysia study, which is presented in Chapter 4. Dr. Hussein noted the public sector faces a productivity imperative to strengthen its service delivery in a time of restrictions on increased spending.

The Malaysia study was relatively well served by data. Output, input, and cost data were available for subsectors of both public hospitals and public schools.

MFP in hospitals increased nearly 13% over the period 2010 to 2014. Strong growth in output (26%) was handled with more moderate growth in inputs (11%). Both output and input growth were stronger in primary healthcare than in secondary. MFP grew by 10% in primary and 14% in secondary. With a strong buildup in labor, labor productivity declined - more so in primary than secondary care. The positive growth in MFP was channeled through capital and intermediates productivity.

MFP in schools fell by nearly 13% over the same period. While preprimary recorded the largest fall (24%), this subsector accounts for only 2% of total public-schools costs. There were similar falls (around 14%) in primary and secondary schools. There was a 7% fall in primary school enrolments and 4% fall in secondary enrolments. Input growth was 7% and 12%, respectively.

Several reasons for qualifying the decline in productivity are offered in the study: the observation period for gains to fully show up; the presence of some unmeasured well-being gains; mismeasured output growth; and unmeasured quality improvements.

Philippines

The Philippines study in Chapter 5, undertaken by Dr. A.D. Abanto, covers a period in which governments implemented measures to improve access to and quality of hospital and education services.

Responsibility for public hospitals was devolved to state and regional governments and the number of hospitals and bed capacity was rationalized. At the same time, the number of health professionals increased. Combined labor and intermediates productivity in a sample of hospitals was shown to decline by about a third or so over the period 2006 to 2016. The productivity result would have been much better if capital could have been included in the estimation (because of reductions in hospital and bed numbers).

A key development in Philippines schooling was the extension of compulsory years of schooling, which increased enrolment rates at the secondary level. At the same time, the government increased funding to schools, providing for rapid expansion of the numbers of classrooms and teachers. Estimates of labor plus intermediates productivity showed a decline of around a quarter between 2007 and 2015. Capital productivity fell to a similar degree. However, the falls in productivity cannot be viewed in isolation from consideration of the effects of the increased resourcing on learning and other outcomes. Available indicators suggest some improvements on this score.

Thailand

Patcharasri Dangthongdee undertook the study of productivity in public-sector hospitals and schools in Thailand. The measurement period covered a time when governments aimed to improve access and quality.

Productivity was estimated in public-sector hospitals in regional areas of Thailand. It was found that multifactor productivity declined by about 25% between 2006 and 2015 with a large part of that decline coming at the end of the 2000s decade. Over the entire period, output had grown by about 30%, but all inputs had grown by more. Growth in capital expenditure under the National Health Security Policy was especially strong. At the same time, broad quality indicators have been improving.

Productivity in Thai public schools declined about 18% between 2006 and 2015. This was associated with both a decline in output and an increase in inputs. School enrolments declined because of demographic change. Growth in secondary enrolments did not outweigh the decline in primary enrolments. While numbers of teachers declined, there were large increases in capital and use of intermediates. Quality indicators were stable in the primary area but showed improvements in relation to secondary schooling.

Improving Productivity Measures

While this measurement exercise has generated some interesting and meaningful results, further work is needed to refine the estimates if firm conclusions about productivity trends and policy influences are to be drawn. Improvements in the quality of both output and input data are required. Greater consistency in definitions of variables is needed to enhance the scope for international comparisons.

While countries differ in the data areas that could be improved (see individual studies), there are some themes:

'Disaggregated' data would greatly assist the proper measurement of productivity and the analysis of productivity trends. For example, understanding productivity of schools as a whole is helped if productivity estimates are also available for different streams or categories, such as primary, secondary, and upper secondary.

Obtaining more disaggregated data is therefore one priority area for improving productivity estimates. Output data for schools are generally good with the degree of disaggregation aligning well with international practice and measurement by enrolments a satisfactory metric. Output data for hospitals needs improvement. Output for inpatients has been measured in the studies as the total number of treatments when the input requirements for treatment of different conditions varies considerably. Some allowance for the mix of different conditions and their costs (such as distinctions according to Disease Related Group) is needed. Separation from outpatients is highly desirable.

Direct measures of labor and capital have emerged as more credible than deflated cost measures. This means measuring labor input by numbers employed and capital input by measures, such as numbers of hospital beds and number of classrooms. One problem with the deflated cost method is the absence of factor-specific deflators.

Even with the direct measures, relative costs of labor, capital, and intermediates are required in order to form an estimate of total input growth. Costs of labor and intermediates have been relatively easy to identify.

Capital costs, capturing both the scale of the capital stock and the price of capital, have not been easy to identify and different approaches have led to very different weights given to growth in capital across the countries studied. Difficulties with capital measurement are widespread internationally and improvement in this area may take some time.

Analysis of productivity trends is also improved if costs can be measured at the same disaggregated levels of outputs. Disaggregated cost data allows growth in output in the different categories to be aggregated up into a meaningful total output growth figure.

Further study on the sensitivity of productivity measures to different aspects of data could identify more specific areas of priority for improvement.

The study reinforced the importance of monitoring quality alongside productivity measures. The country studies identified and included various outcome measures. While these showed some welcome improvement, they were of a general and high-level nature that is difficult to relate back to the delivery of the specific government service outputs under consideration. Compilation of measures on the standards of services delivered would help identify any necessary quality qualifications on productivity estimates for public-sector services.

The best approach is to look for improvements in productivity measures over time, especially in the context of individual government agencies responsible for specific programs. Dunleavy and Carrera [8] noted that the process of selecting outputs can itself lift productivity over time. It encourages public-sector agencies to think more about their objectives, their desired outcomes, what is core and what is peripheral in their activities, and where they can focus their resources to achieve the most. Similarly, agencies themselves will be able to identify strengths and weaknesses in the productivity measures and signal areas for improvement in data collection over time.

Conclusion

Measuring public-sector productivity can be very helpful. In can help improve measures of productivity and growth in the whole economy, improve accountability for use of resources within the public sector, assist better allocation of resources between areas of government activity for delivery of community services and well-being, and provide feedback on initiatives to improve performance.

While this public-sector productivity measurement exercise should be viewed as a first step - to test the feasibility of constructing productivity measures for hospitals and schools in each of the countries studied - it has produced some interesting and meaningful results on productivity trends from readily available data. The estimated trends raise questions and addressing those questions can reinforce thinking about productivity and ways to improve efficiency.

That said, the measures require further refinement, through improvements in output and input data, to produce more precise and reliable estimates of trends. Priorities to improve data collections have been discussed.

The study showed it is important to monitor quality alongside productivity. This covers not just broad outcomes but also output standards.

A major theme across the studies is that governments have pursued social outcomes - improving the reach and quality of hospital and education services. This has meant injections of resources ahead of growth in outputs - at least for the time being. Therefore, measured productivity has declined. But, importantly, outcome indicators have improved.

Governments can improve efficiency in various ways, even while boosting social programs. More detailed and intensive measurement efforts are required to monitor and assess such initiatives, especially if they are smaller in scale.

There are likely to be gains from introducing productivity measures into public-sector agencies at an early stage. That can bring gains from fostering a productivity mind-set, as well as identifying measurement weaknesses and improving measures over time.

CHAPTER 2

INDIA

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Introduction

The government of India instituted the concept of Five-year Plan (FYP) since the country's independence from British rule in 1947. The responsibility of drawing up FYP was entrusted to the Planning Commission of India which also oversaw the implementation of its plans across the country. FYP plans were implemented spanning a period of 60 years and ended with the Twelfth Plan on 31 March 2017.

The new government that took office in 2014 decided to end the FYP and make way for three-year plans which will have 'cooperative federalism' as its core principle unlike the centralized planning of the past. The government has reconstituted the erstwhile Planning Commission into National Institution for Transforming India (NITI Aayog). This institution will only provide policy roadmap for the government based on national goals giving both central and state governments more freedom to plan their developmental schemes. The government has identified the following nine pillars on which India's economic growth and development will rest:

i) Agriculture and farmers' welfare

ii) Rural sector

iii) Social sectors, namely health and education

iv) Skill development and job creation

v) Infrastructure investment

vi) Financial sector reforms

vii) Governance reforms and ease of doing business

viii) Prudent management of government finances

ix) Tax reforms to reduce compliance burden

These are also aligned with the 17 goals and 169 related targets of 'Transforming our world: the 2030 agenda for sustainable development' (SDGs). The 12th FYP targets for Health and Education which were aligned with the Millennium Development Goals tweaked to meet the SDG targets.

There is an increasing realization that health and education needs higher attention than in the past as India strives to make the transition from a developing country to a developed country. Notwithstanding the impressive economic growth of the country as a whole, there are wide disparities in the social indicators between southern and western India which are far more developed than the northern and eastern parts of India. The government of India and the state governments are now focusing on improving service delivery in the social sectors by effectively using IT and e-governance to enable citizens to easily access public services. The various government schemes for health and education are also now being effectively implemented and monitored through IT-enabled governance. The following analysis for 'Measurement of productivity in public sector: hospitals and schools' is also an attempt to analyze the effectiveness and capabilities of these two public sectors in their endeavor to achieve MDGs/SDGs.

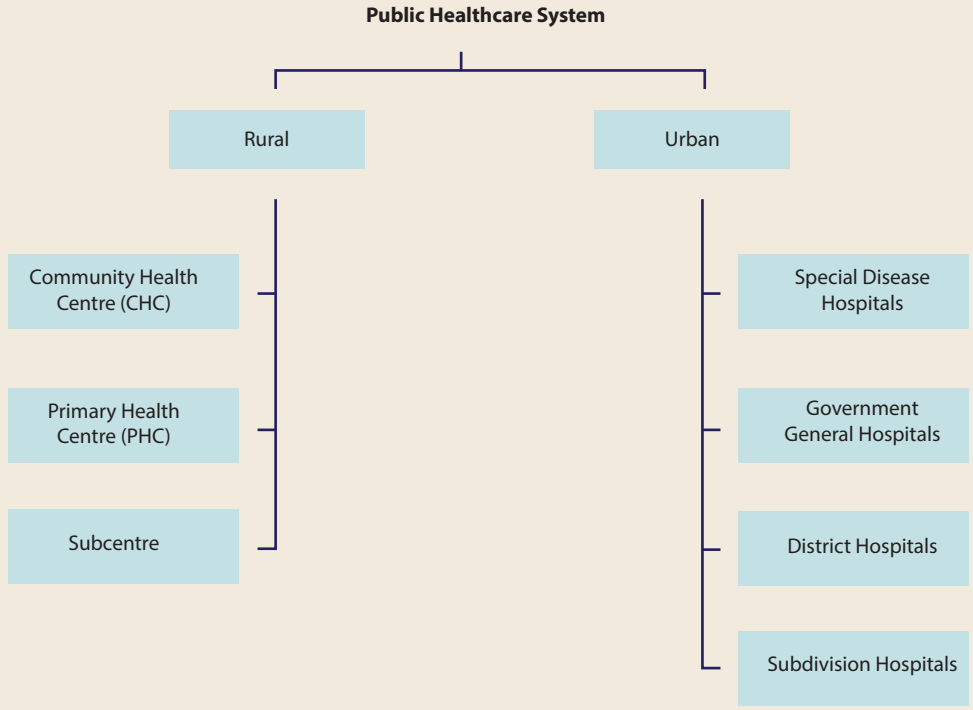
Public Hospitals

Introduction

The public healthcare system in India is primarily the responsibility of the state governments. The Ministry of Health and Family Welfare oversees the issue of health at the national level by developing various schemes and providing funds to the respective departments of health and family welfare of the state governments. The strategy of the government is to deliver preventive, curative, and public health services. This is accomplished through a network of healthcare facilities at the primary, secondary, and tertiary levels run mainly by the state governments providing free or very low cost medical services. The government provides a wide range of preventive and public-health interventions, such as full immunization of children, antenatal and postnatal care, iron/folic acid and vitamin A supplements, provision of contraception, safe abortion services, preventive and promotional health, educational services on a wide range of issues, HIV testing and counseling, malaria and other communicable diseases prevention, vaccines for Hepatitis B and C, etc. These services are delivered through various schemes and implemented by the public healthcare system.

FIGURE 2.1

HEALTHCARE STRUCTURE



Source: Indian Public Health Standards (IPHS) Guidelines 2012

The public healthcare system in India is depicted in Figure 2.1[1].

The Subhealth center (Subcenter) is the bottom most and first point of contact with the public healthcare system for the people in the villages. Each Subcenter is expected to cater to a population of 5,000 people. The essential services of a Subcenter are maternal and child health, family planning and contraception assistance, safe abortion, curative services for minor ailments, adolescent health care, outreach services, etc. Each Subcenter is staffed with one auxiliary nurse cum midwife (ANM) and one male nurse with a common lady health visitor for six subcenters.

The Primary Health Center (PHC) is the first port of call to a qualified doctor of the public sector in rural areas for the sick who are referred by the Subcenter or report directly for curative, preventive, or promotive healthcare. A PHC caters to a population of 30,000 people. The PHC provides OPD services, 24-hour

emergency services, referral services, as well as inpatient treatment for minor ailments. Each PHC is equipped with six beds and associated facilities and staffed with one medical doctor and 14 para medical staff.

The Community Health Centre (CHC) constitutes the secondary level of healthcare and a referral unit for PHCs. Each CHC caters to a population of 120,000 people and is equipped with 30 beds and associated facilities, four medical specialists (surgeon, physician, gynecologist, and pediatrician), and 21 paramedical staff. CHCs provide both OPD and IPD services apart from other services.

The Subdivisional hospitals cater to a population of about 500,000 people and act as first referral unit in providing emergency obstetrics and neonatal care. They are equipped with 30–100 beds and facilities for all kinds of medical treatment. There will be about 20 medical doctors including specialists, 45 para medical staff, and 15 other staff.

The District hospitals cater to the entire population at district level and are the second referral units. The bed strength ranges from 100 to 500, depending on the population. The staff consists of medical doctors (30 to 68), paramedical staff (75 to 325), and administrative staff (12 to 29). District hospitals have all the facilities and equipment required in a modern hospital.

The number of facilities as of April 2016 is given below [2]:

TABLE 2.1

NUMBER OF FACILITIES AS OF APRIL 2016

Subcenters (SC)	153,655
Primary health centers (PHC)	25,308
Community health centers (CHC)	5,396
Subdivisional hospitals (SDH)	1,274
District hospitals (DHs)	984
Total Facilities	**186,617**

Source: National Health Profile 2016, Government of India

As per last census, there were 640 districts, 5,924 subdistricts, and 640,867 villages in India. Thus the coverage of public health system is 153% for districts, 112% for subdistricts (SDHs and CHCs), and 28% (one SC or PHC for every 3.5 villages) for villages.

TABLE 2.2

NUMBER OF SPECIALISTS

Category	Availability in 2011	Density Per 100,000 Population	Expected Availability in 2017	Density Per 100,000 Population	Desired Density as Per International Norms
Physicians	691,633	57	848,616	65	85
AYUSH*	534,691	44	642,386	49	49
Dentists	88,370	7	193,797	15	15
Nurses	743,324	61	1,508,684	115	170
ANM	361,879	30	516,090	39	85
Pharmacists	492,923	41	918,276	70	70
Total		**241**		**354**	**474**

Source: 12th FYP, government of India

Key Challenges

Availability of healthcare is quantitatively inadequate. The number of doctors per 100,000 population was 57 and is expected to increase to 65 by 2017, but still short of international benchmark of 85. Similarly the nurses' density is also quite below the desired norm.

Quality of healthcare, especially in the public sector is relatively poor resulting in overdependence on private sector healthcare, which is expensive. The overall perception of inefficiency and poor quality of service in public hospitals is a major challenge.

Affordability is a serious problem, especially in tertiary care for a major proportion of the population. This means, with the general public preferring private hospitals, the out-of-pocket expenditure on medical treatment in India is one of the highest in the world.

Increase in noncommunicable diseases as a result of increasing life expectancy and lifestyle changes is increasing the load in the hospitals and causing capacity shortages.

Funding Status

The total public expenditure on health during 2014–15 was INR159,492 crore (1 crore = 10 million) against a total health expenditure of INR592,828 crore constituting about 27% of the total [3]. The public expenditure is shared between the central and state governments in the ratio of 33:67. The public expenditure on health as a percentage of GDP has shown a marginal increase from 1.12% in 2009–10 to 1.28% in 2014–15 which is quite low when compared globally.

The out-of-pocket expenditure as percentage of total health expenditure is 62.4% in 2014 for India which is one of the highest in the world. Of this, 68% is spent toward medicines and the rest toward hospital charges.

Objectives and Desired Outcomes

Objectives

The principal strategy of the government is to expand the reach of healthcare and work toward the long-term objective of establishing a system of Universal Health Coverage. This means that each individual would have assured access to a defined essential range of medicines and treatment at an affordable price and the same would be made entirely free to a large percentage of the population.

Outcomes

The national health goals for 2017 are:

- Reduction of infant mortality rate to 25 (per 1,000 live births)
- Reduction of maternal mortality rate to 100 (per 100,000 live births)
- Reduction of total fertility rate to 2.1
- Prevention and reduction of under nutrition in children under three years old
- Prevention and reduction of anemia among women aged 15–49 years to 28%
- Raising child sex ratio in 0–6 age group from 914 to 950
- Prevention and reduction of burden of communicable and noncommunicable diseases. Communicable diseases include tuberculosis, leprosy, malaria, filariasis, dengue, chikungunia, encephalitis, kala-azar, and HIV/AIDS; noncommunicable diseases will specifically focus on cardiovascular diseases, diabetes, cancers, and chronic respiratory diseases
- Reduction of poor households' out-of-pocket expenses

TABLE 2.3

NATIONAL HEALTH GOALS FOR COMMUNICABLE DISEASES

Disease	12th Plan Goal (2012–17)
Tuberculosis	Reduce annual incidence and mortality by half
Leprosy	Reduce prevalence to <1/10,000 population and incidence to zero in all districts
Malaria	Annual malaria incidence of <1/1,000
Filariasis	< 1% microfilaria prevalence in all districts
Dengue	Sustaining case fatality of < 1%
Chikungunya	Containment of outbreaks
Japanese Encephalitis	Reduction in JE mortality by 30%
Kala-azar	< 1% prevalence in all districts
HIV/AIDS	Reduce new infections to zero and provide comprehensive care and support to all persons living with HIV/AIDS and treatment services for all those who require it.

Source: 12th FYP, government of India

Data for Productivity Calculations

Output Growth

The people availing medical care are the main output from the public healthcare sector. The type of medical care varies with the level of healthcare delivery, namely primary, secondary, and tertiary. The primary and secondary healthcare is delivered mostly at the Subcenter, PHCs, and CHCs while the tertiary healthcare is delivered at SDHs, DHs, and other specialty hospitals.

Broadly the following medical care and services are delivered at the two segments of public hospitals, consisting of:

Rural Hospitals

- Antenatal and postnatal care
- Iron and other supplements to pregnant women
- Assisted/cesarean section deliveries
- MTPs/abortion
- Birth control - vasectomy, sterilization, and IUCD insertion
- Immunization of child and mother
- Diagnosis and referral service
- Treatment for minor ailments

Urban Hospitals

- Antenatal and postnatal care
- Assisted and cesarean section deliveries
- Outpatient counseling and treatment
- Inpatient treatment for all types of communicable and noncommunicable diseases

Accordingly the key output details for the public hospitals are given in Table 2.4 [4].

There has been a steady growth in most of the output items of the public hospital system, namely cesarean section

TABLE 2.4

OUTPUT FROM PUBLIC HOSPITAL SYSTEM (MAJOR ITEMS)

Description	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16
Prenatal care for pregnant women	28,539,444	28,277,796	27,689,259	28,959,041	28,398,807	28,242,091
Deliveries in public hospitals	12,330,666	12,452,068	12,290,615	13,198,537	13,025,971	13,265,222
Cesarean section	912,524	1,082,317	1,242,154	1,260,281	1,314,600	1,312,780
Vasectomy	220,072	166,941	112,997	82,774	72,640	73,032
Laparoscopic sterilization	1,936,496	1,754,923	1,510,369	1,459,294	1,316,140	1,299,129
IUCD insertion	5,382,043	5,075,025	5,110,110	4,836,245	4,903,718	5,554,000
Total immunization	22,589,686	21,980,528	22,323,645	22,714,553	22,287,042	22,604,730
Total inpatients (children included)	31,194,986	40,361,513	42,837,408	48,889,003	54,278,605	62,701,998
Inpatient deaths	383,995	444,384	456,317	492,427	497,137	607,477
OPD attendance	640,888,301	811,681,491	913,291,088	1,049,650,171	1,181,274,786	1,336,253,904
Major operations	2,178,690	2,988,799	3,798,581	3,605,255	4,189,984	4,642,928
Minor operations	3,889,023	4,846,600	6,022,242	7,120,320	8,221,213	9,579,586
AYUSH patients	27,935,679	35,292,853	37,925,130	53,230,099	64,474,819	77,029,915
Dental patients	4,775,218	6,866,162	10,395,290	14,031,725	16,419,246	14,731,783
Number of blood tests	20,257,985	362,138,765	358,204,710	49,509,698	67,215,339	80,755,695
HIV tests	8,807,411	13,784,462	14,988,197	18,043,557	22,187,020	24,316,246

Source: HMIS-DICR 2011–2015, All India data items (Data not available for 2005–06 and 2009–10)

(48%), inpatients (101%), outpatients (108%), major operations (113%), minor operations (146%), AYUSH (175%), etc. in the above period. This is a clear indicator of the effective reach of the public health system.

However, the growth has been minimal or negative in population related items, namely deliveries (7.5%), prenatal care (-1.0%), sterilization (-32%), and immunization (0.06%) during the same period. This is an indicator of the effectiveness of population control measures leading to stabilization in child birth.

Output Growth Index

The various output aspects may be grouped under five distinct heads based on the nature of service as follows:

i) Mother and child care (prenatal + deliveries in public hospitals + cesarean)

ii) Birth control (vasectomy + sterilization + IUCD insertion)

iii) Immunization

iv) Inpatient treatment

v) Outpatient attendance

The consolidated country-wide data on output is available only from 2010–11. The financial details in terms of budgeted expenditure for the various services of public hospitals are not available. The DRG (Diagnosis Related Groups) data for the various service outputs of hospitals for India is also not available. In the absence of these data, it is not possible to compute the weighted growth rate of each service output and also the weighted total output index. Consequently, the individual service output index has been computed as shown in Table 2.5.

The graphical depiction of output growth is shown in Figure 2.2.

TABLE 2.5

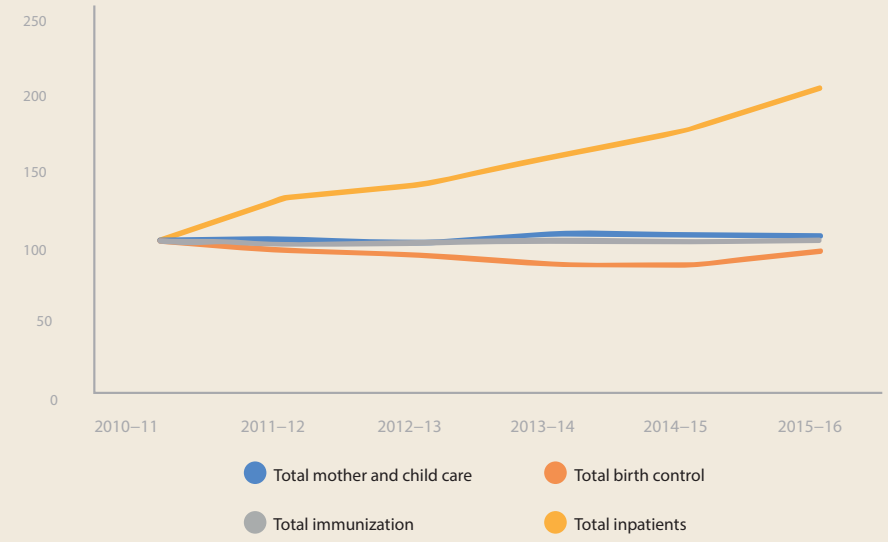
OUTPUT GROWTH INDEX (KEY ITEMS)

Description	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16
Number of Services Delivered						
Total mother and child care (prenatal + deliveries in public hospitals + Cesarean)	41,782,634	41,812,181	41,222,028	43,417,859	42,739,378	42,820,011
Total birth control (Vasectomy + Sterilization + IUCD insertion)	7,538,611	6,996,889	6,733,476	6,378,313	6,292,498	6,926,161
Total immunization	22,589,686	21,980,528	22,323,645	22,714,553	22,287,042	22,604,730
Total inpatients	31,194,986	40,361,513	42,837,408	48,889,003	54,278,605	62,701,998
Total outpatient attendance	640,888,301	811,681,491	913,291,088	1,049,650,171	1,181,274,786	1,336,253,904
Growth in Services						
Total mother and child care		0.001	-0.014	0.053	-0.016	0.002
Total birth control		-0.072	-0.038	-0.053	-0.013	0.101
Total Immunization		-0.027	0.016	0.018	-0.019	0.014
Total inpatients		0.294	0.061	0.141	0.110	0.155
Total outpatients		0.266	0.125	0.149	0.125	0.131
Output Index						
Total mother and child care	100	100.07	98.66	103.91	102.29	102.48
Total birth control	100	92.81	89.32	84.61	83.47	91.88
Total immunization	100	97.30	98.82	100.55	98.66	100.07
Total inpatients	100	129.38	137.32	156.72	174.00	201.00
Total outpatients	100	126.65	142.50	163.78	184.32	208.50

Source: Calculated from the data of Table 2.4

FIGURE 2.2

OUTPUT GROWTH INDEX - HOSPITALS



Source: Table 2.5

TABLE 2.6

INPUT TO HOSPITAL SYSTEM

Description	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16
Rural Hospitals											
Number of Subcenters	142,655	144,988	145,130	145,272	146,036	145,894	148,124	148,366	151,684	152,326	153,655
Number of PHCs	23,109	22,669	22,520	22,370	23,458	23,391	23,887	24,049	24,448	25,020	25,308
Number of CHCs	3,222	3,910	3,978	4,045	4,276	4,510	4,809	4,833	5,187	5,363	5,396
Number of Beds	111,872	132,475	137,436	142,396	143,069	149,690	160,862	196,907	196,182	206,488	216,793
Number of doctors at PHCs	21,974	22,273	22,273	22,608	24,375	23,982	26,329	28,984	29,562	27,355	27,421
Number of ANMs and male health workers at SC and PHC	199,662	215,206	215,206	210,320	213,815	248,358	260,083	259,283	292,498	273,225	267,842
Number of specialists at CHCs	3,953	3,550	5,117	4,279	5,789	6,781	6,935	5,858	5,805	4,091	4,078
Number of GDMOs at CHC	-	-	-	-	6,192	9,933	11,798	10,989	10,777	11,399	11,534
Radiographers at CHC	1,357	1,740	1,695	1,867	1,817	2,221	2,314	2,660	2,189	2,150	2,200
Pharmacists at PHC and CHC	17,708	17,919	20,956	20,967	21,688	24,671	26,219	21,266	22,689	23,131	23,545
Lab technicians at PHC and CHC	12,284	12,101	12,886	12,904	15,094	16,208	17,525	17,129	16,679	17,154	17,859
Nursing staff at PHC and CHC	28,930	29,776	44,936	56,975	58,450	65,344	66,424	68,124	63,938	65,039	65,640
Urban Hospitals											
Number of hospitals (SDH+DH+others)	2,256	NA	NA	2,774	3,115	3,748	4,146	4,949	4,419	3,490	3,835
Number of beds	292,813	340,308	-	324,206	369,351	399,195	412,458	425,721	432,526	492,177	537,931
Number of doctors	67,576	73,549	76,542	84,852	84,569	85,254	97,648	115,483	106,813	106,415	106,987

Source: Central Bureau of Health Intelligence, government of India

Input Growth

The input to the hospital system consists of the following physical and financial resources:

i) Healthcare facilities and hospitals

ii) Qualified doctors and specialists

iii) Qualified nurses and trained ANMs

iv) Paramedical and medical technicians

v) Diagnostic facilities

vi) Hospital beds and other hospital related infrastructure

vii) Finance for both capital expenditure and operational expenses

The trend in input to the health sector is in Table 2.6.

The growth in input has been marginal in most aspects over this period from 2005–06 to 2015–16. While the number of healthcare facilities has increased marginally, such as SC by 7.7%, PHC by 9.5%, and CHC by 67%, the number of beds has increased by 93% in rural hospitals. There has been growth in human resources too, namely doctors by 24%, ANMs by 34%, and nursing staff by 126%. The growth of urban hospitals has been 69%, number of beds by 83%, and number of doctors by 58%.
The public health system in India is largely free and is entirely funded by the central and state governments in the ratio of 33:67. The central government funding goes toward public health schemes, population control, control of communicable and noncommunicable diseases, eradication of some diseases, etc. while the state government funding is mostly toward capital and operating expenditure of rural and urban hospitals. Of the total government expenditure on health, 67% is spent on public health of which 78% constitutes curative care and 14% family welfare. The consolidated information on budgeted and actual expenditure on hospitals is not available presently. Similarly the actual expenditure details on labor, capital, and other intermediates is neither available centrally nor at state level. The National Health Accounts estimates for 2014–15, has provided guidelines for accounting of expenditure under various heads which is expected to become operational in the coming years.

Input Growth Index

Labor

The main labor component for the hospitals comprises of ANM, nurses, doctors, paramedical staff, and technicians. The actual expenditure on this labor component is not available currently. In the absence of this financial data, it is not possible to compute the weighted growth rates of these labor inputs and consequently the total labor input. It is, therefore, attempted to compute labor growth rate for two groups of workers, namely i) ANMs as a distinct group who are engaged predominantly in mother and child care activities of prenatal, deliveries, and postnatal care and ii) Doctors+paramedics which includes nurses, technicians, pharmacists, etc. who are primarily engaged in curative care, as given in Table 2.7.

Capital Growth Index

The capital deployed in public hospitals comprises of buildings and auxiliaries, medical equipment, laboratory equipment, transport facilities, diagnostic facilities, etc. The financial detail on the amount of capital deployed in the public hospitals is not available in consolidated form. However, data on the number of Beds in the public hospitals is available. The facilities created in the public hospitals are proportional to the bed capacity and it can be construed that the bed capacity is a good indicator of the capital deployed. On this premise, the capital growth index has been computed, as given in Table 2.8.

TABLE 2.7

LABOR GROWTH INDEX (HOSPITALS)

Description	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16
Number of Medical Staff						
Number of ANMs in SC+PHC	248,358	260,083	259,283	292,498	273,225	267,842
Number of doctors and specialists (PHC + CHC)	30,763	33,264	34,842	35,367	31,446	31,499
Number of paramedical staff in PHC+CHC (radiologists, lab, pharmacists and nurses)	108,444	112,482	109,179	105,495	107,474	107,474
Number of doctors in SDH+DH	85,254	97,648	115,483	106,813	106,415	106,987
Total doctors+paramedics	224,461	243,394	259,504	247,675	245,335	245,960
Growth in Numbers Employed						
Number of ANMs in SC+PHC		0.047	-0.003	0.128	-0.066	-0.020
Number of doctors (PHC+CHC)		0.081	0.047	0.015	-0.111	0.002
Number of paramedical staff in PHC+CHC		0.037	-0.029	-0.034	0.019	0.000
Number of doctors in SDH + DH		0.145	0.183	-0.075	-0.004	0.005
Total doctors+paramedics		0.084	0.066	-0.046	-0.009	0.003
Labor Growth Index						
ANMs in SC + PHC	100	104.72	104.40	117.77	110.01	107.85
Doctors(PHC + CHC)	100	108.13	113.26	114.97	102.22	102.39
Paramedical staff in PHC + CHC	100	103.72	100.68	97.28	99.11	99.11
Doctors in SDH + DH	100	114.54	135.46	125.29	124.82	125.49
Total Doctors and Paramedics	**100**	**108.43**	**115.61**	**110.34**	**109.30**	**109.58**

Source: Calculated from the data of Table 2.6

TABLE 2.8

CAPITAL GROWTH INDEX (HOSPITALS)

Description	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16
Number of Beds						
Rural hospital	149,690	160,862	196,907	196,182	206,488	216,793
Urban hospital	399,195	412,458	425,721	432,526	492,177	537,931
Total	**548,885**	**573,320**	**622,628**	**628,708**	**698,665**	**754,724**
Capital Growth						
Number of Beds		0.045	0.086	0.010	0.111	0.080
Growth Index	100	104.45	113.44	114.54	127.29	137.50

Source: HMIS-All India data items

TABLE 2.9

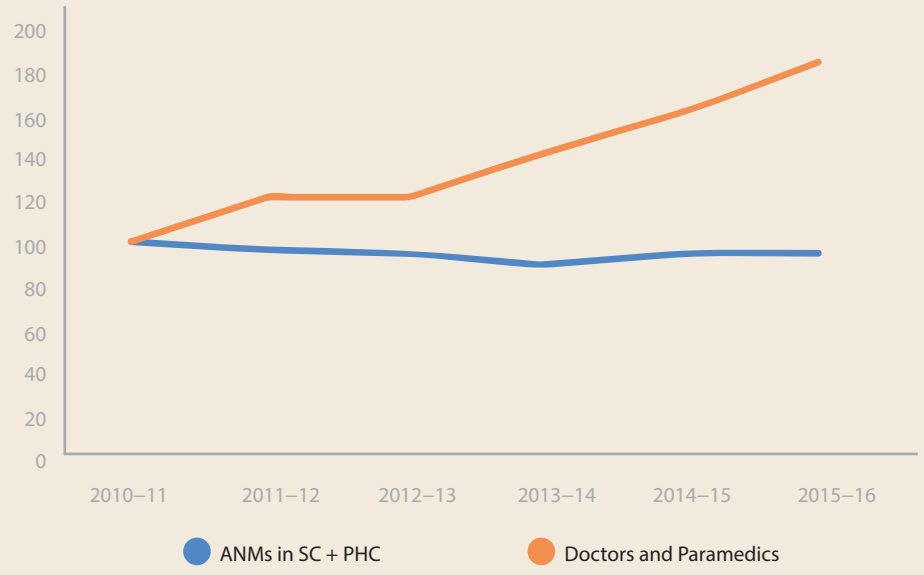
LABOR PRODUCTIVITY (HOSPITALS)

Description	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16
Labor Growth Index						
ANMs in SC+PHC	100	104.72	104.40	117.77	110.01	107.85
Doctors (PHC+CHC)	100	108.13	113.26	114.97	102.22	102.39
Paramedical staff in PHC+CHC	100	103.72	100.68	97.28	99.11	99.11
Doctors in SDH+DH	100	114.54	135.46	125.29	124.82	125.49
Total doctors+paramedics	100	108.43	115.61	110.34	109.30	109.58
Output growth Index						
Total mother and child care	100	100.07	98.66	103.91	102.29	102.48
Total birth control	100	92.81	89.32	84.61	83.47	91.88
Total immunization	100	97.30	98.82	100.55	98.66	100.07
Total inpatients	100	129.38	137.32	156.72	174.00	201.00
Total outpatients	100	126.65	142.50	163.78	184.32	208.50
Labor Productivity						
ANMs productivity	100	95.56	94.50	88.23	92.98	95.03
Inpatient labor productivity (doctors+paramedics)	100	119.32	118.78	142.03	159.19	183.43

Source: Calculated from the data of Tables 2.5 and 2.7

FIGURE 2.3

LABOR PRODUCTIVITY- HOSPITALS



Source: Table 2.9

TABLE 2.10

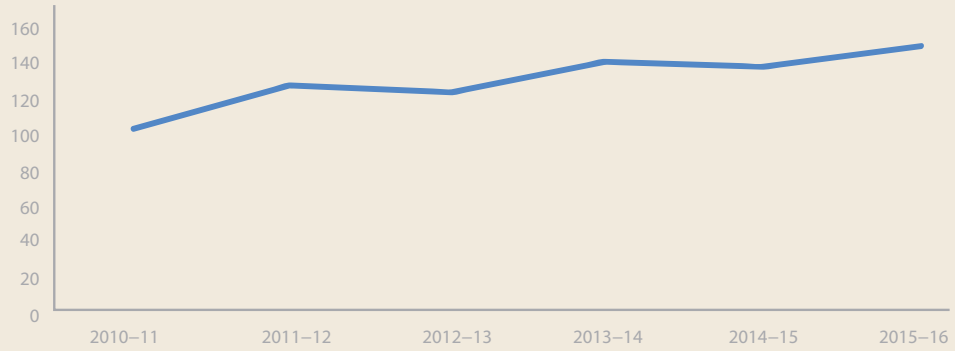
CAPITAL PRODUCTIVITY (HOSPITALS)

Description	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16
Capital growth index	100	104.45	113.44	114.54	127.29	137.50
Output Growth Index						
Total inpatients	100	129.38	137.32	156.72	174.00	201.00
Capital productivity	100	123.87	121.06	136.82	136.70	146.18

Source: Calculated from the data of Tables 2.5 and 2.8

FIGURE 2.4

CAPITAL PRODUCTIVITY - HOSPITALS



Source: Table 2.10

Productivity and Quality

Productivity

Labor Productivity (ANM Productivity and Inpatient Labor Productivity)

The labor productivity for two groups of workers, namely ANMs as a distinct group who are engaged predominantly in mother and child care activities of prenatal, deliveries and postnatal care and doctors+paramedics which includes nurses, technicians, pharmacists, etc. who are primarily engaged in curative care has been computed in Table 2.9. The labor productivity for ANMs has been worked out with output growth index of mother and child care as the basis. In the case of doctors+paramedics, the inpatient growth index is used as the basis. The outpatient growth index has not been used as there is no DRG equivalent between outpatient and inpatient services for government hospitals in India. There is, however, some overlap in services of doctors and nurses with mother and child care but is treated as insignificant.

The Inpatient Labor Productivity Index for doctors and paramedics shows a significant increase of about 83% in the period 2010–11 to 2015–16 which means that the compounded annual rate of growth is 12.9%. This is evident from the fact that the growth in doctors and paramedics was about 9.5% whereas the inpatient growth in hospitals was about 101% during the above period. The labor productivity for ANMs has dropped by about 5% owing to 7.5% growth in ANMs against a growth of 2.5% mother and child related output.

It may, therefore, be concluded that the inpatient labor productivity in public hospitals has shown a very positive trend in the last five years.

Capital Productivity (Inpatient)

Capital growth index has been calculated based on the available data on bed strength. Although outpatients do utilize various services of the public hospitals, only the output growth index of inpatient services has

TABLE 2.11

QUALITY INDICATORS FOR HOSPITALS

Description	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16
IMR (per 1,000 live births)	57	55	53	50	47	46	44	43	42	40	39
MMR (per 1,000)	2.8	2.65	2.5	2.37	2.25	2.15	2.06	1.97	1.89	1.81	1.74
TFR (per woman)	2.96	2.89	2.82	2.75	2.68	2.62	2.56	2.51	2.46	2.42	2.39
Malaria cases (per 1,000)	1.6	1.6	1.5	1.2	1.2	1.2	1.2	0.8	0.6	0.4	0.4
HIV (%)	0.29	0.28	0.27	0.26	0.25	0.24	0.23	0.23	0.22	0.22	0.22
Average life expectancy (years)	64.52	64.91	65.3	65.7	66.1	66.51	66.9	67.29	67.66	68.4	68.4

Source: Niti Aayog data, WHO, and World Bank data

been used for calculating capital productivity index due to nonavailability of data for converting outpatient services to equivalent inpatient services and also on the consideration that inpatients avail the use of a major part of the capital deployed in public hospitals. Accordingly the capital productivity (inpatient) has been worked out, as given in Table 2.10.

The Capital Productivity has shown an impressive increase of about 46% in the period from 2010–11 to 2015–16. The bed capacity has improved by about 37% during this period while the inpatient growth has been over 101% during the same period. This was possible due to improved efficiency in inpatient treatment which has reduced average bed occupancy time thus enabling more patients to avail inpatient care.

It can be concluded that the capital productivity has been positive in the last five years leading to effective realization of national health goals.

Intermediates

The intermediates include the expenditure incurred on medicines, hospital consumables, etc. The productivity index of this resource could not be computed due to nonavailability of data.

FIGURE 2.5

QUALITY PARAMETERS - HOSPITALS

Source: Table 2.11

Multifactor (Total) Productivity (MFP)

The MFP is computed as m=a.k+b.l where m=MFP growth, k-capital deepening, l=labor productivity growth, a=capital cost share, and b=labor cost share. In the absence of cost data, it is not possible to calculate MFP. However, labor productivity has grown by 83% and capital productivity has grown by 46%. Therefore, the MFP for hospitals must have grown by at least 46% during this period. Moreover, the hospitals being labor intensive, where the labor cost share is more than capital cost share, the MFP will be closer to 83%.

Quality

The quality of public health care system can be assessed from the trend in some of the national health indicators, as given in Table 2.11 [5].

The infant mortality ratio (IMR) has reduced significantly from 57 to 39 in the last 10 years. However, it is still quite above the target of 25 which, however, has already been achieved by many states. The IMR remains high in some states of northern and eastern India thus affecting the national average.

The maternal mortality ratio (MMR) has also shown a decline from 2.8 to 1.74 per 1,000 live births. It is still high compared to the national goal of 1.0 per 1,000 live births. The same condition, as given above prevails in this aspect also.

The TFR has reduced from 2.96 to 2.39 at the national level. The goal is to achieve a ratio of 2.1 which has been achieved by many states of India.

Similarly, there has been a significant reduction in malaria and HIV incidences.

The effectiveness of public hospital system can also be gauged from the average life expectancy which has gone up from 64 to 68 in the past 10 years. However, there are also other factors beyond the public system which could have contributed to these improvements in quality performance.

Improving Productivity Measures

Output Measures

i) The various output measures which are being captured at public hospitals seem to be adequate. However, this data is available in a consolidated form covering all constituents of the public health system, such as PHCs, CHCs, SD hospitals, district hospitals, and others. These details may be documented separately for each category. This would facilitate measurement of productivity for each constituent and help in devising appropriate strategy.

ii) DRG data for various inpatient and outpatient services should be developed for assessing the realistic growth in output.

iii) The growing concern on noncommunicable diseases and the effectiveness of managing these diseases also needs to be assessed. The details of such diseases like heart, diabetes, kidney ailments, etc. treated in the public hospitals may also be documented.

Input Measures

i) The cost data for labor, capital, and intermediates may be captured on priority and documented for each constituent. Cost data will also help in developing DRG data bank apart from enabling realistic measurement of productivity.

ii) The data on input measures is available in terms of number of people, facilities, bed strength, medicine issued, etc. This data may also be documented each constituent wise, namely PHC, CHC, etc. for the purpose of analysis.

Quality Measures

i) Incidence of critical noncommunicable diseases, such as heart, diabetes, and renal (as percentage of population) can be taken as a quality indicator.

ii) Out-of-pocket expenditure on medical treatment will be an important quality indicator given as it is very high in India.

iii) Some hospital output related measures, such as readmission rate, patient satisfaction, etc. can be included.

Conclusion

The inpatient labor productivity of doctors and paramedics of public hospitals has grown by 83% during the period 2010–11 and 2015–16 with a compounded annual growth rate of 12.9% which is a very positive aspect for public hospitals. The capital productivity has grown by 46% during the above period signifying very effective use of bed capacity in the hospitals. The MFP should be between 46% and 83% but more likely to be near 83% given the higher share of labor component in public hospitals. It can be concluded that the overall

TABLE 2.12

KEY NUMBERS OF SCHOOL SYSTEM

School System	Number of Schools	Number of Students	Number of Teachers
Elementary schools	1,449,078	196,716,511	7,963,007
Secondary schools	244,653	61,803,397	2,003,653
Total	**1,693,731**	**258,519,908**	**9,966,660**

Source: Education in India - Trends 2005–05 to 2014–15, National University for Education Planning and Administration (NUEPA), government of India

TABLE 2.13

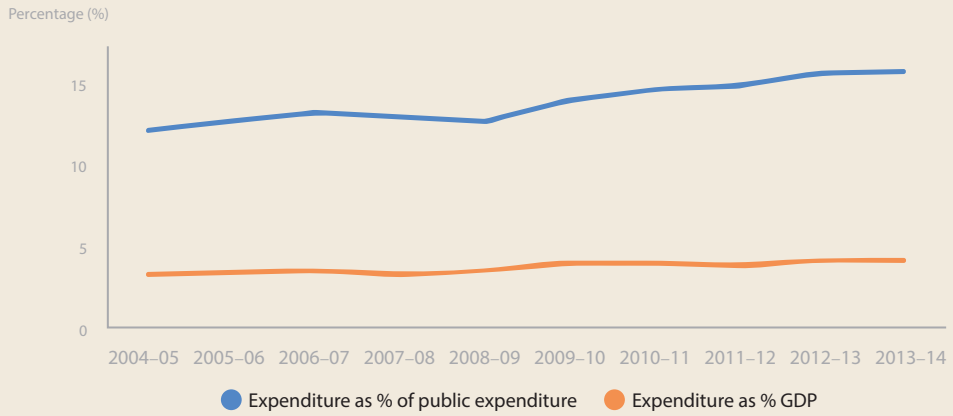
SCHOOL SEGMENT

School Segment	Number of Schools (%)		Number of Students (%)		Number of Teachers (%)	
	Government	Private	Government	Private	Government	Private
Elementary	74	26	60	40	59	41
Secondary	42	58	40	60	44	56

Source: Education in India-Trends 2005–05 to 2014–15, NUEPA, government of India

FIGURE 2.6

EXPENDITURE ON EDUCATION



Source: Expenditure on Education - Statistics, Ministry of Human Resource Development, government of India

productivity in public hospitals has improved significantly with a corresponding improvement in quality indicators. This productivity improvement without compromising quality is a reflection of the progressive state of this sector.

Public Schools

Introduction

The Indian school system comprises of two segments - primary and secondary education. The primary school segment (also called elementary education) covers Class 1 to Class 8 and the secondary education covers Class 9 to Class 12. There is further classification, such as Class 1 to Class 5 as primary, Class 6 to Class 8 as upper primary, Class 9 to Class 10 as secondary, and Class 11 to Class 12 as senior secondary. There are three distinct systems of school education in India characterized by management and content of education - Central Board of Secondary Education (of central government), State Board of Education (of respective

state governments), and a Private Board (Council for Indian School Certificate Examination or CISCE). The government of India has set up The National Council of Educational Research and Training (NCERT) to assist and advise the central and state governments on policies and programs for qualitative improvements in school education leading to uniformity in education in the country. The school education is managed by the Department of School Education and Literacy under the government and the respective Departments of School Education in the provincial states. The key information pertaining to school education as of 2014–15 is as highlighted in Table 2.12 [6].

There were 1.693 million schools with 258.5 million students in the Indian school system against a population of 1.312 billion in 2015 (school students make up about 20% of the population). The net enrolment in elementary education is 98% while it is about 80% at secondary level and 68% at senior secondary level.

The private sector contribution to education has been steadily increasing over the years due to high demand for education in private schools. The status of public vs. private schools as of 2014 is provided in Table 2.13.

The funding for school education in the public sector (government schools) is shared between central and state governments in the ratio of 65:35 (90:10 for northeastern states), respectively. The government expenditure on education as a percentage of GDP has been steadily increasing over the years [7].

Of the total expenditure on education, 75% is spent on primary and secondary education, 10% on higher education, 11% on technical education, and 4% on others, such as distance education, adult education, etc.

Key Challenges

India's mean years of schooling is 5.4 years as of 2014 [8] which is well below the average of many other developing countries (7.09 years). The dropout rate after elementary education is a key challenge for the country.

The overall pupil-teacher ratio (PTR) for secondary school is 24 and for secondary schools is 31 in 2015–16. However, 46% of preprimary and 34% of primary schools have poor PTR. Presence of teachers without approved professional qualification is another key challenge [9].

Provision of adequate infrastructure for education is another area of concern. The student-classroom ratio has improved from 32 in 2009–10 to 27 in 2015–16. However, other infrastructure facilities, such as laboratory, sports facilities, cognitive learning mechanisms, etc. need to be strengthened.

The poor learning outcomes in elementary education are also a matter of concern. A balanced curriculum of scholastic and co-scholastic/cognitive aspects needs to be introduced. The strategy to meet these challenges comprise of the following actions:

i) Focus on the four main priorities of education policy - access, equity, quality, and governance

ii) Make secondary education more job relevant through skills training within the school

iii) Improve learning outcomes through appropriate means

iv) Improve governance at school level

Objectives and Outcomes

The vision of the education department is 'To fully harness the nation's human potential by providing quality school education to all'. Accordingly the objectives are [9]:

i) Expansion of quality education facilities with special attention to vulnerable sections of the society.

ii) Promotion of literacy and skill development to create a fully literate society

iii) Formulating policy and carrying out institutional, systemic, and functional reforms

iv) International cooperation in the field of literacy

Expected Outcomes in 2017

i) Universal access and good quality, free, and compulsory education for all children in the age group of 6–14 years

TABLE 2.14

OUTPUT AND RELATED INDICATORS FOR ELEMENTARY SCHOOLS

Description	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16
Number of Students											
Government schools	121,664,856	129,664,856	133,652,079	133,591,503	130,591,503	130,089,841	129,395,848	125,059,229	121,960,862	118,923,680	116,921,077
Private schools	46,614,483	49,677,961	51,090,375	54,455,996	57,154,825	59,118,176	64,864,069	69,747,073	71,231,794	73,555,385	74,649,104
Total	168,279,339	179,342,817	184,742,454	188,047,499	187,746,328	189,208,017	194,259,917	194,806,302	193,192,656	192,479,065	191,570,181
Number of students in government schools as % of Total	72.30	72.30	72.35	71.04	69.56	68.75	66.61	64.20	63.13	61.79	61.03
Transition Rates											
Primary to upper primary (%)	80.4	81.1	82.9	83.5	85.2	87.1	86.7	89.6	89.7	90.1	90.3
Average dropout rate @ primary level (%)	8.61	9.36	8.02	9.11	6.76	6.5	5.62	4.67	4.34	4.13	4.08
Net enrolment @ primary level (%)	84.53	92.75	95.92	98.59	98.28	99.89	99.89	90.78	88.08	87.41	87.3
Net enrolment @ upper primary level (%)	50.78	52.46	54.66	56.22	58.22	61.82	NA	64.24	70.2	72.48	74.74
Budgeted expenditure (crores)	57,654	65,714	74,898	86,776	100,081	112,249	147,947	184,650	207,428	233,025	261,780

Source: School Report Cards (U-DISE publications)

TABLE 2.15

OUTPUT AND RELATED INDICATORS FOR SECONDARY SCHOOLS

Description	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16
Number of Students											
Government schools	19,200,000	19,600,000	20,915,000	21,344,000	21,825,000	21,925,000	22,350,000	22,916,832	23,907,801	25,419,294	26,145,052
Private schools	19,200,000	20,400,000	23,585,000	25,056,000	26,675,000	32,776,288	32,750,000	31,647,053	35,703,196	36,384,103	37,735,397
Total	38,400,000	40,000,000	44,500,000	46,400,000	48,500,000	54,701,288	55,100,000	54,563,885	59,610,997	61,803,397	63,880,449
Students in government schools as % of Total	50.00	49.00	47.00	46.00	45.00	40.08	40.56	42.00	40.11	41.13	40.93
Examination Results											
Secondary (%)	73.04	73.05	73.56	74.9	76.05	76.86	78.22	79.58	79.58	79.53	80.34
Higher secondary (%)	77.86	77.9	78.2	78.45	78.98	81.49	78.235	74.98	79.18	81.94	81.4
Budgeted expenditure (crores)	31,539	35,043	37,248	46,861	62,785	70,337	87,988	102,907	115,669	130,012	146,133

Source: School Report Cards (U-DISE publications)

ii) Improved attendance and reduced dropout rates at the elementary level (below 10%) and lowered percentage of out-of-school children (below 2%) for all socioeconomic and minority groups and in all states

iii) Increased gross enrolment ratio at the secondary level (over 90%) and at senior secondary level (over 65%)

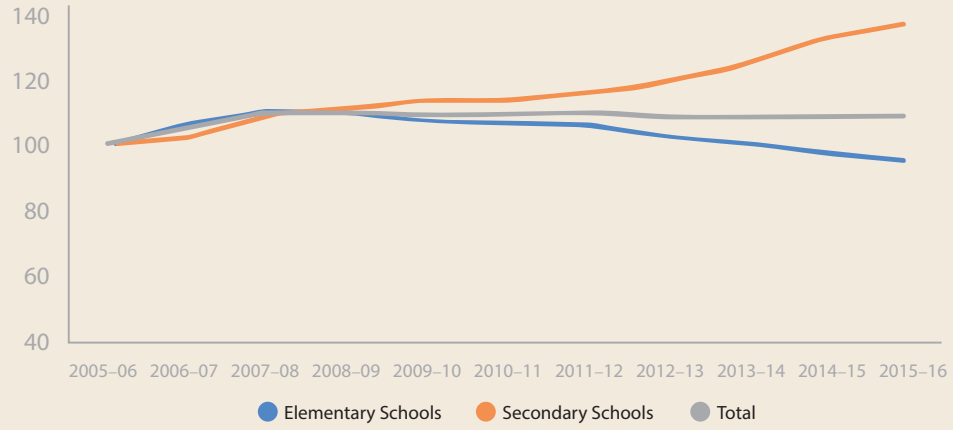
iv) Increased literacy level (over 80%) and gender gap in literacy reduced to less than 10%

v) At least one year of well-resourced and well-supported preschool education in primary schools to all children, particularly to those in educationally backward blocks

vi) Improved learning outcomes that are measured, monitored, and reported independently at all levels of school education with a special focus on ensuring that all children master basic reading and numeracy skills by Class 2 and skills of critical thinking, expression, and problem solving by Class 5

FIGURE 2.7

OUTPUT GROWTH INDEX - SCHOOLS



Source: Table 2.16

vii) Developed life skills including skills of critical and constructive thinking, use of ICT, organization and leadership, and community services

Data for Productivity Calculations

Output Growth

The basic outputs from the school system are the following:

i) Total number of students studying in elementary and secondary schools

ii) Pass percentage in designated public examinations

iii) Dropout rate at upper primary, secondary, and higher secondary classes

iv) Budget utilization

v) Performance in specified excellence indicators

The output details for the period from 2005–06 to 2015–16 for elementary and secondary schools are provided in Tables 2.14 and 2.15 [10–11].

The total number of students in elementary schools has increased from 168.27 million in 2005–06 to 191.5

TABLE 2.16

OUTPUT GROWTH INDEX

Description	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16
Number of Services Delivered											
Elementary school students	121,664,856	129,664,856	133,652,079	133,591,503	130,591,503	130,089,841	129,395,848	125,059,229	121,960,862	118,923,680	116,921,077
Secondary schools	19,200,000	19,600,000	20,915,000	21,344,000	21,825,000	21,925,000	22,350,000	2,2916,832	23,907,801	25,419,294	26,145,052
Growth in Services											
Elementary school students	-	0.066	0.031	-0.0005	-0.022	-0.004	-0.005	-0.034	-0.025	-0.025	-0.017
Secondary schools	-	0.021	0.067	0.021	0.023	0.005	0.019	0.025	0.043	0.063	0.029
Budget Total (INR crores)											
Elementary schools	57,654	65,714	74,898	86,776	100,081	112,249	147,947	184,650	207,428	233,025	261,780
Secondary schools	31,539	35,043	37,248	46,861	62,785	70,337	87,988	102,907	115,669	130,012	146,133
Total	89,193	100,757	112,146	133,637	162,866	182,586	235,935	287,557	323,097	363,037	407,913
Shares in Total Costs											
Elementary schools	0.646	0.652	0.668	0.649	0.614	0.615	0.627	0.642	0.642	0.642	0.642
Secondary schools	0.354	0.348	0.332	0.351	0.386	0.385	0.373	0.358	0.358	0.358	0.358
Base Period Shares											
Elementary schools	-	0.646	0.652	0.668	0.649	0.614	0.615	0.627	0.642	0.642	0.642
Secondary schools	-	0.354	0.348	0.332	0.351	0.386	0.385	0.373	0.358	0.358	0.358
Weighted Growth in Shares											
Elementary schools	-	0.043	0.020	0.000	-0.015	-0.002	-0.003	-0.021	-0.016	-0.016	-0.011
Secondary schools	-	0.007	0.023	0.007	0.008	0.002	0.007	0.009	0.015	0.023	0.010
Total		0.050	0.043	0.007	-0.007	-0.001	0.004	-0.012	0.000	0.007	-0.001
Output Indexes											
Elementary schools	100	106.58	109.85	109.80	107.34	106.92	106.35	102.79	100.24	97.75	96.10
Secondary schools	100	102.08	108.93	111.17	113.67	114.19	116.41	119.36	124.52	132.39	136.17
Total	100	104.99	109.54	110.26	109.52	109.45	109.91	108.64	108.59	109.32	109.25

Source: Calculated from the data of Tables 2.14 and 2.15

TABLE 2.17

INPUTS AND RELATED INDICATORS FOR ELEMENTARY SCHOOLS

Description	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16
Number of Schools											
Government schools	908,555	967,262	1,002,915	1,035,178	1,048,046	1,064,604	1,078,407	1,086,720	1,093,969	1,080,757	1,076,994
Private schools	215,478	229,401	247,860	250,400	255,766	297,720	333,771	344,982	351,838	365,050	372,084
Total	1,124,033	1,196,663	1,250,775	1,285,578	1,303,812	1,362,324	1,412,178	1,431,702	1,445,807	1,445,807	1,449,078
Government schools (% of Total)	80.83	80.83	80.18	80.52	80.38	78.15	76.36	75.90	75.66	74.75	74.32
Number of Teachers											
Government schools	3,236,221	3,608,124	3,904,779	3,971,870	3,955,337	4,200,521	4,286,997	4,522,803	4,609,976	4,682,338	4,676,441
Private schools	1,453,955	1,610,454	1,729,819	1,818,028	1,861,336	2,202,713	2,400,986	2,831,349	3,111,927	3,280,823	3,400,315
Total	4,690,176	5,218,578	5,634,598	5,789,898	5,816,673	6,403,234	6,687,983	7,354,152	7,721,903	7,963,161	8,076,756
Government teachers (% of Total)	69.00	69.14	69.30	68.60	68.00	65.60	64.10	61.50	59.70	58.80	57.90
Student classroom ratio	39	36	35	33	32	31	30	29	28	27	27
Pupil-Teacher Ratio											
Government schools	37.6	35.9	34.2	33.6	33.0	31.0	30.2	27.7	26.5	25.4	25.0
Private schools	32.1	30.8	29.5	30.0	30.7	26.8	27.0	24.6	22.9	22.4	22.0
Actual expenditure of government schools (Cr)	52,722	62,063	69,526	80,313	95,077	123,550	149,164	175,418	197,057	232,527	274,382
Plan expenditure	18,980	22,343	25,029	28,913	34,228	44,478	53,699	63,150	70,940	83,710	98,777
Non-plan expenditure	33,742	39,720	44,497	51,400	60,849	79,072	95,465	112,267	126,116	148,817	175,604
Expenditure on salaries and wages	23,619	27,804	31,148	35,980	42,594	55,350	66,825	78,587	88,281	104,172	122,923
Other expenditure	10,123	11,916	13,349	15,420	18,255	23,722	28,639	33,680	37,835	44,645	52,681
Average number of classrooms	3.8	3.6	3.6	3.6	3.7	3.8	3.8	3.8	4.0	4.1	4.2
Number of classrooms	3,452,509	3,482,143	3,610,494	3,726,641	3,877,770	4,045,495	4,097,947	4,129,536	4,375,876	4,431,104	4,523,375

Source: School Report Cards (U-DISE publications) and Analysis of Budgeted Expenditure on Education 2005–06 to 2013–14, Ministry of Human Resource Development, government of India

TABLE 2.18

INPUTS AND RELATED INDICATORS FOR SECONDARY SCHOOLS

Description	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16
Number of Schools											
Government schools	78,204	83,104	84,770	87,561	89,194	93,166	95,580	97,216	97,216	101,483	104,603
Private schools	81,396	86,496	88,230	98,739	104,706	113,317	116,820	131,698	139,895	143,170	147,573
Total	159,600	169,600	173,000	186,300	193,900	206,483	212,400	228,914	237,111	244,653	252,176
Government Schools (% of Total)	49.0	49.0	49.0	47.0	46.0	45.1	45.0	42.5	41.0	41.5	41.5
Number of Teachers											
Government schools	543,080	573,493	605,609	639,523	675,337	713,155	753,093	795,265	849,178	901,539	906,639
Private schools	663,764	700,935	740,188	781,639	825,411	871,635	920,446	971,992	1,080,771	1,101,882	1,168,074
Total	1,206,844	1,274,428	1,345,797	1,421,162	1,500,748	1,584,790	1,673,539	1,767,257	1,929,949	2,003,421	2,074,713
Government teachers (% of Total)	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	44.0	45.0	43.7
Student classroom ratio	57	57	57	56	56	55	54	54	50	47	46
Pupil-teacher Ratio											
Government schools	35	34	35	33	32	31	30	29	28	28	29
Actual Expenditure of government schools (Cr)	29,220	31,976	35,805	45,831	59,620	71,358	85,572	97,762	109,886	123,511	138,826
Plan expenditure	10,519	11,511	12,890	16,499	21,463	25,689	30,806	35,194	39,559	44,464	49,977
Non-plan expenditure	18,701	20,465	22,915	29,332	38,157	45,669	54,766	62,567	70,327	79,047	88,849
Expenditure on salaries and wages	13,091	14,325	16,041	20,532	26,710	31,968	38,336	43,797	49,229	55,333	62,194
Other expenditure	5,610	6,139	6,875	8,800	11,447	13,701	16,430	18,770	21,098	23,714	26,655
Average number of classrooms	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.2
Number of classrooms	312,816	332,416	339,080	350,244	356,776	372,664	382,320	388,864	388,864	405,932	439,333

Source: School Report Cards (U-DISE publications) and Analysis of Budgeted Expenditure on Education 2005–06 to 2013–14, Ministry of Human Resource Development, government of India

million in 2015–16, an increase of about 14%. While the number in secondary schools has increased from 38.4 million in 2005–06 to 63.8 million in 2015–16, an increase of about 66%. The total number of students studying in government schools has remained almost constant at 116 million in 2015–06 to 121 million in 2015–16 for elementary schools while there has been an increase from 19.2 million in 2005–06 to 26.14 million in 2015–16 for secondary schools. However the share of students studying in government schools has decreased from 72.3% to 61.03 % for elementary education and from 50% to 40.9% during the same period. This declining trend highlights the growing public preference for private schools.

The budgeted expenditure, however, has shown a steady increase during the above period with an average yearly increase of 16.7% and 16.8%, respectively for elementary and secondary schools.

Output Growth Index

The output growth has been calculated by considering the total students studying in both elementary and secondary schools. The two distinct outputs were analyzed to arrive at the growth trend both individually and collectively. The budget allocations for these two entities were taken as the basis for computing the weighted growth and the total output growth. The output growth index has been computed in Table 2.16.

Input Growth

The inputs to the school system comprises the following:

i) Availability of schools to cater to the population

ii) Qualified teachers to impart education to the students

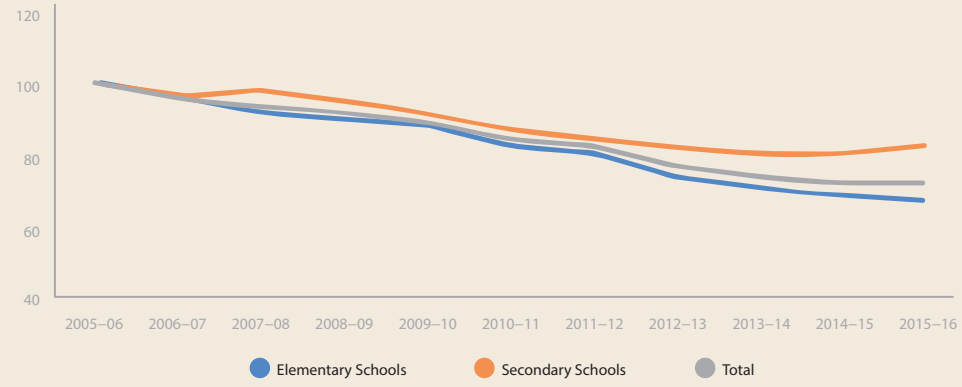
iii) Classrooms and related infrastructure in the schools

The details on inputs to the school system are in Tables 2.17 and 2.18.

The total number of elementary schools has increased from 1.124 million in 2005–06 to 1.449 million in

FIGURE 2.8

LABOR PRODUCTIVITY - SCHOOLS



Source: Table 2.21

2015–16, an increase of 29%. Government schools have also increased from approximately 908,000 to 1.076 million during this period (18.5%). However, the private sector schools are increasing more rapidly and consequently the share of government elementary schools has decreased to 74.3% from 80.8%. The number of secondary schools has increased from 159,600 in 2005–06 to 252,176 in 205–16, an increase of 58%. However, the share of government secondary schools has decreased to 41.5% from 49% during this period.

The number of teachers in elementary schools has increased from 4.69 million in 2005–06 to 8.076 million in 2015–16. The share of government teachers has decreased to 57.9% from 69% during the same period. In secondary schools, the number of teachers in the secondary schools has increased from 1.206 million

TABLE 2.19

LABOR GROWTH INDEX (SCHOOLS)

Description	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16
Number of Teachers											
Elementary schools	3,236,221	3,608,124	3,904,779	3,971,870	3,955,337	4,200,521	4,286,997	4,522,803	4,609,976	4,682,338	4,676,441
Secondary schools	543,080	573,493	605,609	639,523	675,337	713,155	753,093	795,265	849,178	901,539	906,639
Total	3,779,301	4,181,617	4,510,388	4,611,393	4,630,674	4,913,676	5,040,090	5,318,068	5,459,154	5,583,877	5,583,080
Labor Cost (Actual)											
Elementary schools	23,619	27,804	31,148	35,980	42,594	55,350	66,825	78,587	88,281	104,172	122,923
Secondary schools	13,091	14,325	16,041	20,532	26,710	31,968	38,336	43,797	49,229	55,333	62,194
Total	36,710	42,129	47,188	56,513	69,304	87,319	105,162	122,384	137,510	159,505	185,117
Price Deflator	1.000	0.965	0.888	0.837	0.768	0.708	0.656	0.618	0.598	0.591	0.558
Labor Cost (Price Deflated)											
Elementary schools	23,619	26,838	27,659	30,113	32,706	39,171	43,829	48,534	52,779	61,602	68,640
Secondary schools	13,091	13,827	14,244	17,184	20,509	22,623	25,144	27,048	29,431	32,721	34,729
Total	36,710	40,666	41,903	47,298	53,214	61,794	68,972	75,582	82,211	94,323	103,369
Unit Cost (For Information Only)											
Elementary schools	72,985	74,382	70,834	75,817	82,687	93,252	102,237	107,309	114,489	131,562	146,779
Secondary schools	241,043	241,109	235,201	268,705	303,682	317,231	333,871	340,117	346,587	362,946	383,055
Total	314,028	315,492	306,035	344,522	386,369	410,483	436,108	447,426	461,076	494,508	529,834
Share in Labor Costs											
Elementary schools	0.643	0.660	0.660	0.637	0.615	0.634	0.635	0.642	0.642	0.653	0.664
Secondary schools	0.357	0.340	0.340	0.363	0.385	0.366	0.365	0.358	0.358	0.347	0.336
Total	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Growth in Numbers Employed											
Elementary schools		0.115	0.082	0.017	-0.004	0.062	0.021	0.055	0.019	0.016	-0.001
Secondary schools		0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.068	0.062	0.006
Total		0.106	0.079	0.022	0.004	0.061	0.026	0.055	0.027	0.023	0.000
Base Period Shares in Labor Cost											
Elementary schools		0.643	0.660	0.660	0.637	0.615	0.634	0.635	0.642	0.642	0.653
Secondary schools		0.357	0.340	0.340	0.363	0.385	0.366	0.365	0.358	0.358	0.347

TABLE 2.19

LABOR GROWTH INDEX (SCHOOLS) (Continued)

Description	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16
Weighted Growth in Labor Input											
Elementary schools		0.074	0.054	0.011	-0.003	0.038	0.013	0.035	0.012	0.010	-0.001
Secondary schools		0.020	0.019	0.019	0.020	0.022	0.021	0.020	0.024	0.022	0.002
Total		0.094	0.073	0.030	0.018	0.060	0.034	0.055	0.037	0.032	0.001
Labor Input Index											
Elementary schools	100	111.49	120.66	122.73	122.22	129.80	132.47	139.76	142.45	144.69	144.50
Secondary schools	100	105.60	111.51	117.76	124.35	131.32	138.67	146.44	156.36	166.00	166.94
Total	100	109.39	117.41	120.98	123.12	130.46	134.84	142.31	147.52	152.26	152.44

Source: Calculated from the data of Tables 2.17 and 2.18 and GDP Deflator Data, World Bank

TABLE 2.20

CAPITAL GROWTH INDEX (SCHOOLS)

Description	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16
Number of Classrooms											
Elementary schools	3,452,509	3,482,143	3,610,494	3,726,641	3,877,770	4,045,495	4,097,947	4,129,536	4,375,876	4,431,104	4,523,375
Secondary schools	312,816	332,416	339,080	350,244	356,776	372,664	382,320	388,864	388,864	405,932	439,333
Total	3,765,325	3,814,559	3,949,574	4,076,885	4,234,546	4,418,159	4,480,267	4,518,400	4,764,740	4,837,036	4,962,707
Growth in Numbers											
Elementary schools		0.009	0.037	0.032	0.041	0.043	0.013	0.008	0.060	0.013	0.021
Secondary schools		0.063	0.020	0.033	0.019	0.045	0.026	0.017	0.000	0.044	0.082
Total		0.013	0.035	0.032	0.039	0.043	0.014	0.009	0.055	0.015	0.026
Capital Growth Index											
Elementary schools	100	100.86	104.58	107.94	112.32	117.18	118.69	119.61	126.74	128.34	131.02
Secondary schools	100	106.27	108.40	111.96	114.05	119.13	122.22	124.31	124.31	129.77	140.44
Total	100	101.31	104.89	108.27	112.46	117.34	118.99	120.00	126.54	128.46	131.80

Source: School Report Cards (U-DISE publications) and Calculations

TABLE 2.21

LABOR PRODUCTIVITY (SCHOOLS)

Description	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16
Labor Input Index											
Elementary schools	100	111.49	120.66	122.73	122.22	129.80	132.47	139.76	142.45	144.69	144.50
Secondary schools	100	105.60	111.51	117.76	124.35	131.32	138.67	146.44	156.36	166.00	166.94
Total	100	109.39	117.41	120.98	123.12	130.46	134.84	142.31	147.52	152.26	152.44
Output Indexes											
Elementary schools	100	106.58	109.85	109.80	107.34	106.92	106.35	102.79	100.24	97.75	96.10
Secondary schools	100	102.08	108.93	111.17	113.67	114.19	116.41	119.36	124.52	132.39	136.17
Total	100	104.99	109.54	110.26	109.52	109.45	109.91	108.64	108.59	109.32	109.25
Labor Productivity Indexes											
Elementary schools	100	95.59	91.04	89.47	87.82	82.38	80.29	73.55	70.37	67.56	66.50
Secondary schools	100	96.67	97.69	94.40	91.41	86.96	83.94	81.51	79.63	79.75	81.57
Total	100	95.97	93.30	91.14	88.96	83.90	81.51	76.34	73.61	71.79	71.67

Source: Calculated from the data of Tables 2.16 and 2.19

TABLE 2.22

CAPITAL PRODUCTIVITY (SCHOOLS)

Description	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16
Capital Growth Index											
Elementary schools	100	100.86	104.58	107.94	112.32	117.18	118.69	119.61	126.74	128.34	131.02
Secondary schools	100	106.27	108.40	111.96	114.05	119.13	122.22	124.31	124.31	129.77	140.44
Total	100	101.31	104.89	108.27	112.46	117.34	118.99	120.00	126.54	128.46	131.80
Output Indexes											
Elementary schools	100	106.58	109.85	109.80	107.34	106.92	106.35	102.79	100.24	97.75	96.10
Secondary schools	100	102.08	108.93	111.17	113.67	114.19	116.41	119.36	124.52	132.39	136.17
Total	100	104.99	109.54	110.26	109.52	109.45	109.91	108.64	108.59	109.32	109.25
Capital Productivity											
Elementary schools	100	105.67	105.05	101.73	95.57	91.25	89.60	85.94	79.09	76.16	73.35
Secondary schools	100	96.06	100.49	99.29	99.67	95.85	95.24	96.02	100.17	102.02	96.96
Total	100	103.63	104.43	101.83	97.38	93.28	92.37	90.53	85.82	85.10	82.89

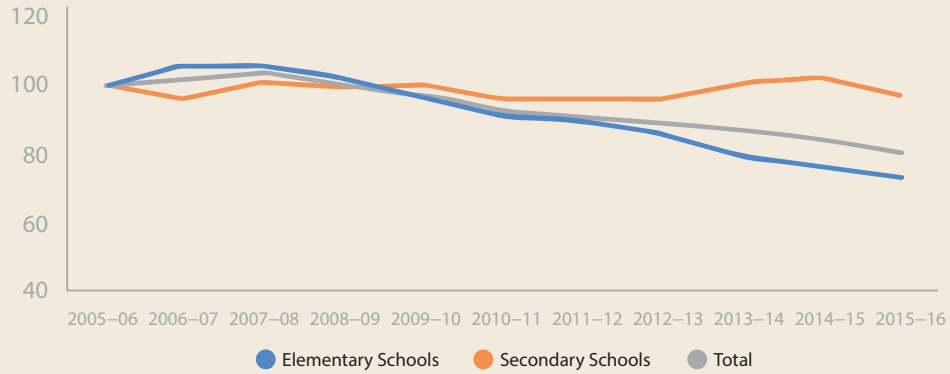
Source: Calculated from the data of Tables 2.16 and 2.20

in 2005–06 to 2.074 million, showing an increase of 71%. The share of government school teachers has remained near constant at 43%.

The actual expenditure in elementary schools and secondary schools has increased at an average rate of

FIGURE 2.9

CAPITAL PRODUCTIVITY - SCHOOLS



Source: Table 2.22

18% and 17%, respectively [12]. This expenditure comprises of both plan and non-plan components; plan expenditure relates to new capital expenditure, new schemes, etc. while non-plan expenditure relates to salaries and wages, operation and maintenance, depreciation, etc. An analysis of the past expenditure for education department shows that the ratio of plan to non-plan is about 36:64. Accordingly, 64% of the actual expenditure has been taken toward non-plan expenditure. It is further observed that 80% of non-plan is spent toward salaries and wages and the rest toward other expenses and accordingly the following data has been incorporated for analysis purpose.

Input Growth Index

Labor

For labor growth index, only teachers were considered as they are the major input component and with available data. The labor input growth index has been computed on the basis of number of teachers and the expenditure incurred on salaries as labor cost. The price deflator has been applied to the labor cost for calculating the actual growth rates (Table 2.19).

Capital

In the case of schools, the capital investment is mainly toward building and related infrastructure, such as laboratory, library, sports facilities, etc. The total number of classrooms has been taken as the main aspect for capital growth as this is used as an important indicator for school infrastructure. In the absence of data regarding the actual capital expenditure on school buildings, the number of classrooms has been taken as the input factor for capital growth (Table 2.20).

Productivity and Quality

Productivity

Labor Productivity

Labor productivity implies productivity of teachers in the case of schools. The labor productivity has been calculated as an index with 2005–06 as the base period with 100 in Table 2.21.

The labor productivity in the case of elementary schools shows a downward trend from 100 to 66.5, a decline of 33.5%. This is because the output growth index has decreased from 100 to 96 in the last 10 years whereas

TABLE 2.23

QUALITY INDICATORS

Description	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16
ELEMENTARY SCHOOLS											
Transition from primary to upper primary (%)	80.4	81.1	82.9	83.5	85.2	87.1	86.7	89.6	89.7	90.1	90.3
Average dropout rate @ primary level (%)	8.61	9.36	8.02	9.11	6.76	6.5	5.62	4.67	4.34	4.13	4.08
Gross enrolment primary level (%)	94.9	97.1	100.3	101.1	101.5	103.9	97.4	97.0	97.0	96.9	96.9
Gross enrolment upper primary level (%)	71.0	73.8	78.1	79.8	81.7	85.2	82.5	82.5	89.3	91.2	91.2
Student classroom ratio	39	36	35	33	32	31	30	29	28	27	27
SECONDARY SCHOOLS											
Examination Results											
Gross enrolment @ secondary level (%)	52.2	53.5	58.2	60.4	62.9	65.2	66.6	68.1	76.8	78.5	78.5
Examination results: secondary (%)	73.04	73.05	73.56	74.9	76.05	76.86	78.22	79.58	79.58	79.53	80.34
Examination results: higher secondary (%)	77.86	77.9	78.2	78.45	78.98	81.49	78.24	74.98	79.18	81.94	81.4
Pupil teacher ratio: elementary school	37.6	35.9	34.2	33.6	33.0	31.0	30.2	27.7	26.5	25.4	25.0
Pupil teacher ratio: secondary school	35.4	34.2	34.5	33.4	32.3	30.7	29.7	28.8	28.2	28.2	28.8
Student classroom ratio	57	57	57	56	56	55	54	54	50	47	46

Source: Educational Statistics at a Glance 2016 (government of India)

the labor growth index has increased from 100 to 144. While the number of students in elementary schools has decreased marginally, the number of teachers has increased by 44%. However, the pupil-teacher ratio has improved from 37.6 to 25 and this is a desirable outcome from the quality perspective. The overall enrolment in elementary schools remaining constant is a cause for concern.

The labor productivity in secondary schools has decreased to 81.5. In this case, although the Output growth index has increased from 100 to 136, the labor growth index has increased from 100 to 166 during the same period. This is a very positive trend because more students are enrolling in government schools and more teachers are being inducted which improves the quality factor, such as pupil-teacher ratio.

The labor productivity for total schools has however declined from 100 to 71.6.

Capital Productivity

The capital productivity has been calculated with growth in classrooms as the input factor (Table 2.22).
The Capital Productivity has decreased from 100 to 73.3 in the case of elementary schools. While the school infrastructure is being improved and there is a 31% growth in the number of classrooms, the output index has reduced from 100 to 96. Although the student/classroom ratio has actually improved, the decline in enrolment in government schools is a reflection of people's perception about public schools. Consequently, the number of students enrolling in private schools has steadily increased.

The capital productivity in the case of secondary schools has remained constant at 96.9. The capital growth index has increased from 100 to 140 whereas the output index has grown from 100 to 136 in the same period. This is a positive trend given the increase in enrolment in secondary schools and the corresponding increase in intake in public schools. The overall capital productivity for total schools has decreased from 100 to 82.9.

Intermediates

The intermediates include the expenditure incurred on school consumables, school maintenance, etc. The productivity index of this resource could not be computed due to data nonavailability.

Multifactor (Total) Productivity (MFP)

The MFP in the case of elementary schools is nearer to 67% with labor and capital productivity being 66.5% and 73.3%, respectively. The MFP in the case of secondary schools will be nearer to 82% with labor and capital productivity being 81.5% and 96.86%, respectively. In both cases, it is imperative to increase enrolments in public schools and also increase the classrooms for overall improvement in MFP.

Quality

The quality of public school system can be assessed from the trend in some of the educational indicators (Table 2.23).

There has been a steady improvement in all the above indicators. However, the statistics in Table 2.23 pertains to education at national level as a whole, including both public and private schools. The share of students enrolling in government schools has been decreasing with the rapid expansion of private schools. The percentage of students in government elementary schools has decreased from 72% to 61% and in secondary schools from 50% to 41% in the last 10 years. While this decline may be attributed to the fall in productivity, the above quality parameters are equally applicable to government public schools.

Improving Productivity Measures

Output Measures

i) Preschool enrolment can be used as another output measure to assess achievement against outcome statement of education department which aims at making preschool education mandatory for all children.

ii) The effectiveness of developing life skills of critical and constructive thinking, use of IT, leadership, and community services may be captured through appropriate measure.

Input Measures

The cost details for labor, capital, and intermediates have to be captured on priority through proper accounting system. The actual expenditure on salaries and other welfare schemes for teachers and support staff may be documented. The annualized cost of capital toward buildings and facilities, annual school expenditure on consumables, and other costs may also be captured and documented.

Quality Measures

The effect of education on mitigation of social and religious conflicts can be another important quality indicator.

Conclusion

The productivity growth for labor and capital in the case of both elementary and secondary schools shows a declining trend. Although the output index has marginally reduced (by about 4%) for elementary schools and grown by 36% for secondary schools, the corresponding labor and capital growth indexes have grown relatively higher at 44% and 31%, and 66% and 40%, respectively for elementary and secondary schools. This has brought down the labor and capital productivity growth for schools. While the growth of labor and capital components is desirable from the quality perspective, it is also imperative to increase the output, namely enrolment in government schools which will improve the overall productivity of public schools.

Final Conclusion

The methodology for measurement of productivity in the public sector is based on comparing the output growth index and input growth index after converting the various types of output into a single index on the basis of DRG (Diagnosis Related Groups) or budget and various types of input into a single index based on their cost shares. This approach would depict the actual productivity trend and also bring into focus the real issues in managing productivity growth. In the public health and education sector, presently there is no system for capturing cost data separately for labor, capital, capital expenses, intermediates, etc. which has hampered measurement of productivity as per this methodology. Going forward, it would be highly desirable to capture cost data at ground level, namely schools and hospitals which can be aggregated for the sector so that measurement of productivity can be done on a regular basis which will facilitate evolving appropriate policies at the national level.

CHAPTER 3

INDONESIA

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Public Hospitals

Introduction

Indicators of overall health status in Indonesia have improved significantly over the last two and half decades with life expectancy rising from 63 years in 1990 to 71 years in 2012, under-five mortality falling from 52 deaths per 1,000 live births in 2000 to 31 deaths in 2012, and infant mortality falling from 41 deaths per 1,000 live births in 2000 to 26 deaths in 2012. However, progress on maternal mortality and communicable diseases has been slower - maternal mortality remaining high (210 deaths per 100,000 live births in 2010) and continuing high incidences of tuberculosis (TB) and malaria. At the same time, risk factors for noncommunicable diseases (NCDs), such as high blood pressure, high cholesterol, overweight, and smoking are increasing. Responding to this increasingly complex epidemiological pattern in the midst of multiple macro-transitions is one of the major challenges for the country's health system [1].

The Indonesian health system has a mixture of public and private providers and financing. The public system is administered in line with the decentralized government system in Indonesia, with central, provincial, and district government responsibilities. The central Ministry of Health (MoH) is responsible for management of some tertiary and specialist hospitals, provision of strategic direction, setting of standards and regulation, and ensuring availability of financial and human resources. Provincial governments are responsible for management of provincial-level hospitals, provide technical oversight and monitoring of district health services, and coordinate cross-district health issues within the province. District/municipal governments are responsible for management of district/city hospitals and the district public health network of community health centers (*puskesmas*) and associated subdistrict facilities (Figure 3.1). There are a range of private providers, including networks of hospitals and clinics managed by not-for-profit and charitable organizations, for-profit providers, and individual doctors and midwives who engage in dual practice (i.e., have a private clinic as well as a public facility role).

Indonesia faces the challenge of increasing health expenditures, as nominal health spending has been steadily increasing in the last eight years, by 222% overall[1]. Although there has been a substantial increase in health spending at national level (also reflected in Table 3.1), health spending as a proportion of GDP remains below average among the low-to-middle-income countries until 2012. The government share of total health expenditure also remains low, at only 39%, whereas private, primarily out-of-pocket (OOP) expenditure, is 60% [2].

Human resources for health have also grown in the last two decades, with increases in health worker to population ratios. However, the ratio of physician to population is still lower than the WHO-recommended figure, and ongoing geographical disparities exist. There is also a pronounced shortage of nurses and midwives at both hospital and *puskesmas* level, despite the increase in absolute numbers.

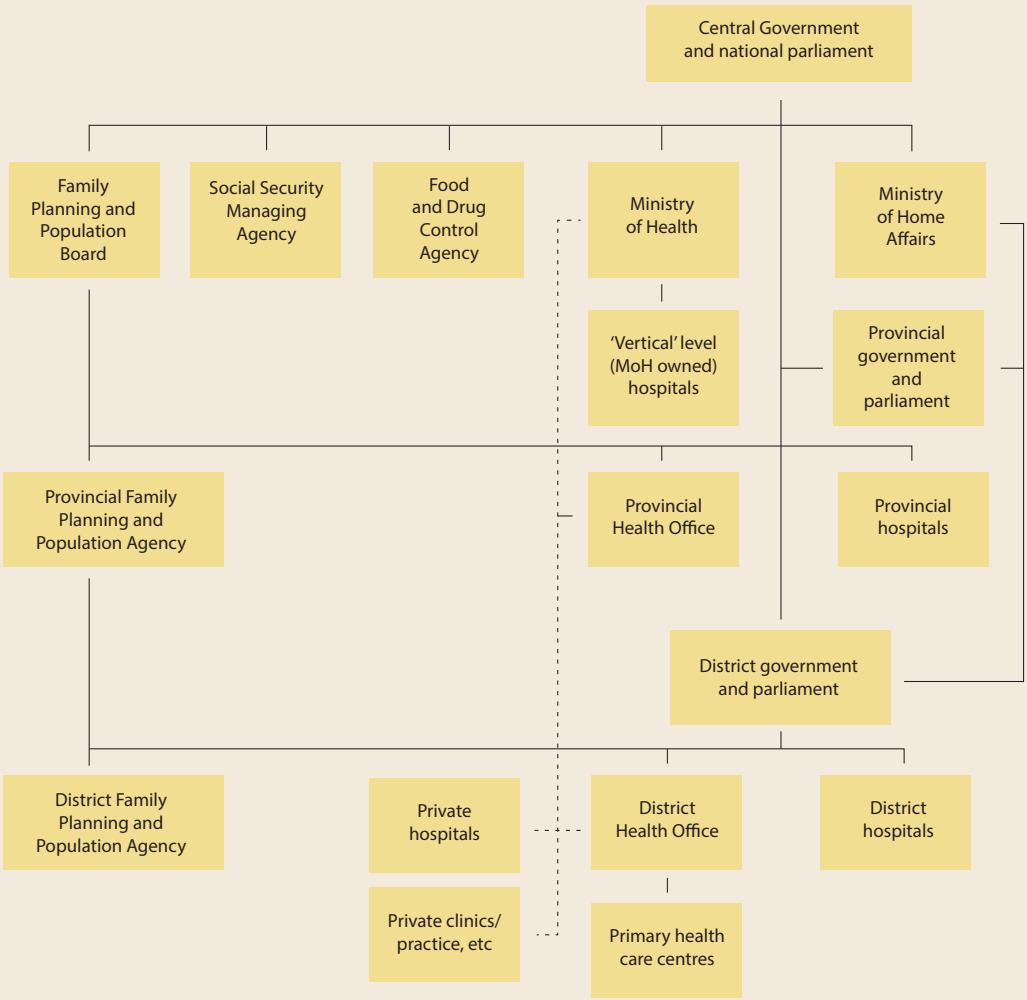
Indonesia has also introduced several reforms to different aspects of the health system, while the health system has also been affected by reforms of government and public administration that are multisectoral. Key

[1] The Republic of Indonesia Health System Review, Chapter 3. Health Financing, p. 65

multisectoral reforms include the delegation of authority for certain government functions from central to local governments, including responsibility for the management and provision of public-health services; and the progressive introduction of greater autonomy in the management of public-service organizations, which include hospitals. Reforms that focus specifically on the health sector include reforms to improve the quality of medical education and the introduction of a national health insurance scheme (the national health insurance program or JKN). Following its introduction, JKN has significantly influenced management and delivery of health services.

FIGURE 3.1

INDONESIA HEALTH SYSTEM



Continuous line = authority; Dotted line = technical supervision

Source: Government organization, decentralization, and health system (government of Indonesia, 2007; House of Representatives, 2004g; House of Representatives, 2008; House of Representatives, 2014b; President of Indonesia, 2011a; President of Indonesia, 2011b).

Indonesia Health System

Potential future reforms are likely; i) with the use of telemedicine to address issues of geographical coverage, ii) more innovative ways of addressing the challenge of distribution of the health workforce, including contracting in by local governments, and iii) dealing with the implications of removal of restrictions on free movement of the health workforce within the member countries of the Association of Southeast Asian Nations (ASEAN).

TABLE 3.1

INDONESIA HEALTH BUDGET (2010–17) (IDR 'TRILLION)

Health Budget Components	2010	2011	2012	2013	2014	2015	2016	2017
	APBN	APBN	APBN	APBN	APBN	APBN	APBN	APBN
1. Budget managed by Central Gov	25.2	35.4	37.3	43.8	56.4	63.5	76.1	75.2
2. Budget managed by Local Gov	3.7	4.0	4.2	4.5	4.6	7.8	21.2	25.2
3. Health Budget by Project	-	-	-	-	-	3.5	6.8	3.6
4. Total Health Budget	28.8	39.4	41.5	48.2	61.0	74.8	104.1	104.0
5. Total Government Budget	1,047.7	1,320.8	1,548.3	1,726.2	1,876.9	1,984.1	2,082.9	2,080.5
RATIO Health Budget	2.8	3.0	2.7	2.8	3.3	3.8	5.0	5.0

Source: Indonesia Ministry of Health (2015), Strategic Plan 2015–20, Jakarta.

Objectives and Desired Outcomes

Act No. 36 of 2009 stated that health is a human right and one of the social welfare objectives as referred to in the Constitution of Republic of Indonesia of 1945 and the philosophical foundation 'Pancasila'. The Act also mentioned that health development aims to improve the awareness, willingness, and ability of everyone to attain healthy living as an investment for productive human resource development, both socially and economically. Thus every activity for improving the level of health of the people should align with principles of nondiscrimination, participation, protection, and sustainability for Indonesian human resource development and national competitiveness. Furthermore, to implement part of the act number 36/2009, a Presidential Decree Number 72/2012 on the national health system was instituted. This decree regulates management and administration of health efforts and services from the central level up to the district/municipality level (President of Indonesia, 2012b).

Meanwhile, the MoH in 2010 launched the National Strategic Plan for the Health Sector 2010–2014 that mentioned six health system objectives, which are:

i) Improving the involvement of communities, the private sector and civil society in health development through national and global collaboration

ii) Improving health services' accessibility, equitability, affordability, quality, and fairness, as well as evidence-based health services, mainly for promotive and preventive efforts

iii) Improving health financing, in particular to establish nationwide social health insurance

iv) Improving the development and empowerment of equitable and qualified human resources for health

v) Improving the availability, equity, and affordability of drugs and medical equipment, as well as ensuring safety/effectiveness, efficacy, and quality of pharmaceutical products, medical equipment, and food

vi) Improving accountable, transparent, efficient, and effective health system management for strengthening health system decentralization [3]

Data for Productivity Calculations

Output

Growth in total output is calculated as the weighted sum of growth in outpatient and inpatient services. A 75% weight is given to outpatient growth and 25% to inpatient growth. These weights are the proportions of total costs incurred in the two areas. The 75/25 split was based on discussions with hospital administrators.

Growth in output (inpatients and outpatients as well as total) has been steadily increasing since 2010 to 2016 (Table 3.2, Figure 3.2). This is partly due to the government program to increase access for health services by providing JKN.

TABLE 3.2

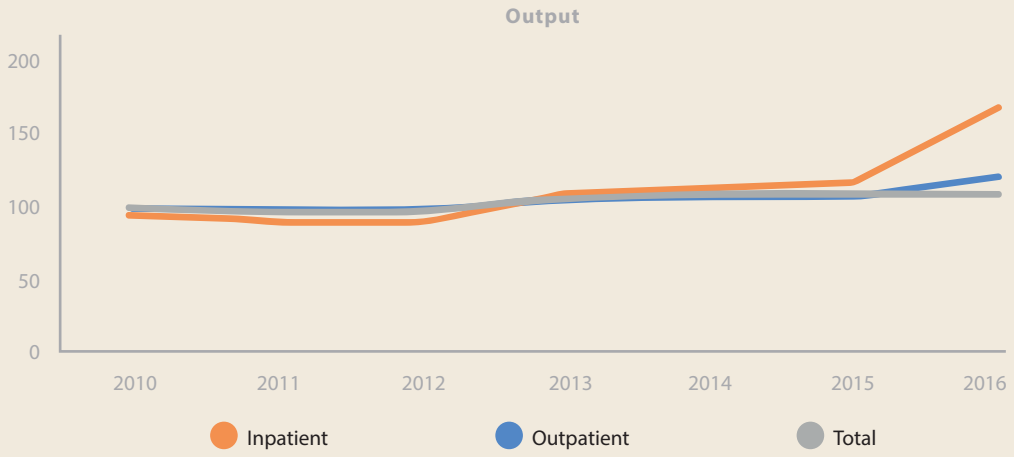
OUTPUT[2]: NUMBER OF SERVICES DELIVERED (HOSPITALS)

Number of Services Delivered (Index, 2010 = 100)	2010	2011	2012	2013	2014	2015	2016
Outpatient	100	98.7	98.9	106.8	106.9	107.8	122.4
Inpatient	100	89.2	90.6	108.5	109.9	117.9	170.3
Total	100	95.4	96.0	107.6	108.2	111.6	111.6

Number of Services Delivered (Millions)	2010	2011	2012	2013	2014	2015	2016
Outpatient	45.73	45.14	45.24	48.83	48.87	49.29	55.96
Inpatient	2.12	1.89	1.92	2.3	2.33	2.5	3.61
Total	47.85	47.03	47.16	51.13	51.20	51.79	59.57

FIGURE 3.2

OUTPUT: NUMBER OF SERVICES DELIVERED (HOSPITALS)



Inputs

All input costs (labor, capital, and intermediates) have been deflated using inverse of inflation rate from 2010 to 2016

The use of proportion 75/25 for input outpatient/inpatient was based on discussion with several public hospital managers and has been tested for sensitivity to 70/30 and 80/20.

Labor

The labor costs for outpatient, inpatient, and total were calculated based on numbers employed. Growth in total labor is a weighted sum of growth in outpatient and inpatient numbers employed. The weights are an assumed 75/25 split between outpatient and inpatient labor costs. The trend shows overall steady increase since 2010.

[2] Data number of services delivered (in million) from Ministry of Health Report 2010–16, published by Indonesia Central Bureau of Statistics (2017).

TABLE 3.3

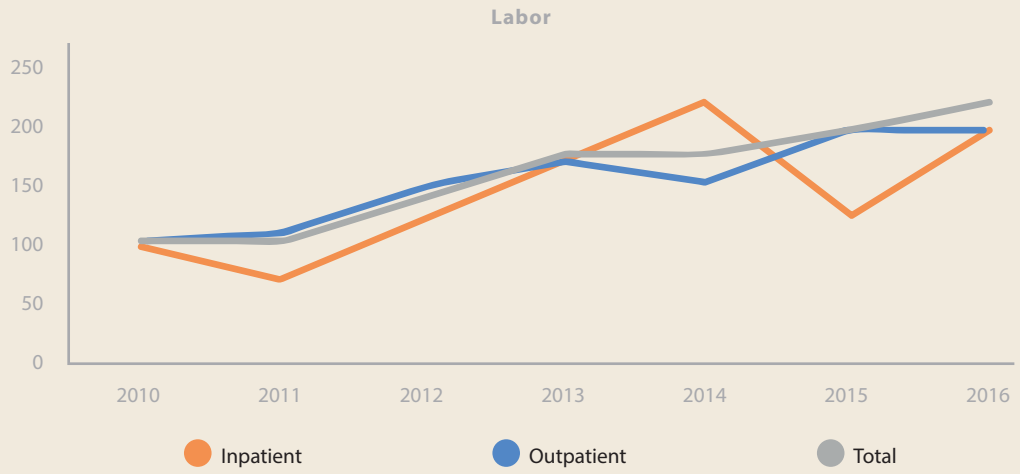
LABOR[3] COSTS (HOSPITALS)

Labor Costs (Index, 2010 = 100)	2010	2011	2012	2013	2014	2015	2016
Outpatient	100	110.4	146.2	169.8	154.9	199.6	194.9
Inpatient	100	69.5	113.0	169.8	219.5	125.7	194.9
Total	100	92.0	135.7	173.8	188.3	182.0	219.5

Labor Costs (Trillion)	2010	2011	2012	2013	2014	2015	2016
Outpatient	4.546	4.546	6.501	6.051	6.656	7.987	8.786
Inpatient	3.720	4.546	3.500	4.951	5.446	5.325	5.857
Total	8.266	9.092	10.001	11.002	12.102	13.312	14.643

FIGURE 3.3

LABOR COSTS (HOSPITALS)



[3] Data Labor Costs (in trillion) from Ministry of Health Report 2010–16, published by Indonesia Central Bureau of Statistics (2017).

TABLE 3.4

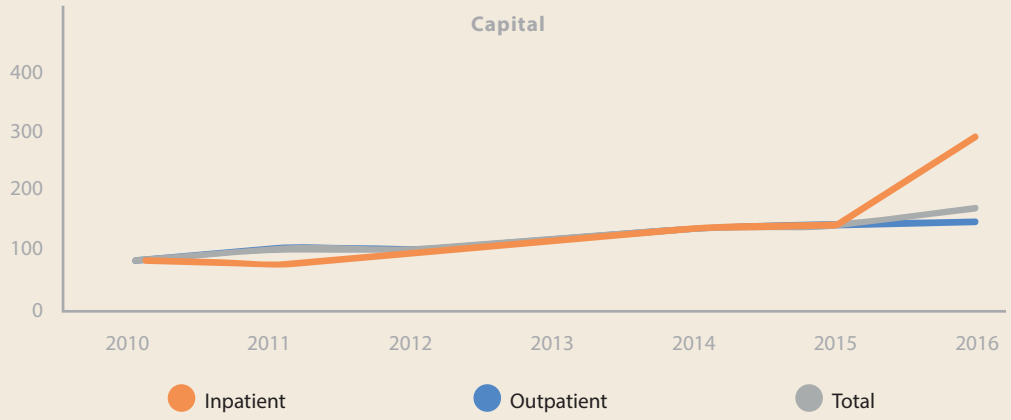
CAPITAL[4] COSTS (HOSPITALS)

Capital Costs (Index, 2010 = 100)	2010	2011	2012	2013	2014	2015	2016
Outpatient	100	133.1	132.4	146.2	180.4	187.2	197.4
Inpatient	100	102.9	132.4	146.2	180.4	187.2	372.9
Total	100	128.6	132.4	146.2	180.4	187.2	223.7

Capital Costs (Trillion)	2010	2011	2012	2013	2014	2015	2016
Outpatient	18.181	25.914	26.524	31.103	40.355	43.586	47.041
Inpatient	3.208	3.534	4.681	5.489	7.121	7.692	15.680
Total	21.390	29.448	31.205	36.592	47.476	51.277	62.721

FIGURE 3.4

CAPITAL COSTS (HOSPITALS)



[4] Data Capital Costs (in trillion) from Ministry of Health Report 2010–16, published by Indonesia Central Bureau of Statistics (2017).

TABLE 3.5

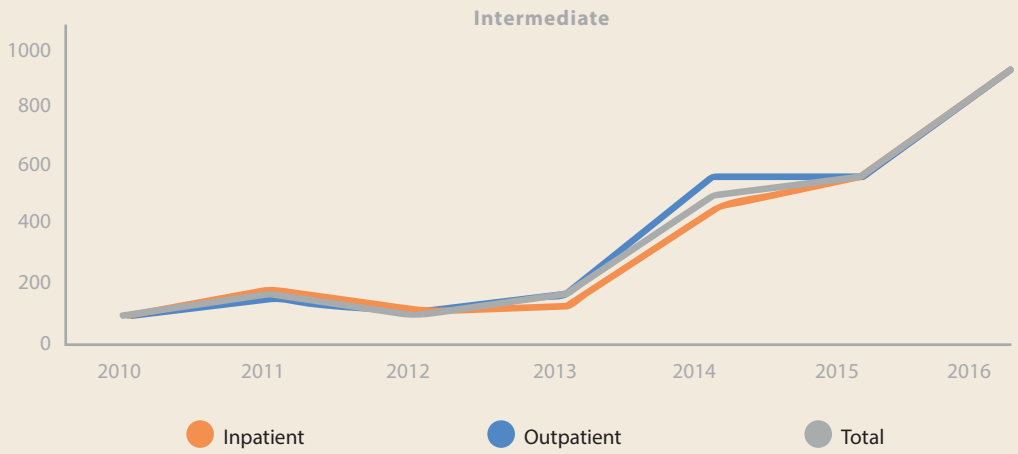
INTERMEDIATES[5] COSTS (HOSPITALS)

Intermediates Costs (Index, 2010 = 100)	2010	2011	2012	2013	2014	2015	2016
Outpatient	100	146.6	119.4	172.5	560.6	566.5	933.4
Inpatient	100	179.1	119.4	141.1	458.7	566.5	933.4
Total	100	162.8	119.4	156.8	509.7	566.5	933.4

Intermediates Costs (Trillion)	2010	2011	2012	2013	2014	2015	2016
Outpatient	0.902	1.416	1.187	1.821	6.223	6.543	11.034
Inpatient	0.902	1.730	1.187	1.490	5.092	6.543	11.034
Total	1.804	3.146	2.373	3.311	11.315	13.085	22.068

FIGURE 3.5

INTERMEDIATES GROWTH (HOSPITALS)



[5] Data Intermediates Costs (in trillion) was obtained from Ministry of Health Report 2010–16 by Indonesia Central Bureau of Statistics (2017).

TABLE 3.6

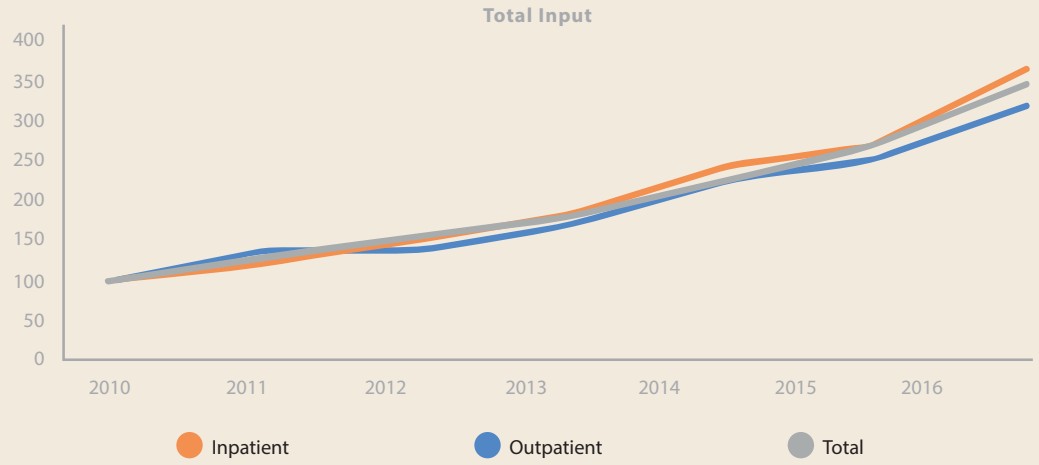
TOTAL INPUT INDEX (HOSPITALS)

Total Input	2010	2011	2012	2013	2014	2015	2016
Labor	8.2656	9.09216	10.00138	11.00151	12.10166	13.31183	14.643
Capital	21.38959	29.44774	31.20454	36.59215	47.47647	51.27728	62.7209
Intermediates	1.803986	3.145579	0.373165	3.310638	11.31481	13.08545	22.0679
Total	31.45917	41.68548	41.57908	50.9043	70.89295	77.67456	99.4319

Total Input Index	2010	2011	2012	2013	2014	2015	2016
Outpatient	100.0	131.8	137.0	168.5	225.6	253.3	317.7
Inpatient	100.0	121.1	148.5	185.5	243.7	266.6	362.8
Total	100.0	129.2	152.0	180.5	226.1	268.0	344.9

FIGURE 3.6

TOTAL INPUT INDEX (HOSPITALS)



Capital

The capital costs consist of costs used for new facilities and equipment as well as upgrading the existing one. Capital costs have overall steady increase since 2010.

Intermediates

The intermediates inputs has also overall steady increase since 2010.

Total Inputs

The trend that highlights the steady increase for all inputs since 2010 can be explained by the Government Policy and Program to improve access to health service. The dominant input is capital as seen from the total annual government budget allocated for health.

FIGURE 3.7

PUBLIC HEALTH MFP GROWTH (HOSPITALS)

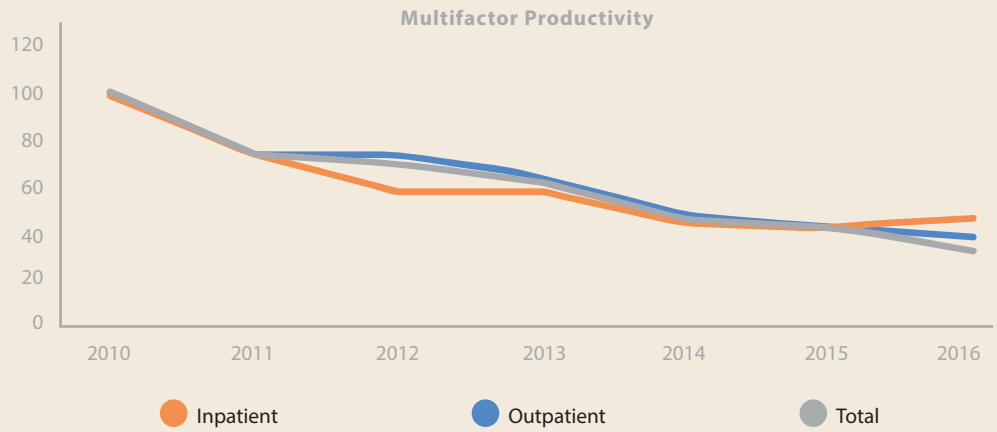
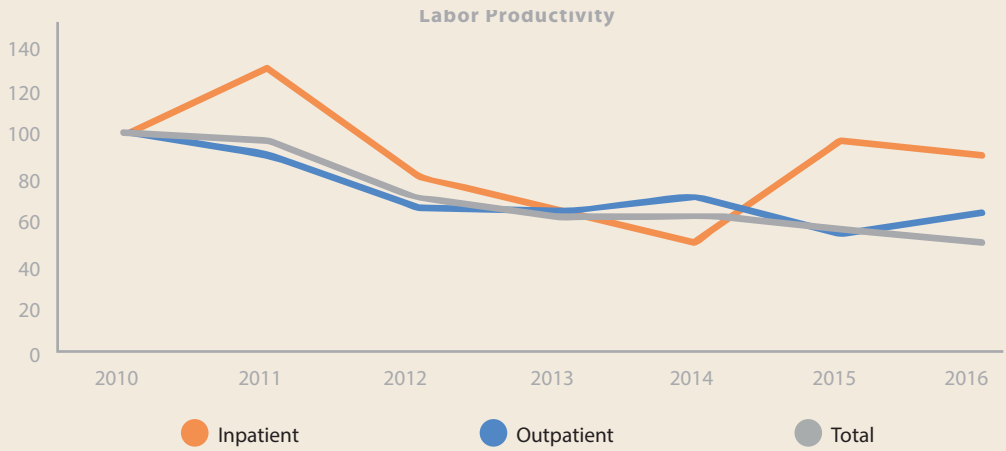


FIGURE 3.8

LABOR PRODUCTIVITY (HOSPITALS)



Productivity and Quality

Productivity

Figure 3.7 highlights the multifactor productivity (MFP) results for outpatient, inpatient, and total, showing a steady decrease from 2010 to 2016.

On these estimates, productivity has gone down, which suggest that more of the increased budget has gone into increasing inputs than it has into delivering more services. This could mean improved quality of care.

Figure 3.8 on labor productivity features a decreasing trend for all indices except for inpatient, which however changes with the trend direction going upward.

Figure 3.9 on capital shows a steady decrease for all indices with an exception of the increase seen for inpatient from 2014.

Figure 3.10 intermediates presents the decrease for all indices except for the 2012's steep increase and decrease again. This cannot yet be explained with the data available.

FIGURE 3.9

CAPITAL PRODUCTIVITY (HOSPITALS)

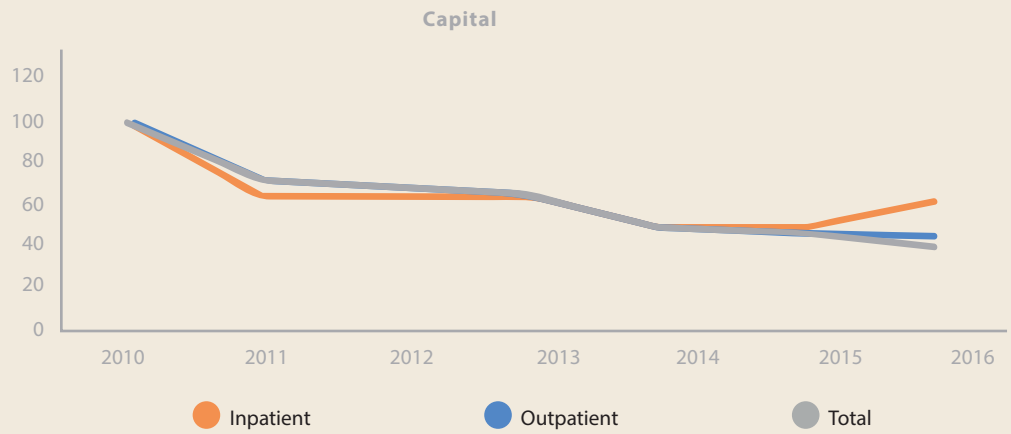
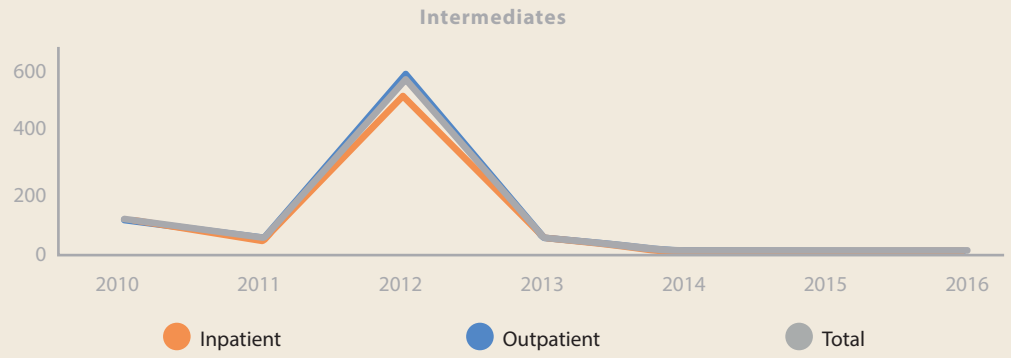


FIGURE 3.10

INTERMEDIATES PRODUCTIVITY (HOSPITALS)



The measure used is good enough to display the good quality (Figure 3.11) which appear to be favourable. This is in line with the government policy to increase access and quality health service provided (Indonesia MoH, 2015).

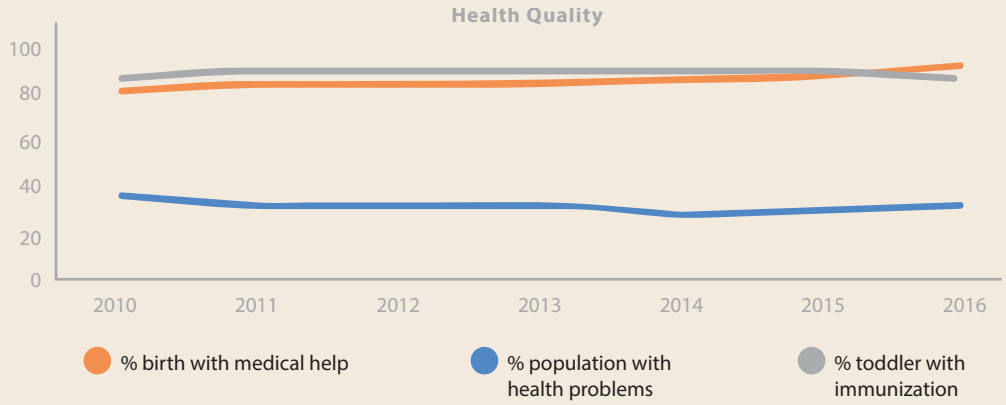
Quality

While quality measures show a consistent range, with the exception of the slight increase in the percentage of births with medical help since 2010, this perhaps is once again due to the introduction of JKN. Therefore, it is expected that health quality will continue to improve as long as the increase budget allocation is at the minimum of 6% of GDP.

The increased budget for health has concurrently improved the health quality on a steady basis and it is expected to increase in the next years.

FIGURE 3.11

PUBLIC HEALTH QUALITY OUTPUT (HOSPITALS)



Improving Productivity Measures

The problem of data availability is one of the major problems in this report. For example, there is no separate cost for each output, namely outpatients and inpatients.

From the data used in this report, trends in productivity cannot be accurately calculated. As there is no separation to inpatients and outpatients, the cost data used is an estimation proportional with each of its numbers. This should be taken into consideration when reading this report. It is known that health cost has increased about 222% in the last eight years, and one would be right in identifying that health productivity will not increase if sufficient budget is not allocated to offset it.

Conclusion

The factors for the steady decrease in public health productivity growth in Indonesia since 2010 is still not clear, due to the limitation in data availability. It may be construed that it was due to the increasing cost of health (222%) in the last eight years. Also, the fact that a very large number of poor people seek for health services, particularly public hospitals since the introduction of JKN.

The increase of health budget used to treat more patients will certainly help improve health productivity. However, as the government covers only about 40% of the health cost, the improvement will also be dependent on the cost of private health provider. The limitation of available data hinders a comprehensive analysis which limits the conclusion in this report.

However, based on data, it is clear that public hospital productivity has been steadily decreasing. The quality results for toddler immunization was satisfying, except in 2016, where the figure somewhat decrease. This suggest that public health need to focus more on quantity.

The health system in Indonesia has improved significantly. However, due to limited data and the use of assumption to input costs for outpatients and inpatients, some considerations need to be applied when reading this report. Otherwise, the results in this report is accurate. It is also evident that greater spending has improved quality, but at the same time, productivity remains unimproved.

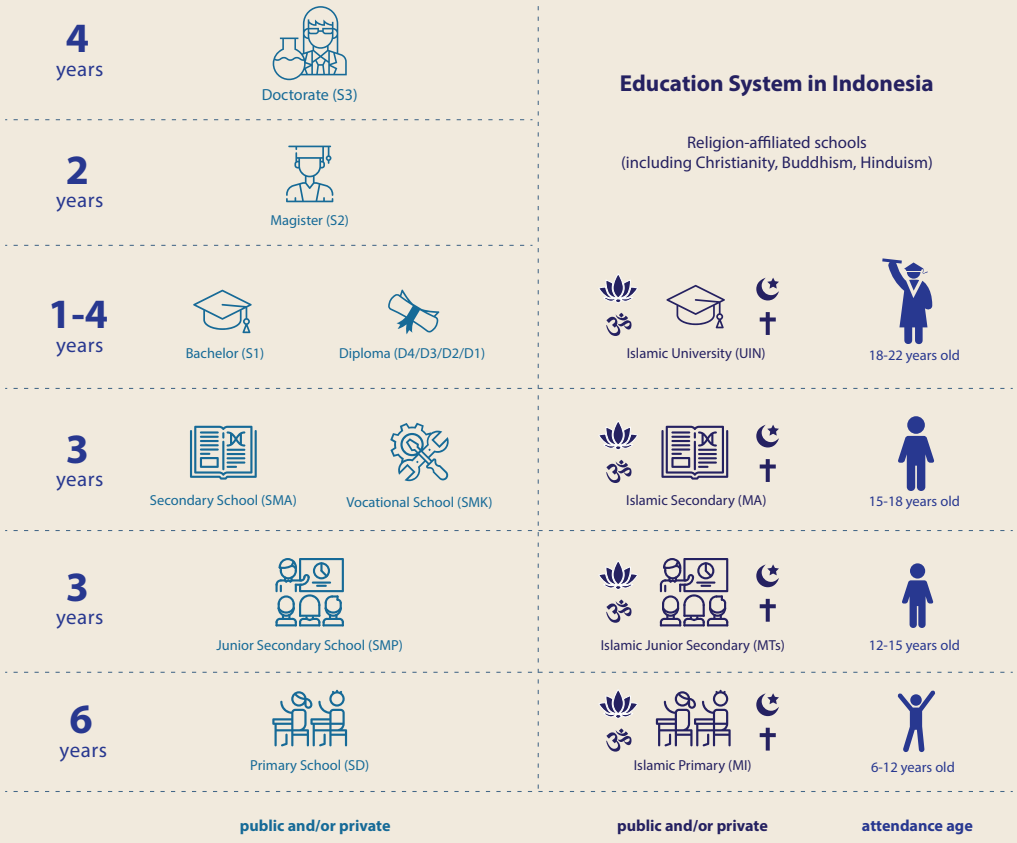
Public Schools

Introduction

Over the past few decades, Indonesia has made enormous strides in ensuring most of its children get basic education. Now the focus turns to quality and preparing them for life in the 21st century. President Joko Widodo made education a key part of his election campaign and after taking office in October 2014, embarked

FIGURE 3.12

INDONESIA'S EDUCATION SYSTEM



Source: Indonesia Ministry of Education and Culture (2016)

on a series of reforms designed not only to make the education system more appropriate for contemporary Indonesia, but also to help the government meet its goal of raising per capita incomes from USD3,500 in 2011 to USD14,250–15,000 by 2025 [4].

Under the 2002 constitutional amendment, all levels of governments were required to spend at least 20% of their annual budgets on education. In practice, however, authorities have tended not to meet that target, with spending peaking at 18.1% in 2012 and declining to 17.5% in 2014, according to UNESCO. District authorities generally cover most of the costs of basic education, contributing 61% of spending at primary and junior high levels, while the central government pays 38% and the provincial authorities 1%, according to the World Bank. Indonesia has more than 250,000 schools, 2.6 million teachers and 50 million students. From June 2015 (the start of the school year in Indonesia), the government made it compulsory for all children to complete 12 years of schooling, starting at the age of seven (previously, it was nine years of compulsory schooling). Early learning remains exclusively private, thus is generally practiced by the better-off Indonesians [2]. The Indonesian education system is shown in Figure 3.12.

In the past 20 years, school participation rate has risen from 94.4% to 98.6% for 7–12 year olds in primary education, from 75.8% to 94.6% for 13–15 year olds in junior high school, and from 47.6% to 70.3% for 16–18 year olds in high school. The literacy rate for all adults over 15 is now 92.6%, rising to 99.5% for those aged 15–24. However, the numbers mask stark regional differences as well as a divide between urban and rural areas. While this has been gradually narrowing, further challenges are raised by the country's ethnic and linguistic diversity, with Indonesia home to some 700 active languages, eight of which are considered major. Many children are not able to speak the national medium of instruction - Bahasa Indonesia - by the time they start school.

TABLE 3.7

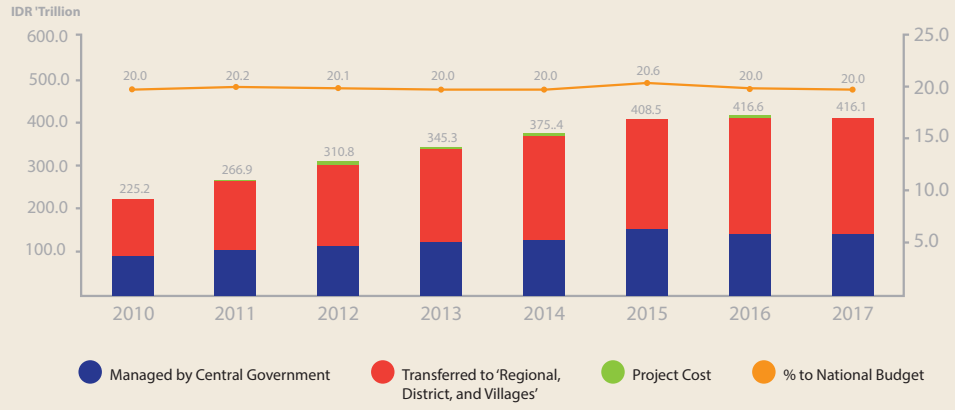
INDONESIA EDUCATION BUDGET (2010–17)[7] (IDR 'TRILLION)

Education Budget Components	2010	2011	2012	2013	2014	2015	2016	2017
	APBN	APBN	APBN	APBN	APBN	APBN	APBN	APBN
1. Managed by Central Government	96.5	105.4	117.2	126.2	128.2	154.4	145.0	145.4
A. Managed by Ministrial or Institution	96.5	105.4	117.2	126.2	128.2	154.4	141.7	141.8
B. Managed by others (BA BUN)	-	-	-	-	-	-	3.3	3.6
2. Budget transferred to Regional, District and Village	127.7	159.0	186.6	214.1	238.8	254.2	266.6	268.2
3. Budget by Project Cost	1.0	2.6	7.0	5.0	8.4	-	5.0	0.0
4. Total Education Budget	225.2	266.9	310.8	345.3	375.4	408.5	416.6	416.1
5. Total National Budget	1,126.1	1,320.8	1,548.3	1,726.2	1,876.9	1,984.1	2,082.9	2,080.5
Education Budget Ratio (%)	20.0	20.2	20.1	20.0	20.0	20.6	20.0	20.0

Source: Indonesia Ministry of Education and Culture (2016)

FIGURE 3.13

INDONESIA'S EDUCATION BUDGET



Spending per student has shown steady growth, with primary level expenditure rising from USD808.47 (in purchasing power parity terms) in 2007 to USD1,291.29 in 2014, while at secondary level it rose from USD667.88 in 2007 to USD1,046.68 in 2014, according to UNESCO[6]. However, despite the headline-grabbing 20% benchmark, Indonesia's spending-to-GDP ratio for education remains relatively small. Southeast Asia's biggest economy spent 2.3% of GDP on non-tertiary education in 2012, only slightly more than Russia (2.2% of GDP), and less than the Republic of Korea's 3.2% of GDP, according to the OECD. The proportion of spending relative to GDP is also lower than many of Indonesia's regional peers. In Vietnam, education spending was 6.3% of GDP in 2012. The National Budget for Education in 2010–17 is shown in Table 3.1 and Figure 3.2 [5].

Figure 3.13 shows the portion of education budget increasing under the regional and district government with the aim to effectively boost the local autonomy. Additional spending is available under the School Operational Assistance program introduced in 2005, with this coming directly from central government on a "per student" basis as well as under district support programs.

Most Indonesian children attend state-run primary schools (83.2% in 2010), but the proportion in private institutions rises as children get older. At junior high level, the percentage in public schools drops to 63.7%

[6] Oxford Business Group. https://oxfordbusinessgroup.com/overview/turning-it-around-through-substantial-investments-ministry-education-path-producing-more-educated

[7] Indonesia Education Budget (2010 – 2017) from The Management of National Education in 2014/2015 at a Glance. Division of Utilization and Services by Indonesia Ministry of Education and Culture (2016).

and by upper secondary level it is 50.2%. Key exams take place at the end of primary school and junior high, with the latter used to stream children into either academic or vocational studies. In an attempt to address skills shortage, the government has been encouraging young people to enrol in technical and vocational training as an alternative to more traditional academic study.

Under the Teacher and Lecturer Law implemented in 2005, professional teachers are those who hold a bachelor's degree and pass a teaching competency test. Those who received the designated qualifications would receive an additional allowance to effectively double their salary. The initiative proved successful in increasing the level of training, with the majority of the country's 2.6 million teachers taking steps toward being assigned with professional status. However, a 2014 World Bank study concluded that the program did not significantly improve learning outcomes, and made recommendations for increased monitoring across the teacher training program and improving teacher selection process [1].

The increased salaries paid under the program also put a strain on the education budget, according to the study. In 2013, 13% of the entire education budget - nearly USD4 billion - went to teachers' allowances.

Nevertheless, the World Bank praised the initiative for its goal to "re-professionalise a de-professionalized occupation", and noted that teaching reforms also depend on teacher motivation. It welcomed the creation of cluster-based teacher working groups and attempts to bring together parents, schools, and communities to help children.

Some parts of the direction of Education Development Year 2015–19 are the same as breakthrough policies used by the Ministry of Education and Culture in 2010–14. The breakthrough policies were continuously implemented and enjoyed success with some modification during 2015–19 [1]. The direction of policies are as follows:

i) Increase teachers'/trainers' qualificatioan and certification

ii) Improve the quality of education at the public and private teacher training colleges (LPTK) and their graduates

iii) Empower school principles and school supervisors

iv) Implement education methodology for good morals and character building

v) Develop education methodology that builds individuals that are creative, inovative, sportive, and entrepreneurial

vi) Use the Integrated Education Assessment System well

vii) Empower and expand the use of ICT in education

viii) Provide inexpensive textbook

ix) Provide sufficient fund for education, research, and community service

x) Empower society, business, and industry

xi) Strengthen and expand nonformal and informal education

xii) Reform the bureacracy

xiii) Coordinate among ministries and/or government agencies, and between central and local governments

xiv) Accelerate education development in remote and less developed areas as well as for victims of natural disaster

xv) Synchronize education and the needs of businesses and industries

Objectives and Desired Outcomes

i) To make available and build the capacity of all provinces, districts, and cities to implement Early Childhood Education (ECE) services

ii) Guarantee for all to a good quality basic education in all provinces, districts, and cities

TABLE 3.8

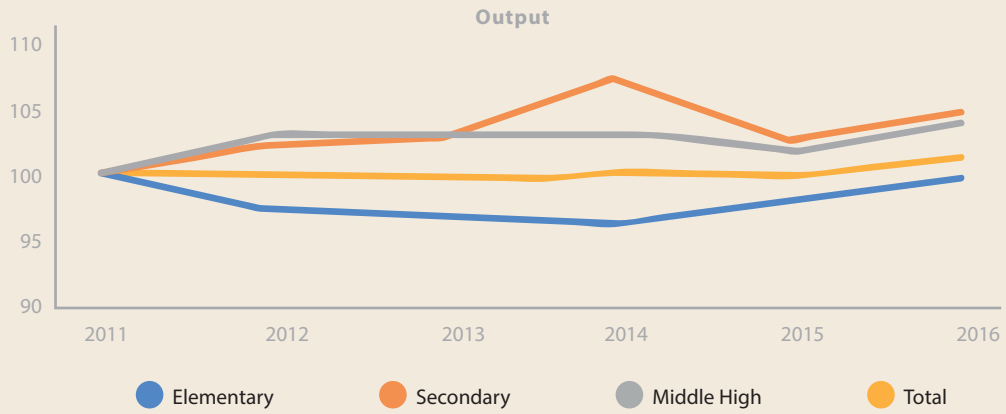
OUTPUT[8]: NUMBER OF SERVICES DELIVERED (SCHOOLS)

Number of Services Delivered (Index, 2011 = 100)	2011	2012	2013	2014	2015	2016
Elementary	100	97.52	96.72	96.07	97.53	99.44
Secondary	100	102.13	102.92	107.30	102.75	104.76
Middle high	100	102.65	102.97	102.81	102.09	104.09
Total	100	99.74	99.63	100.24	99.60	101.55

Number of Services Delivered (Millions)	2011	2012	2013	2014	2015	2016
Elementary	30.78	30.04	29.79	29.60	30.05	30.65
Secondary	12.17	12.43	12.53	13.09	12.56	12.81
Middle high	9.28	9.53	9.56	9.54	9.48	9.67

FIGURE 3.14

OUTPUT: NUMBER OF SERVICES DELIVERED (SCHOOLS)



iii) Availability and reachability of quality secondary education in all provinces, districts, and cities

iv) Availability and reachability of relevant, quality, and internationally competitive higher education in all provinces

v) Availability and reachability of quality and relevant adult learning and continuing education that meet society's needs

vi) Reliable management system that guarantees prime services in national education

Data for Productivity Calculations

Output

Data used in this analysis for all levels of schooling for output and input were easily available. Output shows that number of enrolment and growth for elementary, secondary, and middle high has been increasing, especially since 2014 with the government headed by President Joko Widodo (Table 3.8 and Figure 3.14).

[8] Data number of services delivered (in million) from Ministry of Education Report 2010–16 by Indonesia Central Bureau of Statistics (2017).

TABLE 3.9

LABOR[9] INPUT COSTS (SCHOOLS)

Labor Input Costs (Index, 2011 = 100)	2011	2012	2013	2014	2015	2016
Elementary	100	109.56	105.52	115.61	107.67	109.82
Secondary	100	110.46	108.68	133.44	113.15	115.41
Middle high	100	111.69	118.07	147.55	119.33	121.72
Total	100	110.25	110.53	128.89	112.05	114.29

Labor Input Costs (Trillion)	2011	2012	2013	2014	2015	2016
Elementary	35.05	15.51	28.30	25.44	32.80	36.08
Secondary	13.19	10.04	10.98	17.90	24.42	26.87
Middle high	15.17	14.60	15.75	19.66	33.95	37.34
Total	63.42	40.15	55.02	62.99	91.17	100.29

FIGURE 3.15

LABOR INPUT COSTS (SCHOOLS)

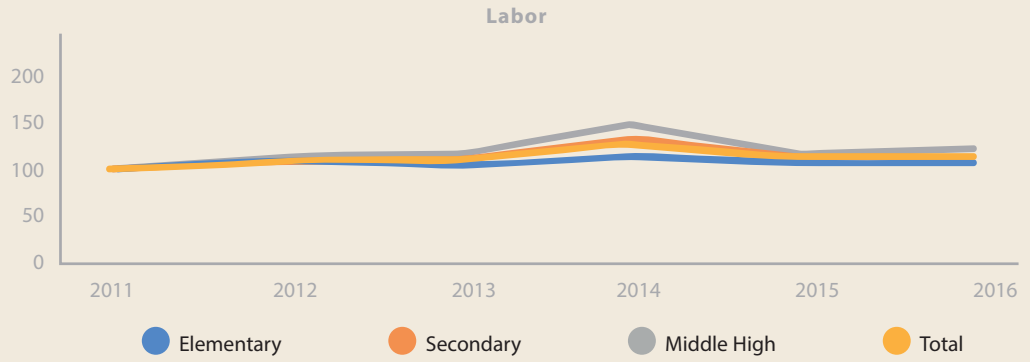


TABLE 3.10

CAPITAL[10] INPUT COSTS (SCHOOLS)

Capital Input Cost (Index, 2011 = 100)	2011	2012	2013	2014	2015	2016
Elementary	100	98.47	92.59	88.02	84.40	84.11
Secondary	100	101.53	96.84	94.74	87.65	87.34
Middle high	100	100.32	100.52	98.03	89.02	88.71
Total	100	100.32	89.90	81.28	64.39	63.72

Capital Input Costs (Trillion)	2011	2012	2013	2014	2015	2016
Elementary	25.48	25.83	25.79	25.78	25.72	26.24
Secondary	12.23	12.78	12.94	13.31	12.82	13.07
Middle high	10.00	10.33	10.99	11.27	10.65	10.86
Total	47.71	48.94	49.72	50.36	49.18	50.17

[9] Data labor costs (in trillion) from Ministry of Education Report 2010–16 by Indonesia Central Bureau of Statistics (2017).
[10] Data capital costs (in trillion) from Ministry of Education Report 2010–16 by Indonesia Central Bureau of Statistics (2017).

FIGURE 3.16

CAPITAL INPUT COST (SCHOOLS)

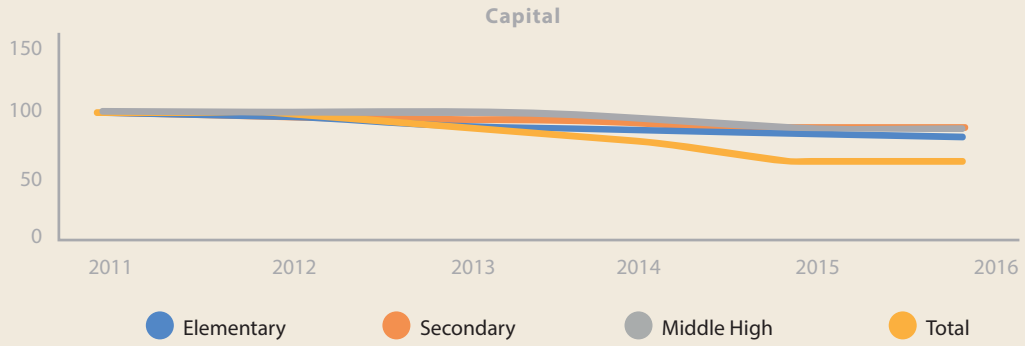


TABLE 3.11

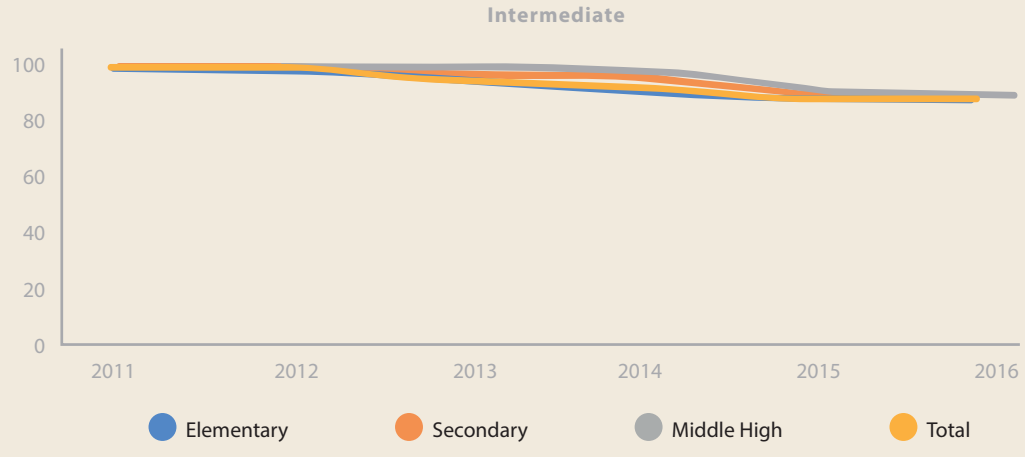
INTERMEDIATES[11] INPUT COSTS (SCHOOLS)

Intermediates Input Costs (Index, 2011 = 100)	2011	2012	2013	2014	2015	2016
Elementary	100	98.47	92.59	88.02	84.40	84.11
Secondary	100	101.53	96.84	94.74	87.65	87.34
Middle high	100	100.32	100.52	98.03	89.02	88.71
Total	100	99.64	95.34	91.84	86.20	85.90

Intermediates Input Costs (Trillion)	2011	2012	2013	2014	2015	2016
Elementary	12.74	12.92	12.90	12.89	12.86	13.12
Secondary	6.11	6.39	6.47	6.66	6.41	6.54
Middle high	5.00	5.16	5.49	5.63	5.32	5.43
Total	23.86	24.47	24.86	25.18	24.59	25.08

FIGURE 3.17

INTERMEDIATES INPUT COSTS (SCHOOLS)



[11] Data intermediates (in trillion) from Ministry of Education Report 2010–16 by Indonesia Central Bureau of Statistics (2017).

TABLE 3.12

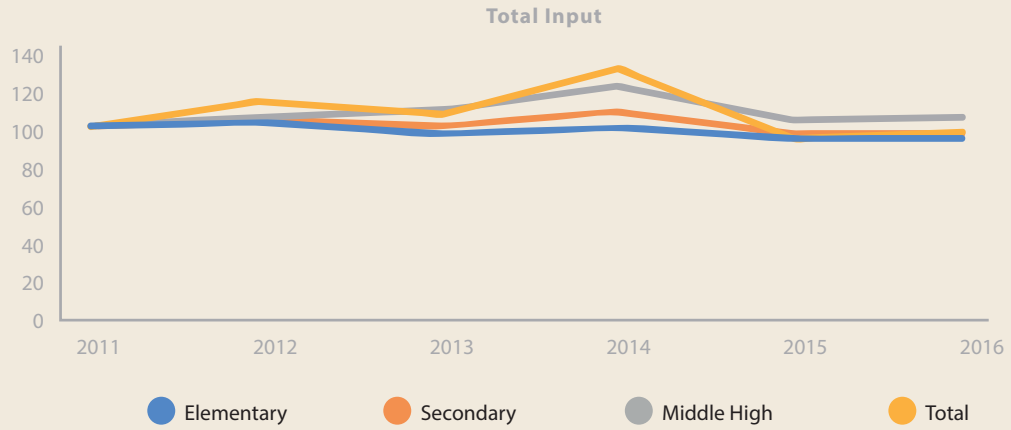
TOTAL INPUT COSTS (SCHOOLS) (TRILLION)

Total Inputs	2011	2012	2013	2014	2015	2016
Labor	63.42093	40.14758	55.02357	62.99189	91.17054	100.2876
Capital	47.71	48.94	49.72	50.36	49.18	50.17
Intermediates	23.85673	24.46985	24.86175	25.18128	24.5924	25.08425
Total	134.9911	113.5571	129.6088	138.5357	164.9477	175.5403

Total Input (Index, 2011 = 100)	2011	2012	2013	2014	2015	2016
Elementary	100.0	103.8	98.3	99.4	94.3	94.9
Secondary	100.0	105.3	101.5	108.4	96.4	97.3
Middle high	100.0	106.0	109.1	121.0	103.4	104.7
Total	100.0	114.9	108.9	130.6	94.8	97.6

FIGURE 3.18

TOTAL INPUTS INDICES (SCHOOLS)



Inputs

All input costs (labor, capital, and intermediates) were deflated using inverse inflation rate from 2011 to 2016 (Table 3.9 and Figure 3.15).

Labor

Labor costs cover all employees. Labor input has been decreasing since 2011, but began to increase in 2014. This is due to the then new government's policy (Table 3.9 and Figure 3.15).

Capital

Capital cost calculated from the data provided as total budget minus labor and intermediates. The capital cost used was deflated, opposite of historical inflation since 2010. Capital costs encompass new buildings and facilities as well as upgrading and maintaining existing facilities. Capital growth has been almost flat since 2011, but began to rise in 2014 (Table 3.10 and Figure 3.16).

FIGURE 3.19

PUBLIC SCHOOL MFP GROWTH

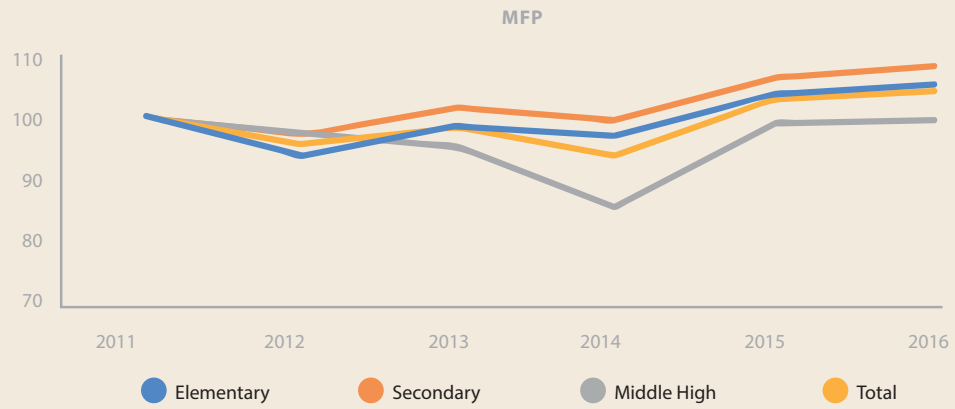
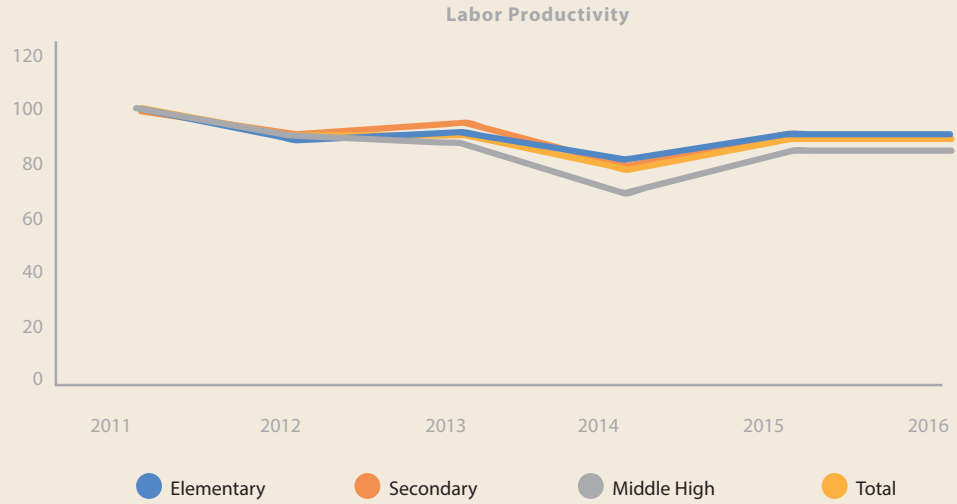


FIGURE 3.20

PUBLIC SCHOOL LABOR GROWTH



Intermediates

Intermediates growth for all indices has been steadily increasing since 2011 (Table 3.11 and Figure 3.17).

Total Inputs

Total inputs are somewhat decreasing although the actual budget increased, except for middle high. This is due to deflation adjustment (Table 3.12 and Figure 3.18).

Productivity and Quality

Productivity

The MFP (Figure 3.19) was decreasing for almost all indices until 2014. From the year, all indices recorded an increase and the total highlights significant improvement. These coincided with the new policies implemented by President Joko Widodo.

FIGURE 3.21

PUBLIC SCHOOL CAPITAL PRODUCTIVITY

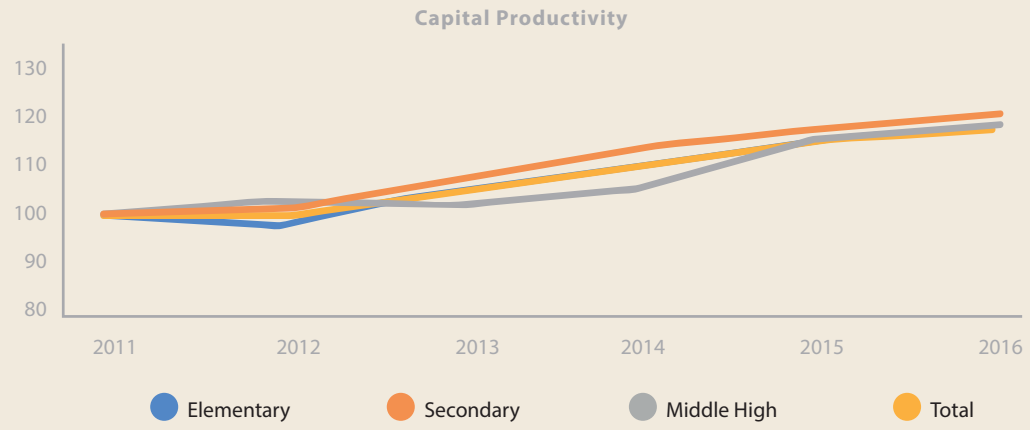


FIGURE 3.22

PUBLIC SCHOOL INTERMEDIATE GROWTH

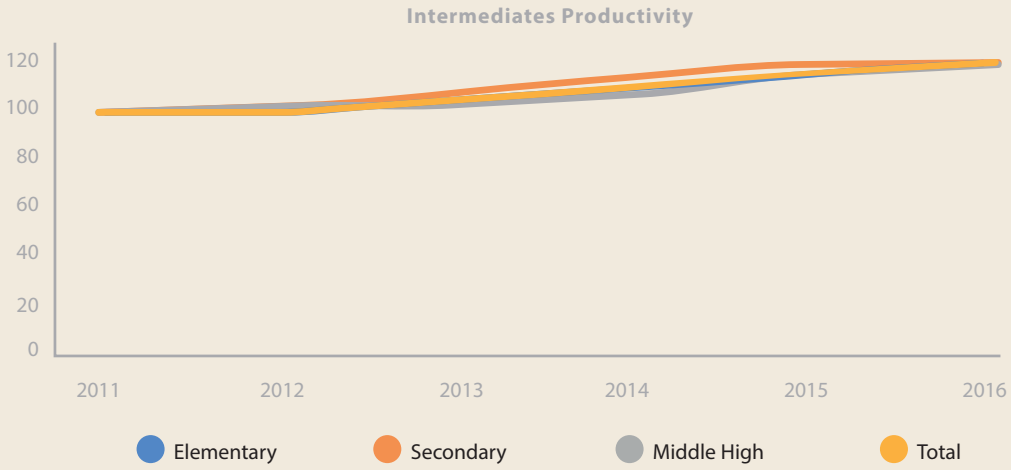


Figure 3.20 on labor productivity shows the same trend, where all indices were on a decrease until the trend begin to reverse in 2014.

Capital productivity in Figure 3.21 sees a steadily rising trend from 2011.

The same continues for intermediates productivity, as shown in Figure 3.22.

Labor productivity and intermediates productivity in general were on the downward trend from 2011–13 and begins to increase from 2014 onwards. Capital productivity however shows a steady increase.

The measures used for input and output as set out in the overview presented a positive and credible trend in MFP for elementary, secondary, middle high, and the total.

Quality

The quality measures presented for level of schooling highlight that a positive overall result for ‘no school’, ‘not finish elementary’, and ‘secondary’. However, for ‘elementary’ and ‘middle high’, the improvement was not encouraging.

Figure 3.24 shows a steady improvement since 2011 in school participation for all indices.

FIGURE 3.23

PUBLIC SCHOOL QUALITY

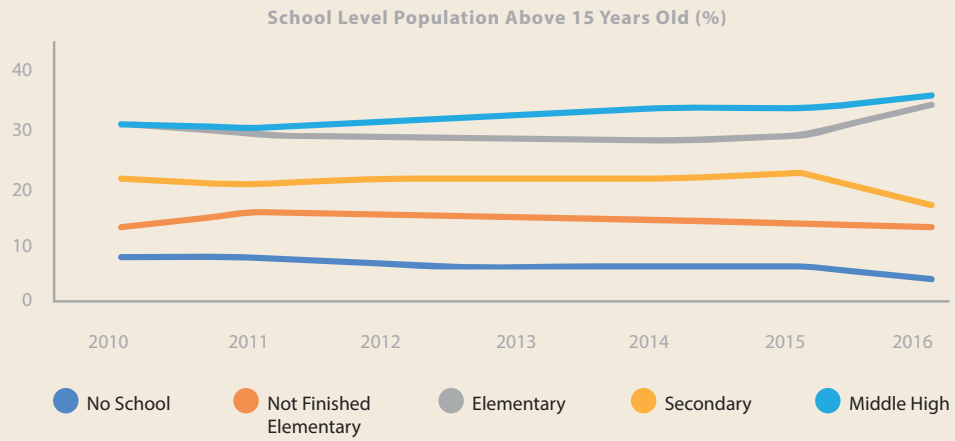
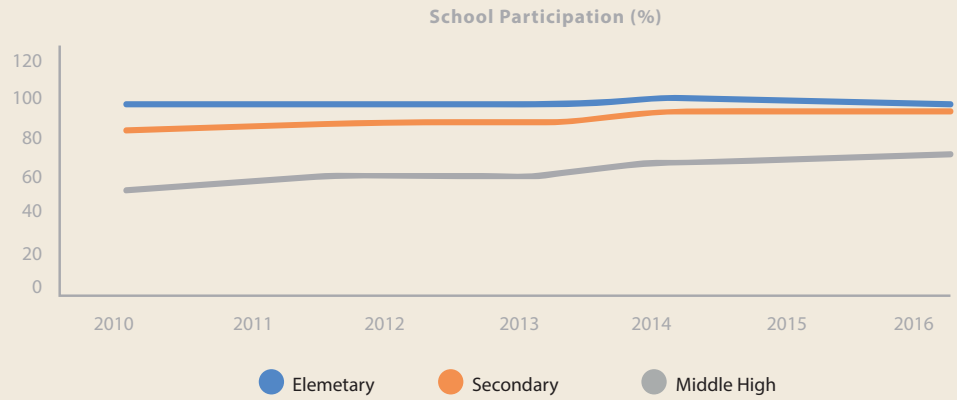


FIGURE 3.24

PUBLIC SCHOOL PARTICIPATION



While Figure 3.25 presents the steady improvement (decreasing) since 2011 of illiteracy rate for all indices.

The positive change in productivity appears to be due to policy changes that has been continuously improved and refocused from time to time.

Improving Productivity Measures

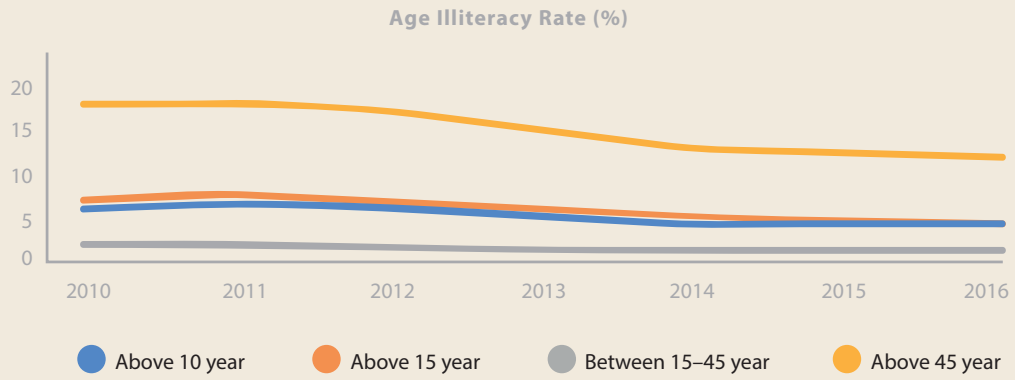
By looking at Figures 3.23, 3.24, and 3.25, one can suggest that the quality of schools has not shown clear improvement. The continuing implementation of policy needs to be evaluated and identified to see what works, what doesn't, and what needs to be replaced.

Conclusion

Overall, public schools in Indonesia have been improving since 2011 and the improvement has been more positive with the new government since 2014. However, these improvements are still far behind the goals stated in the Sustainable Development Goals (SDG) and behind several ASEAN countries. Therefore, policies and programs need to be evaluated and realigned as to speed up the overall education productivity and education quality in order to achieve SDG and elevate national competitiveness.

FIGURE 3.25

PUBLIC SCHOOL AGE ILLITERACY RATE (%)



Even though Indonesia has made great progress in reducing poverty - the proportion of the population living below the poverty line fell to 15.9% in 2012, according to the ADB - the costs associated with schooling remain a problem. Joko Widodo's government has attempted to address the issue through its Indonesia Smart Card initiative. One of its earliest policies launched upon taking office is the program that provides fees and stipends to children from low-income backgrounds to ensure they complete their schooling. The School Operational Assistance program has also helped millions of poor children to stay in school by paying their fees - from 34.5 million in 2005 to 44.7 million in 2012. The government is also working closely with NGOs and corporate foundations to raise the standards in Indonesian schools, especially for the most disadvantaged.

Indonesia has recognized the challenges posed by an education system that is struggling to equip its students for the fast-changing demands of the global economy. The adoption of the ASEAN Economic Community in 2016, theoretically enabling the free movement of labor, will increase the pressure on Indonesia to compete effectively, provide opportunities for its people, and nurture human capital with the skills to feed its economy. In an archipelago of more than 17,000 islands and 250 million people, change will take time, but the country is on the right path.

CHAPTER 4

MALAYSIA

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Manager
Malaysia Productivity Corporation

Introduction

Productivity represents the relationships between inputs and outputs in the production process. As a practical concept, productivity helps define both the scope for raising living standards and the competitiveness of an economy. Productivity has, therefore, an increasing role in formulating and assessing government policy. Public-services productivity is a measure of how well each government agency utilizes input resources (labor, materials, machines, etc.) into goods and services.

The current Malaysia fiscal environment and ongoing demographic challenges make the task of improving public-services productivity even more pressing. Austerity also provides the opportunity for governments to be creative and disruptive in their drive to change the way they do business, more so than in times of relative economic stability. The private sector also rely on the public sector for services and for clear, consistent, and appropriate regulations. The strength of implementation of these activities delivered by the public service will directly affect the performance of the private sector.

The Importance of Public-Services Productivity

The public sector faces a productivity imperative to strengthen its service delivery to the people - growth in various programs, new national priorities, and the people's demand for a greater level of choices, convenience, and customer service. All these require the government to do more and doing it even better in an era of doing its best within the same level of spending [1]. Public-sector spending is always a starting point for understanding public-sector productivity. While the focus on cost is important, particularly during periods of fiscal challenges, productivity is also about understanding how to optimize inputs into service delivery outcomes [2]. Productivity is ultimately related to money, and money does much to explain how and what the government has delivered in the best interests of the *rakyat* (people). The appraisal of the governmental performance is necessary to explain the rational use of public resources within the country for the rakyat's benefit as well.

The public sector is the largest employer in the country at the federal, state, municipal, and statutory body levels. It is therefore a major service provider, particularly business services (which also affect the cost of resource inputs, such as labor or technology) and social services (which affect labor quality). In order to operate, the public sector has to rely on tax resources. Public expenditure is financed largely by taxation, and taxpayers have an interest in how the government uses the proceeds from their tax payments (Table 4.1). Similarly, users too have a right to information about the quantity and quality of the services offered. The performance of the public sector is therefore of great interest to taxpayers, those who use its services, and those who provide the services in order for the government to assess the success of its performance.

The importance of productivity in the public sector should be given due emphasis as the sector contributes significantly to the Malaysian economy and society [3]. This sector, comprising 1.61 million employees, contributed to 9% of Malaysia's total employment. In 2014, the government spent MYR219.6 billion operating expenses paid to public service emolument (30.1%), supply and services (15.6%), subsidies (18.1%), and other expenses (32.6%) (Figure 4.1).

TABLE 4.1

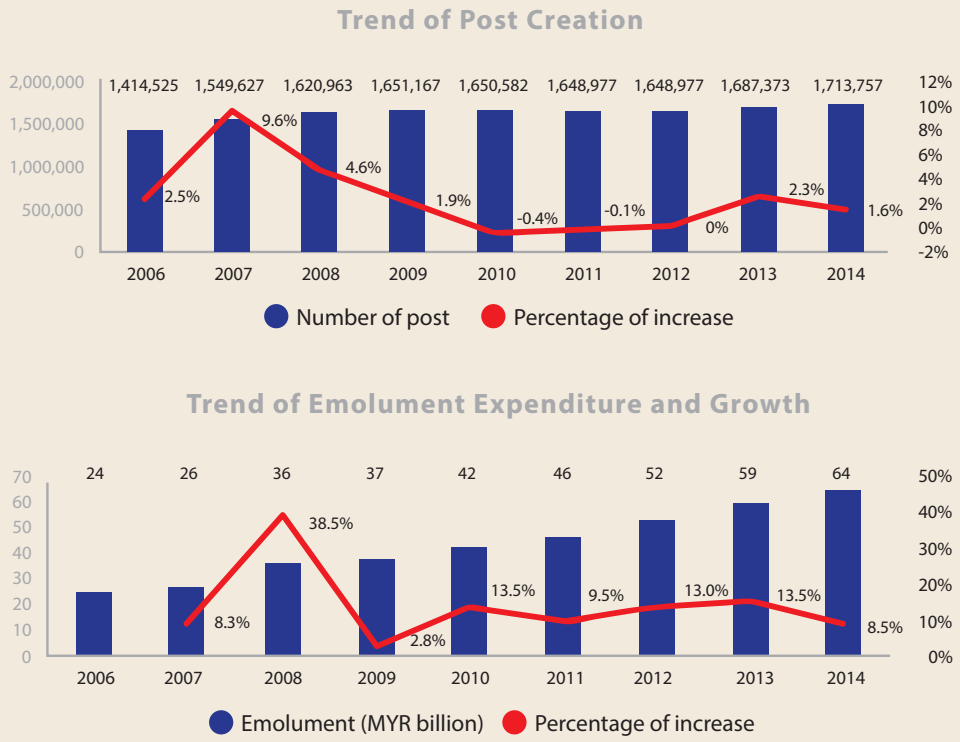
PUBLIC-SERVICES' ACCOUNTS (MYR BILLION)

	2012	2013	2014	2015	2016
Revenue	207.9	213.4	220.6	219.1	217.9
Expenditure	252.4	253.5	259.1	257.8	257.2
Operating Expenditure	205.5	211.3	219.6	217.0	211.2
Development Expenditure	46.9	42.2	39.5	40.8	46.0
Overall Surplus/Deficit	-42.0	-38.6	-37.4	-37.2	-38.5

Source: Department Statistic, Malaysia

FIGURE 4.1

TREND OF EMOLUMENT AND POST CREATION



Source: JPA Annual Report, various issues from Public Service Department, Economic Report, and Ministry of Finance

This will lead to a huge impact on the productivity performance of the country as the sector accounted for nearly 30% of Malaysia's GDP (Figure 4.1). The consistency of government spending as an element of growth is also in line with rising GDP, as noted under Eleventh Malaysia Plan, 2011–20 (Figure 4.2).

Scope of Study

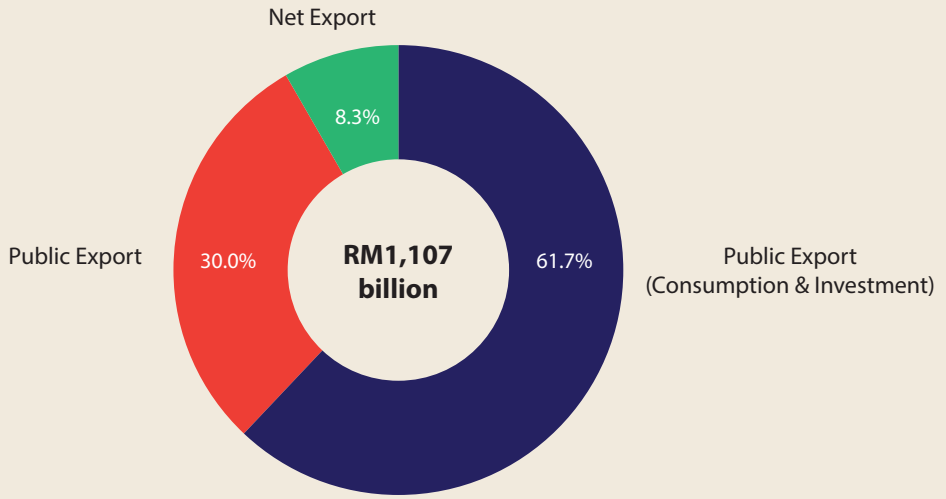
The study covers two main sectors in the public services:

- Public hospitals (Primary hospital (health and dental clinics) and secondary hospitals)
- Public schools (Preschool, primary, and secondary school)

These sectors were selected as they represent 40.7% of the total public service and 33% of the federal government operating expenditures in 2014. The analysis covers the period of 2010–14.

FIGURE 4.2

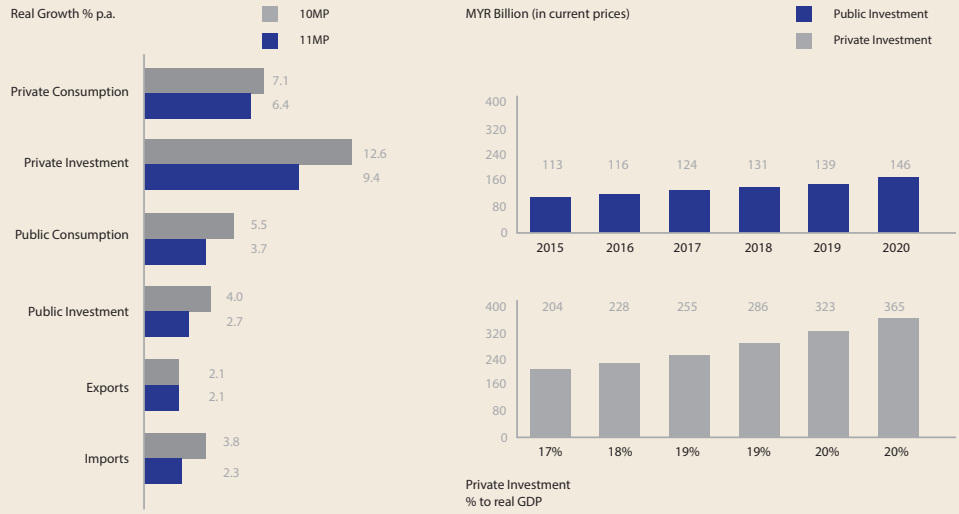
SHARE OF GROSS DOMESTIC PRODUCTS BY EXPENDITURE COMPONENTS IN 2016



Source: Central Bank of Malaysia and Department of Statistics, Malaysia

FIGURE 4.3

GDP EXPENDITURE COMPONENTS (2011–20)



Source: Eleventh Malaysia Plan 2016–20, Economic Planning Unit, Prime Minister Department

Sources of Data

For this study, the primary data source is based on the official publication of both the Ministries of Health and Education, Department of Statistics, and Accountant General Malaysia. Data labor which uses the figure of professional and support staffs are obtained from the respective ministries, while the data of emolument, expenditure, and capital assets are obtained in the form of current value level under the code of 10,000, 20,000, and 30,000, respectively. The wage deflator is calculated based on the changes of emolument per employee with

the price of wage rate 2010 (based year). The Domestic Production Index for the year 2010 to 2014 is used as the deflators for the intermediate inputs spending which were publish by Department of Statistics.

In addition, Consumption of Fixed Capital (COFC) at real prices is published by the Department of Statistics, Malaysia (DOSM). COFC is a flow concept and it is the value of the assets used in the production process during accounting. Challenges encountered during the preparation were DOSM's only published COFC data at sector level. The estimation of COFC according to subsector is based on the annual expenditure share and depreciation rate of the assets according to the subsector.

Selection of output for public hospitals and schools is based on the relationship between outputs and inputs. However, in relation to the public sector, the community and policymakers expect outputs to be produced for some broad social gain and not just narrow economic gain, or to reflect what is required and not just what is easy to accomplish.

Inputs comprise the volume of labor, goods and services, and capital consumption used in delivering public-sector services. These series of input used for the measurement is overall estimate of the volume of inputs used in each of the activities identified. A more detailed explanation on these are as follows:

i) Labor input, such as hospital consultants, registrars, nurses, technical staff, ambulance staff and support, general medical practitioners (GPs), and practice staff

ii) Goods and services input, such as pharmaceutical services, dental and ophthalmic services, and intermediate consumption by hospitals and GP practices. This component also includes GP prescribed drugs

iii) Capital consumption - this is estimated based on annual depreciation rate and asset investment for each public hospitals and schools

Table 4.2 shows the identified output and input factors for each of the sector.

TABLE 4.2

DATA USED IN PRODUCTIVITY MEASUREMENT OF PUBLIC HOSPITAL AND SCHOOLS

Sector	Activity	Output	Input
Healthcare	Hospital • Primary • Secondary	• Number of outpatients • Number of inpatients • Number of day-care patients	1. Number of labor and emolument by job: • Medical staff • Nonmedical staff 2. Goods and services 3. Capital consumption
	Clinic • Health and dental clinic	• Number of patients	1. Number of labor and emolument by job: • Medical staff • Nonmedical staff 2. Goods and services 3. Capital consumption
Public Schools	School • Preschool • Primary • Secondary	• Number of students	1. Number of labor and emolument by category: • Teaching staff • Nonteaching staff 2. Goods and services 3. Capital consumption

Findings

Public-service productivity is not a measure of production. It is a measure of efficiency. It measures the volume of what is produced per unit of input. Inputs are capital investment, labor, and the interaction between both.

Labor productivity measures how much is produced per unit of labor. Capital productivity measures how much is produced per unit of capital. Total productivity measures changes that are not directly attributed to either capital or intermediate inputs and labor, which can be ascribed to changes, such as the application of technology to improve production and system as well as innovation and skill workforce. None of these measures are "pure" in themselves. For example, labor productivity may change due to how well capital assets and technology are utilized, without any change in the effort or capability of workers.

Productivity is not a complete performance management tool. There are other indicators that can evaluate performance. Given the differences between productivity and other performance measures, users of these statistics should be clear on the answers they seek.

Productivity can increase due to either:

• An increase in output, holding input constant

• A decrease in input, holding output constant

• Output growth increasing faster than input growth

• Decline in output growth less than the decline in input

A change in the productivity of the public schools or hospitals reflects only the growth in outputs or inputs for that sector. Output growth for these sectors will have flow on effects to other industries, such as a more educated or healthy workforce, which may enable wider productivity gains.

Public Hospitals

Public hospitals in Malaysia are governed by the Ministry of Health (MOH). The MOH is specifically responsible for formulating the strategic direction of public hospitals in relation to the National Missions Thrust. Broadly, the public hospitals can be further separated into primary health services (health and dental clinics) and secondary health services (hospital).

The primary healthcare services (PHS) is established as two budget programs - Program 2: Public Health (also referred as primary medical health) and Program 5: Dental Health (or oral health). The objectives for Public Health are i) to provide public health services that encompass promotion, prevention, control, treatment, and rehabilitation to the public for a better standard of health and to prevent the spread of diseases, and ii) to ensure that the community has access and enjoy the healthcare facilities to encourage active participation for positive lifestyle.

As for Dental Health, the objective is to improve the oral health of Malaysians so that they can achieve and maintain a healthy live that is both economically and socially productive.

The Secondary Care Services delivery objective as stated in the MOH budget Program 3 is "to provide comprehensive medical services, effective, accessible, comfortable, suitable technology and high quality standards of excellence to patients in need of services" [3]. This is implemented in the form of 30 budgeted activities with their specific objectives. Activity 1 and Activity 2 are overheads as they are allocations for the management of head and state offices and hospital management services.

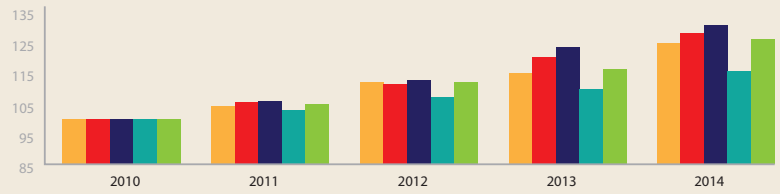
MOH has maintained the nation's hospitals (excluding special medical institutions) at 132 hospitals and clinics since 2011 (introducing a new one in 2011). The number of beds has increased from 33,211 in 2010 to 34,576 in 2013, recording a yearly increase of 1.4%.

Output and Input for Public Hospitals

Over the period 2010–14, health clinics grew the fastest, by 31.1% in total, an annual average of 7% and contributing to higher primary healthcare output growth. Over the entire period, it grew by 28.2% with an annual average growth of 6.4%.

FIGURE 4.4

OUTPUT INDEX OF HEALTHCARE (2010–14)



	2010	2011	2012	2013	2014
Secondary Healthcare	100.0	104.4	112.0	115.0	125.0
Primary Healthcare	100.0	105.4	111.6	120.8	128.2
Health Clinics	100.0	106.0	112.7	123.4	131.1
Dental Clinics	100.0	103.1	107.0	109.8	115.9
Total Healthcare	100.0	104.6	111.9	116.3	125.8

Note: Index numbers, 2010=100

TABLE 4.3

OUTPUT GROWTH OF PUBLIC HOSPITALS (2010–14)

	2011	2012	2013	2014	Average Growth
Secondary healthcare	4.4%	7.3%	2.7%	8.7%	5.8%
Primary healthcare	5.4%	5.8%	8.3%	6.1%	6.4%`
- Health clinics	6.0%	6.3%	9.6%	6.2%	7.0%
- Dental clinics	3.1%	3.8%	2.5%	5.6%	3.8%
Total public hospitals	4.6%	7.0%	3.9%	8.1%	5.9%

The secondary healthcare recorded the growth of 25% for the same period with the average growth of 5.8%. The healthcare output is strongly affected by the number of patients, which has been on a rise over the period.

Inputs of Public Hospitals

Healthcare inputs is similar to public schools, with three components: labor (including doctor, nurses, and staff), goods and services (e.g., support materials and electricity), and capital services (e.g., the flow of services provided by a medical equipment or building in a given period).

Expenditure on labor and goods and services is measured in current prices (what was actually paid). Figures for capital consumption for healthcare are estimates based on official national capital consumption for public service.

Figure 4.5 highlights that over the period 2010 to 2014, the volume of healthcare inputs increased by 11.4%, an annual average increase of 11.4%. Input growth was particularly high in 2012, with annual growth rates of 10.3%. Only in 2013, the inputs recorded the negative growth of -2.7%.

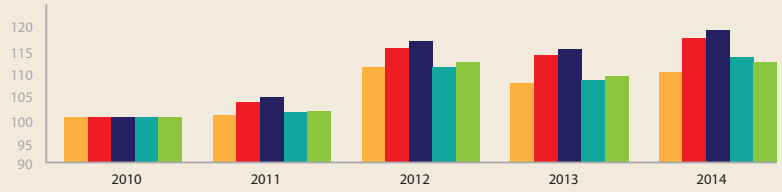
The health clinic recorded the higher input at 18.4% over the same period with an annual growth of 17.7%. This was contributed to higher input growth in primary healthcare at 17% over the period. The trend for secondary healthcare was consistently upward, except for 2013 with a marginal decrease of 3.1%. The annual average the input of secondary healthcare grew at 9.7% during 2010–14.

Labor Productivity Index of Public Hospitals

Labor productivity in public hospitals is driven by two key sectors, namely primary and secondary healthcare. In 2010–14, the labor productivity index dropped by 2.4%, at the annual average growth of -0.6%. The

FIGURE 4.5

INPUT INDEX OF HEALTHCARE (2010–14)



	2010	2011	2012	2013	2014
Secondary Healthcare	100.0	100.4	110.4	107.1	109.6
Primary Healthcare	100.0	103.1	114.7	112.8	117.0
Health Clinics	100.0	103.9	116.0	114.3	118.4
Dental Clinics	100.0	100.6	110.4	108.0	112.5
Total Healthcare	100.0	101.1	111.5	108.5	111.4

Note: Index numbers, 2010=100

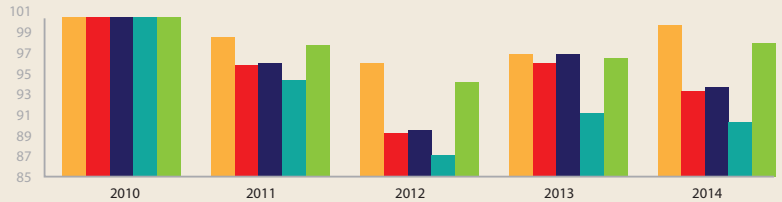
TABLE 4.4

INPUT GROWTH OF PUBLIC HOSPITALS (2010–14)

	2011	2012	2013	2014	Average Growth
Secondary healthcare	0.4%	10.0%	-3.1%	2.3%	9.7%
Primary healthcare	3.1%	11.2%	-1.6%	3.7%	16.5%
- Health clinics	3.9%	11.6%	-1.5%	3.6%	17.7%
- Dental clinics	0.6%	9.8%	-2.2%	4.2%	12.3%
Total public hospitals	1.1%	10.3%	-2.7%	2.7%	11.4%

FIGURE 4.6

LABOR PRODUCTIVITY INDEX OF PUBLIC HOSPITALS (2010–14)



	2010	2011	2012	2013	2014
Secondary Healthcare	100.0	98.1	95.6	96.6	99.2
Primary Healthcare	100.0	95.4	89.1	95.7	93.1
Health Clinics	100.0	95.7	89.5	96.5	93.4
Dental Clinics	100.0	94.2	86.9	91.0	90.2
Total Healthcare	100.0	97.4	94.0	96.2	97.6

Note: Index numbers, 2010=100

TABLE 4.5

LABOR PRODUCTIVITY GROWTH OF PUBLIC HOSPITALS (2010–14)

	2011	2012	2013	2014	Average Growth
Secondary healthcare	-1.9%	-2.5%	0.9%	2.8%	-0.2%
Primary healthcare	-4.3%	-6.5%	7.8%	-3.2%	-1.6%
- Health clinics	-5.8%	-7.7%	4.7%	-0.9%	-2.4%
- Dental clinics	-4.6%	-6.7%	7.4%	-2.7%	-1.6%
Total public hospitals	-2.6%	-3.5%	2.4%	1.4%	-0.6%

public hospitals recorded positive growth for the two years at 2.4% in 2013 and 1.4% in 2014. The main contributors to this growth was secondary healthcare growing at 2.8% to 99.2 labor productivity index level.

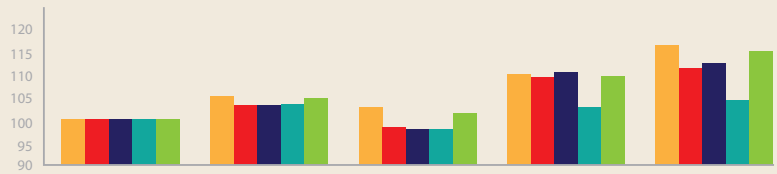
The labor productivity of primary healthcare declined at 6.9% over the study period. Labor productivity performance within this primary healthcare has contributed negatively to the performance of sector. The dental clinic and health clinics registered labor productivity growth of -0.9% and 2.7% to an index of 93.1 and 90.2, respectively.

Capital Productivity Index of Public Hospitals

Capital productivity index of total public hospitals recorded an increase of 14.4% in 2010–14, with the annual average growth 3.5%. The highest contribution to sector was the secondary healthcare with an increase of 15.8% over the same period. This program recorded the average growth of 3.8% during the period.

FIGURE 4.7

CAPITAL PRODUCTIVITY INDEX OF HEALTHCARE (2010–14)



	2010	2011	2012	2013	2014
Secondary Healthcare	100.0	104.7	102.3	109.5	115.8
Primary Healthcare	100.0	102.8	97.9	108.5	110.7
Health Clinics	100.0	102.6	97.7	109.6	111.9
Dental Clinics	100.0	103.2	97.6	102.4	104.0
Total Healthcare	100.0	104.2	101.2	109.1	114.4

Note: Index numbers, 2010=100

TABLE 4.6

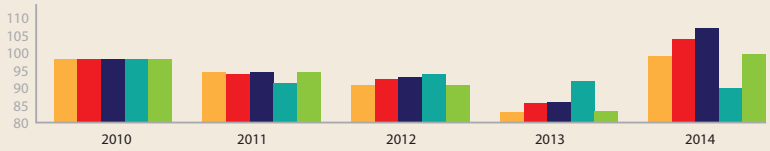
CAPITAL PRODUCTIVITY GROWTH OF HEALTHCARE (2010–14)

	2011	2012	2013	2014	Average Growth
Secondary healthcare	4.7%	-2.3%	7.1%	5.7%	3.8%
Primary healthcare	2.8%	-4.8%	10.9%	2.0%	2.7%
- Health clinics	2.6%	-4.8%	12.2%	2.1%	3.0%
- Dental clinics	3.2%	-5.4%	4.9%	1.6%	1.1%
Total public hospitals	4.2%	-2.9%	7.9%	4.8%	3.5%

The primary healthcare registered the capital productivity growth of 10.7% from capital productivity index of 100 in 2010 to capital productivity index of 110.7 in 2014 (Figure 4.7). Both programs under primary healthcare contributed positively over the period with healthcare clinics registered growth of 11.9% and dental clinics at 4%. In terms of average growth of capital productivity, both programs, health clinics and dental clinic recorded growth at 3% and 1.1%, respectively.

FIGURE 4.8

INTERMEDIATE PRODUCTIVITY INDEX OF PUBLIC HOSPITALS (2010–14)



	2010	2011	2012	2013	2014
Secondary Healthcare	100.0	95.9	91.6	83.1	100.9
Primary Healthcare	100.0	95.4	93.5	85.6	106.8
Health Clinics	100.0	96.0	93.9	86.2	109.8
Dental Clinics	100.0	92.5	95.5	93.1	91.2
Total Healthcare	100.0	95.9	91.9	83.7	102.1

Note: Index numbers, 2010=100

TABLE 4.7

INTERMEDIATE PRODUCTIVITY GROWTH OF PUBLIC HOSPITALS (2010–14)

	2011	2012	2013	2014	Average Growth
Secondary healthcare	-4.1%	-4.5%	-9.3%	21.5%	0.9%
Primary healthcare	-4.6%	-2.0%	-8.5%	24.8%	2.4%
- Health clinics	-4.0%	-2.2%	-8.2%	27.4%	3.3%
- Dental clinics	-7.5%	3.3%	-2.5%	-2.1%	-2.2%
Total public hospitals	-4.1%	-4.2%	-8.9%	21.9%	1.2%

Intermediate Productivity Index of Public Hospitals

In 2010–14, the total public hospitals intermediate productivity index registered a marginal increase of 2.1% and an annual average growth of 1.2%.

Both the secondary and primary healthcare programs recorded negative growth over the period of the first three years. In 2014, both the programs registered a growth of 0.9% and 6.8% with an annual average growth of 0.9% and 2.4%, respectively.

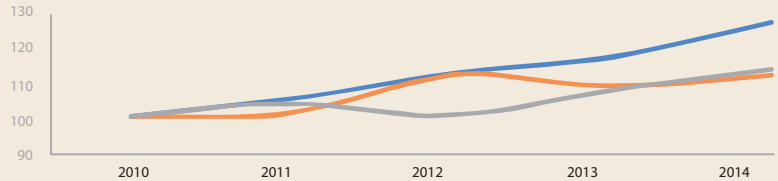
Total Productivity Index of Public Hospitals

Public hospitals are the second single largest area of spending. Output growth has been fairly steady, reflecting rising patient numbers in secondary and primary healthcare. Inputs growth was relatively high in 2012, explained in part by increase in number of staff which led to higher expenditure on emolument.

Public-service hospitals total productivity is estimated by comparing growth in the total quantity of healthcare output provided with growth in the total quantity of inputs used. If the growth rate of output exceeds the growth rate of inputs, productivity increases - meaning that more output is being produced for each unit of input. Conversely, if the growth rate of inputs exceeds the growth rate of output, then productivity will fall, indicating that less output is being produced for each unit of input.

FIGURE 4.9

COMPONENTS OF PUBLIC HOSPITALS TOTAL PRODUCTIVITY (2010–14)



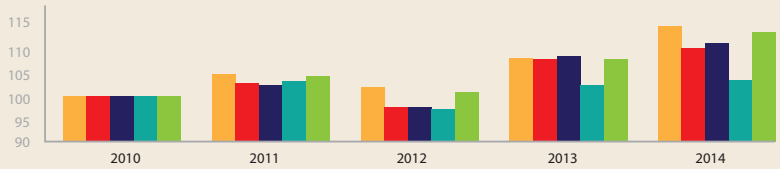
	2010	2011	2012	2013	2014
Output	100.0	104.6	111.9	116.3	125.8
Input	100.0	101.1	111.5	108.5	111.4
Total Productivity	100.0	103.5	100.4	107.2	112.9

	2011	2012	2013	2014	Average Growth
Output	4.6%	7.0%	3.9%	8.1%	5.9%
Input	1.1%	10.3%	-2.7%	2.7%	2.8%

Note: Index numbers 2010 =100 and annual percentage change

FIGURE 4.10

TOTAL PRODUCTIVITY INDEX OF PUBLIC HOSPITALS (2010–14)



	2010	2011	2012	2013	2014
Secondary Healthcare	100.0	104.0	101.5	107.4	114.1
Primary Healthcare	100.0	102.2	97.3	107.1	109.5
Health Clinics	100.0	102.0	97.1	108.0	110.7
Dental Clinics	100.0	102.5	97.0	101.6	103.1
Total Healthcare	100.0	103.5	100.4	107.2	112.9

Note: Index numbers, 2010=100

TABLE 4.8

TOTAL PRODUCTIVITY GROWTH OF HEALTHCARE (2010–14)

	2011	2012	2013	2014	Average Growth
Secondary healthcare	4.0%	-2.4%	5.9%	6.2%	3.4%
Primary healthcare	2.2%	-4.8%	10.1%	2.3%	2.4%
- Health clinics	2.0%	-4.8%	11.2%	2.5%	2.7%
- Dental clinics	2.5%	-5.4%	4.8%	1.4%	0.8%
Total public hospitals	3.5%	-3.0%	6.8%	5.3%	3.1%

In 2010–14, both output and input increased at 25.8% and 11.4%, respectively. The higher increases of output compared to inputs were led to total productivity registering a growth of 12.9%. The increase in healthcare total productivity in 2014 rose from substantially slower inputs growth (2.8%) and relatively strong output growth (8.1%). Total productivity registered negative growth of -3% in 2012 was due to sharp increase of input at 10.3% even though output grew at 7%.

In 2010–12, both secondary and primary healthcare recorded an annual average growth of 3.4% and 2.4%, respectively. This reflects strong output growth and slowing in labor input, particularly in hospitals. All programs registered negative growth in 2012 but there was a sharp increase in input factor especially in emolument and capital investment due to policy changes, upgrading hospitals' facilities and equipment, and opening of a new concept of health clinic 1Malaysia.

Public Schools

Public schools' productivity is estimated by comparing growth in the total amount of public schools output with growth in the total amount of inputs used. Productivity will increase when more output is being produced for each unit of input compared with the previous year. Estimates of output, inputs, and productivity are given as both growth rates which indicate the change from the previous year and as indices show the overall trend over time compared to the base year in 2010.

Output and Input for Public Schools

The programs of school education in Malaysia are divided into preschools, primary schools, and lower and upper secondary schools. The typical schooling age is between 5+ to 6 for preschools, 6+ to 12 for primary schools, 12+ to 17 for lower secondary schools, and 17+ to 19 for upper secondary schools (Form 6). In total, the school learning period for Malaysian - preschools to upper secondary school - is 15 years.

Output measured is the sum of publicly funded public schools delivered using the number of pupils and students. The quantity of public schools includes full-time equivalent (FTE), publicly funded pupils, and students in:

- Preschool education
- Primary school
- Secondary school

TABLE 4.9

GROWTH OF FTE PUPIL/STUDENT NUMBERS BY PROGRAM (2011–14)

	2011	2012	2013	2014
Preschool	9.1%	5.3%	2.1%	2.1%
Primary	-1.3%	-1.7%	-2.4%	-1.2%
Secondary	-0.7%	0.0%	-0.3%	-2.7%

Source: Annual Reports, various issues, Ministry of Education Malaysia [4–6]

TABLE 4.10

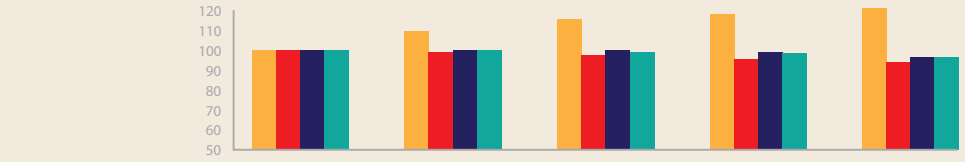
EXPENDITURE–BASED PUBLIC SCHOOLS WEIGHTS (2010–14)

	2010	2011	2012	2013	2014
Preschool	1%	1%	1%	2%	2%
Primary	52%	52%	51%	51%	50%
Secondary	43%	42%	43%	43%	44%

Source: Federal Government Financial Statement, Accountant General's Department of Malaysia [7]

FIGURE 4.11

OUTPUT INDEX OF PUBLIC SCHOOLS (2010–14)



	2010	2011	2012	2013	2014
Preprimary School	100.0	109.08	114.91	117.36	119.86
Primary School	100.0	98.66	96.97	94.61	93.45
Secondary School	100.0	99.25	99.22	98.95	96.28
Total Education	100.0	99.436	98.813	97.506	95.639

Note: Index numbers, 2010=100

TABLE 4.11

OUTPUT GROWTH OF PUBLIC SCHOOLS (2010–14)

	2011	2012	2013	2014	2015	Average Growth
Preprimary schools	9.1%	5.3%	2.1%	2.1%	1.2%	4.0%
Primary schools	-1.3%	-1.7%	-2.4%	-1.2%	-0.9%	-1.5%
Secondary schools	-0.7%	0.0%	-0.3%	-2.7%	-3.4%	-1.4%
Public schools	-0.6%	-0.6%	-1.3%	-1.9%	-2.0%	-1.3%

Table 4.9 presents the growth of pupil/student by program. Out of three programs highlighted, only preschools experienced an increase in the number of pupils, while primary and secondary schools showed a decrease in trend due to the slow growth of population as well as an increase to the number of private school establishments.

Primary schools constitute the largest proportion of expenditure, accounting for around 50% of the total in 2014. Overall, the expenses for primary school program increases on an average of 7% for the period of 2010–14. Conversely, the proportion of expenditure on preschools is the lowest between 1% to 2%, and increasing in trend as the numbers attending rose. Although the numbers of attending declined, the proportion of expenditure on secondary schools has increased marginally by 1% during 2010–14 (Table 4.10).

Output of Public Schools

Figure 4.11 shows the output of public schools is the quantity of Public Schools delivered. The quantity is measured as the number of students' enrolment. Preprimary schools are seen to be driving the growth in output in the last five years of the series. The annual average of total output for the growth of public schools recorded a decline of -1.3% from 2010 to 2014, which also affected the decline in both primary and secondary output of -1.5% and 1.4%, respectively. The annual average of total public schools output index decreased by -1.3% in 2010–14.

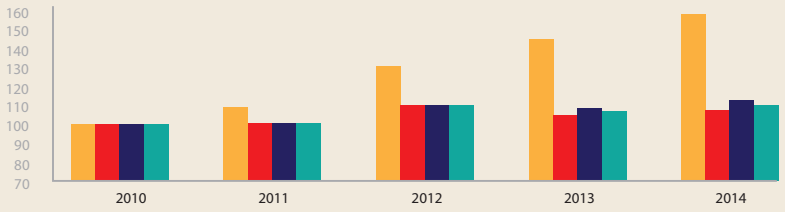
Inputs of Public Schools

Public school inputs have three components: labor (e.g., teaching and staff), goods and services (e.g., learning materials and electricity), and capital services (e.g., the flow of services provided by a vehicle or building in a given period).

Expenditure on labor and goods and services is measured in current prices (what was actually paid). Figures for capital consumption are estimates of the value of the flow of investment from public schools capital

FIGURE 4.12

INPUTS INDEX OF PUBLIC SCHOOLS (2010–14)



	2010	2011	2012	2013	2014
Preprimary School	100	109	130	144	157
Primary School	100	100	110	104	107
Secondary School	100	100	110	108	112
Total Education	100	100	109	106	110

Note: Index numbers, 2010=100

TABLE 4.12

INPUTS GROWTH OF PUBLIC SCHOOLS (2010–14)

	2011	2012	2013	2014	Average Growth
Preprimary school	8.7%	19.6%	11.0%	9.1%	12.1%
Primary schools	0.0%	9.6%	-4.9%	2.6%	1.8%
Secondary schools	0.5%	9.1%	-1.9%	3.8%	2.9%
Total public schools	0.5%	9.0%	-2.9%	3.1%	2.4%

consumption. While they do not form an explicit part of publicly funded public schools expenditure, they represent the annual input provided by capital assets owned and are therefore included alongside actual current expenditure.

Figure 4.12 shows that over the period 2010 to 2014, the volume of total public schools inputs increased by 10%, an annual average increase of 2.4%. Input growth was particularly high in 2012 and 2014, with annual growth rates of 9% and 3.1%, respectively. However in 2013, the inputs recorded negative growth at -2.9%. The increase in 2012 was due to the readjustment of remuneration of the teachers based on the new time-based system.

Labor Productivity Index of Public Schools

Figure 4.13 highlights labor productivity changes of public schools by program. This can be concluded that:

i) Preschool registered the highest labor productivity index of 96.2 in 2014, an increase of 0.2% from 2013. This was followed by secondary school at 93.6 and primary schools at labor productivity index of 90.

ii) Both primary schools and secondary schools programs recorded the decline trend from 2011 to 2014 at an average of 2.6% and 1.6%, respectively.

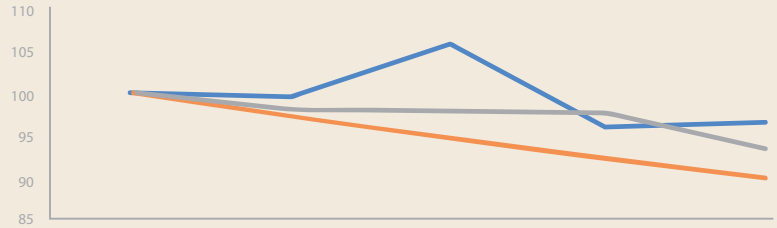
Figure 4.14 features the overall labor productivity index for public schools. Latest estimates show that:

i) Labor productivity declined by 3.2% in 2014 with the annual average of 2%. The negative growth rates in productivity is registered since the series began in 2011, driven by falling output in number of students, while input factor increased.

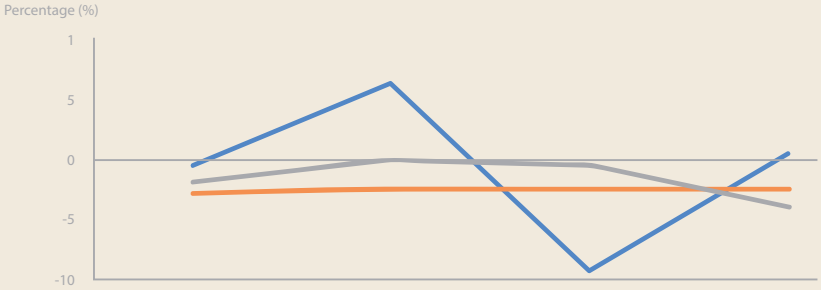
ii) The negative productivity was resulted from the decline in output of 1.1% while the inputs increased by 0.9% in 2014.

FIGURE 4.13

LABOR PRODUCTIVITY INDEX AND GROWTH OF PUBLIC SCHOOLS BY PROGRAMS (2010–14)



	2010	2011	2012	2013	2014
Preprimary School	100.0	99.7	105.7	96.0	96.2
Primary School	100.0	97.1	94.7	92.3	90.0
Secondary School	100.0	98.1	98.0	97.5	93.6



	2011	2012	2013	2014
Preprimary School	-0.3%	6.0%	-9.1%	0.2%
Primary School	-2.9%	-2.5%	-2.5%	-2.6%
Secondary School	-1.9%	-0.1%	-0.5%	-4.0%

Capital Productivity Index of Public Schools

Capital input growth was consistently strong, leading to capital deepening in almost every year except in 2013. From 2010–14, the total capital consumption grew at an average annual rate of 5%. Nonresidential buildings are the main asset in the capital consumptions for public schools. Land and equipment also form a significant part of the capital consumption. In 2014, the number of government schools in Malaysia stands at a total of 10,134 physical schools with preschools programs sharing the resources of existing primary school settings.

Although IT (computers and software) has become increasingly important for the production of public schools outputs, these assets still comprise a relatively small proportion of total assets. Primary and secondary schools constitute the largest proportion of capital consumption in public schools, accounting for around 98% of the total in 2014, while preschools is only at 2% of the total capital consumption. This was due to share facilities.

Capital productivity index of all public school programs presents a declining trend. Preprimary schools recorded the largest decline in capital productivity at an average of -7.3% from 100 in 2010 to 74 in 2014 (Figure 4.15). Although the output of preprimary schools increased over the observation period, the number of input also grew at the fastest rate. This reflects the effectiveness of the sector in managing inputs with the growing output.

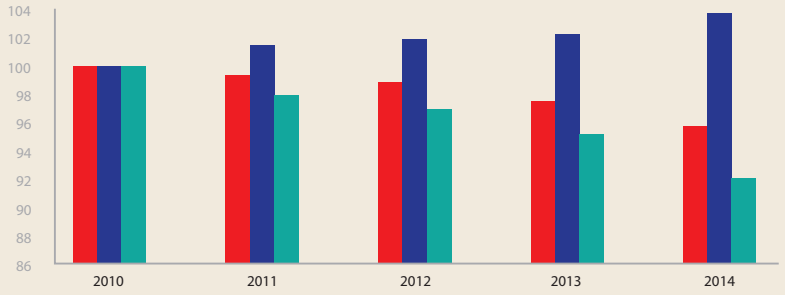
Figure 4.16 displays the overall productivity index for public schools. Latest estimates show that:

i) Productivity decline by 3.4% in 2014 with the annual average of -3.1%. The negative growth rates in productivity since the series began in 2011, driven by falling output in number of students while capital input factor increased.

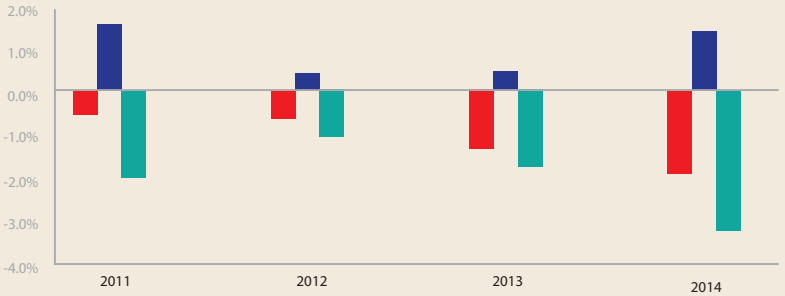
ii) The negative productivity was resulted from the decline in output of 1.7% while the inputs increased 2.3% in 2014.

FIGURE 4.14

LABOR PRODUCTIVITY INDEX AND GROWTH OF PUBLIC SCHOOLS (2010–14)



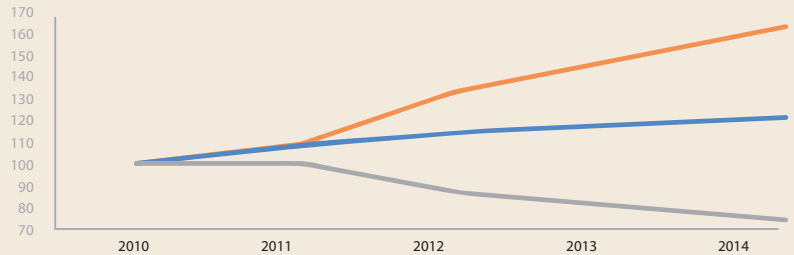
	2010	2011	2012	2013	2014
Output	100	99	99	98	96
Input	100	102	102	102	104
Labor Productivity	100	98	97	95	92



	2011	2012	2013	2014
Output	-0.6%	-0.6%	-1.3%	-1.9%
Input	1.5%	0.4%	0.4%	1.4%
Labor Productivity	-2.0%	-1.0%	-1.7%	-3.2%

FIGURE 4.15

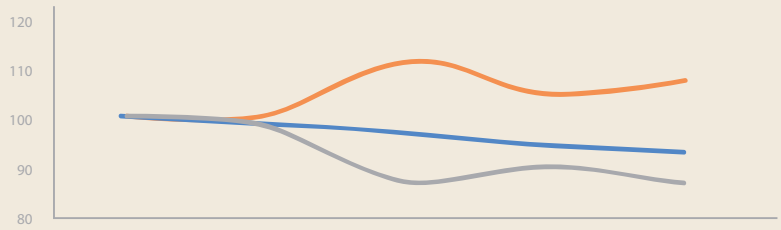
CAPITAL PRODUCTIVITY INDEX AND GROWTH OF PREPRIMARY SCHOOLS (2010–14)



	2010	2011	2012	2013	2014
Output	100	109	115	117	120
Input	100	109	133	148	163
Capital Productivity	100	100	86	79	74

FIGURE 4.16

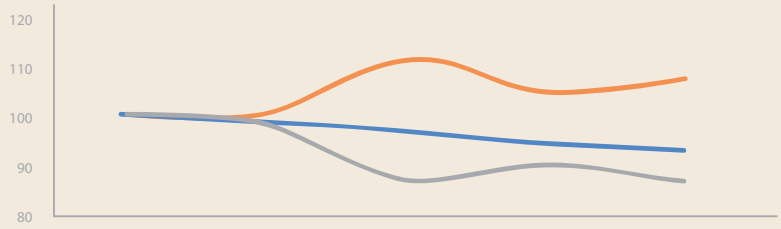
CAPITAL PRODUCTIVITY INDEX AND GROWTH OF PRIMARY SCHOOLS (2010–14)



	2010	2011	2012	2013	2014
Output	100	99	99	99	96
Input	100	100	111	108	113
Capital Productivity	100	99	89	91	86

FIGURE 4.17

CAPITAL PRODUCTIVITY INDEX AND GROWTH OF SECONDARY SCHOOLS (2010–14)



	2010	2011	2012	2013	2014
Output	100	99	99	99	96
Input	100	100	111	108	113
Capital Productivity	100	99	89	91	86

Figure 4.17 shows that in 2014, capital productivity declined by -3.7% for the period 2010–14. The negative growth rates in productivity since the series began in 2011 was due to the increase in capital investment over the years, while the number of student enrolment declined. The negative capital productivity index was resulted from the decline in output index to 96 in 2014 from 99 in previous year.

Intermediate Productivity Index of Public Schools

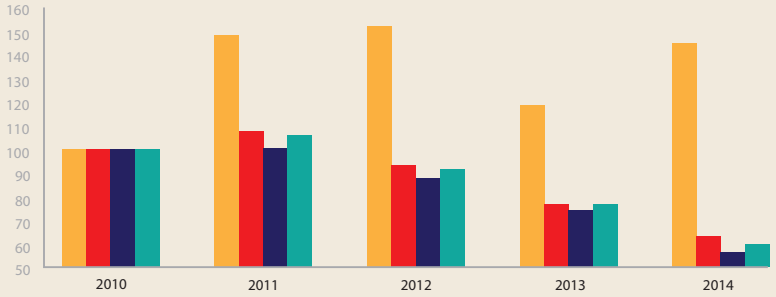
Total Public Schools Intermediate Productivity Index registered a double digit decline of -11.4% in the annual average in 2010–14. Preprimary school was the only program that registered positive intermediate productivity growth at an average of 12.8% from 100 in 2010 to 145.3 in 2014 (Figure 4.18). The preprimary schools consumed only 1% of the total intermediate expenditure because the majority of spending for goods and services were covered under the primary school program with sharing facilities.

Total Productivity Index of Public Schools

This section presents the estimates of total productivity. Total productivity index is derived by dividing the index of output by the index of inputs and multiplying by 100; productivity change is then calculated using the periodic growth in this index. These estimates provide information relevant to the measurement of the efficiency with which public services of education are provided. However, they do not provide direct information on how far (if at all) public service total productivity is below best practices (which would require systematic quantitative measures of best practices), or how much any productivity change is due to

FIGURE 4.18

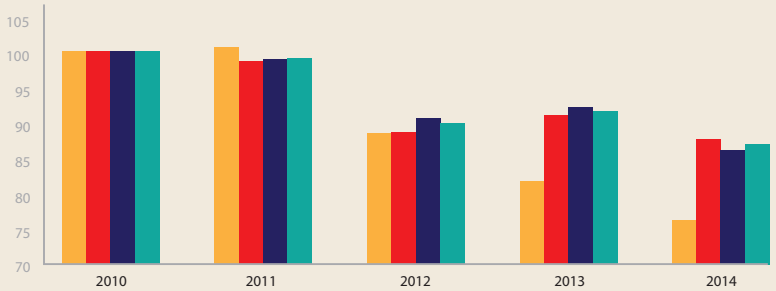
INTERMEDIATE PRODUCTIVITY INDEX (2010–14)



	2010	2011	2012	2013	2014
Preprimary School	100.0	148.0	152.3	119.0	145.3
Primary School	100.0	107.6	93.9	77.1	63.0
Secondary School	100.0	100.8	88.1	74.3	57.3
Total Education	100.0	106.1	92.3	76.9	60.1

FIGURE 4.19

TOTAL PRODUCTIVITY INDEX OF PUBLIC SCHOOLS (2010–14)



	2010	2011	2012	2013	2014
Preprimary School	100.0	100.3	88.4	81.3	76.1
Primary School	100.0	98.6	88.5	90.8	87.4
Secondary School	100.0	98.8	90.5	92.0	86.2
Total Education	100.0	99.0	90.2	91.7	87.2

Note: Index numbers, 2010=100

TABLE 4.13

TOTAL PRODUCTIVITY GROWTH OF PUBLIC SCHOOLS (2010–14)

	2011	2012	2013	2014	Average Growth
Preprimary schools	0.3%	-11.9%	-8.0%	-6.4%	-6.5%
Primary schools	-1.4%	-10.3%	2.6%	-3.7%	-3.2%
Secondary schools	-1.2%	-8.4%	1.7%	-6.3%	-3.6%
Total public schools	-1.0%	-8.8%	1.6%	-4.9%	-3.3%

changes in the way services are provided (which would require an estimate of what would have happened if the changes had not been made).

The total Productivity Index of public schools registered a double digit decline at an annual average of -12.8% during the period 2010–14 (Figure 4.19). The preprimary school registered the highest drop of total productivity at an annual average of 23.9% from 100 (2010) to 76.1 in 2014.

Table 4.13 shows the total productivity growth of public schools fell by 4.9% in 2014 with an annual average of -3.3% in 2010–14. All programs under public schools recorded the declining trend from 2010–14, except 2013 where primary and secondary schools recorded positive growth of 2.6% and 1.7%, respectively. Preprimary schools recorded the positive growth of 0.3% in 2011.

Conclusion

Improving Malaysia's measures of public-services productivity has become a priority over the last few years. It is necessary to update and apply the internationally acceptable practices in the measurement process and play a crucial part in focusing on outputs and outcomes in government service performance.

In line with that, the Asian Productivity Organization (APO) carries out activities to enhance productivity and competitiveness which outlines several programs related to public-service productivity. The organization has also developed a method to measure public-sector productivity and experts from member countries are encouraged to measure performance. UK has made considerable progress in measuring the performance of public-service productivity, which allows for APO member countries to use this methodology as a guide. Meanwhile, other developed countries continue to test new methods that give valuable lessons to Malaysia.

Following the APO methodology and other developed countries' experience in conducting this study, options need to be selected. The results of the study make the best choice in the framework and set of measurable principles that include output, input, and productivity.

Output growth has lagged behind the increasing inputs of public schools in 2012–1115 and hospitals in 2012. This has led to a decline in productivity. This suggests that over time the resources used are less efficient. However, there are other important explanations for this development:

i) The increase in spending may have been used on things which will raise the capacity to produce more high quality output in the future.

- Policy changes by the government have had a detrimental effect on productivity, which is due to a short period of five-year study which is insufficient to show a positive change in productivity. Among the changes that raised the cost of spending are the increase in teachers' salaries due to the minimum entry level of at least minimum degree holders and implementation of promotion based on time or period of services as well as change in annual increment and the adjustment of Malaysian civil servants salaries

ii) The spending may have been on things which improve outcomes but do not contribute to output as measured for national accounts.

- In order to ensure the services offered by the government can be equally felt by the people, the government had to bear the high costs of managing all the public schools and hospitals or clinics located in remote areas. This is to ensure longer life expectancy and literacy rate continue to rise. A total of 2,058 primary schools across the country are placed in the category of schools that lack students (less than 150 students)

iii) The output measures used may not have monitored all the outputs produced.

- Although education is the responsibility of the federal government, each state and federal territory has an education department to coordinate educational matters in the areas under their purview. For this study, the selections of output are based on the availability of data and the numbers of pupils overseen by the Ministry of Education

iv) The output measures used didn't reflect all the quality improvements made in the outputs as a result of rising consumer expectations and the more demanding standards set for service delivery.

- For this study, output quality contribution has been ignored due to data problems and other technical issues. If measurement included the quality of output produced, it may contribute differently to productivity performance

Recommendations for future measurements, some steps need to be reviewed, if necessary, with:

i) Widening the coverage of output volume indicators for each function.

- The findings of this report were based on the measurement of productivity of public hospitals and schools under their respective ministries. However, the measurement should not focus only on specific departments and agencies under the ministries of health and education, but extended to all ministries that provide similar services of public schools and health. If the overall education and public health services in Malaysia take into account other possibilities or measurements, the findings may differ

ii) Increasing the level of detail at which output and input indicators are measured.

- The coverage of both public schools and hospital measurements is at an aggregate level without detail of each output according to the activities that involve different expenses or cost units. For example, a school by type, such as boarding or sports school and major medical surgery is a different unit of cost for each activity

iii) Take into account the quality of the output.

- This study also does not take into account the changes of quality of the output. Measurements in most developed countries will take into account elements that will also affect the performance of productivity. By looking at the performance in education and health outcomes in Malaysia, such as literacy and life expectancy rate that continue to rise will indirectly contribute to output in comparison

iv) Revisions on the use of deflator for weighting process

- Limited to the range of input deflators used in this measurement. For example, the purchasing power parity (PPP) index is used to describe a variety of intermediate input in a state where there should be a more appropriate deflator

The country needs to continue this work with the aim of publishing productivity estimates for each government function. To achieve this goal, Malaysia Productivity Corporation will increase coverage of this series and try to take into account changes in output quality in measurement. Further studies will continue to be reported.

CHAPTER 5

PHILIPPINES

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Introduction

Productivity growth is considered as one of the major sources of economic growth. Measuring productivity and understanding the behavior of productivity changes are important not only in the economic sectors but also in the public sector. Productivity change is both the cause and effect of the evolution of dynamic reforms in the government encompassing accumulation of human and physical resources, systems and process improvements, and institutional arrangements.

There are many factors that explain changes in public-sector productivity. Among these are the technical characteristics of the service processes and the movements in budget distribution. The technical characteristics include the process efficiency that may include the application of better practices and the bias in innovation that means the nature of the new techniques leads to a disruptive change that yields greater results. The movements in budget distribution include: i) the scale of operations that may consider enhancement in budget policies and ii) the budget utilization rate that means the speed by which allocated funding are used for intended purpose at the right time.

The paper is structured as follows: after the introduction, the succeeding sections are divided into two parts. The first part covers discussions on estimating productivity in the public hospitals and the second part covers the public schools. Each part is divided into eight sections. The first section discusses the context in Philippine setting. Sections two to five present the general profile of the sectors followed by the empirical estimation and analysis of available output and input data that were used in estimating the productivity. Section seven provides a summary of the major findings and implications of the paper.

Public Hospitals

Health System Strategies, Objectives, and Legislation [1]

The Philippines health functions are largely devolved to provinces and municipalities. The Local Government Code (1991) outlines the roles of different levels in health care, including barangay (village), municipality, and province. The Aquino Health Agenda: Achieving Universal Health Care for All Filipinos is the Philippine government's continuing commitment to health sector reform and in achieving the Millennium Development Goals (MDGs).

The National Objectives for Health (2011–16) sets all the health program goals, strategies, and performance indicators and targets that lead the health sector toward achieving its primary goal of universal health care. The overall goal is to achieve the health system goals of financial risk protection, better health outcomes, and responsive health system - and it includes three strategic thrusts, namely:

- Financial risk protection through expansion of the National Health Insurance Program, enrolment, and benefit delivery
- Improved access to quality hospitals and health care facilities
- Attainment of the health-related MDGs

The Aquino Health Agenda's six strategic instruments are health financing, service delivery, policy, standards and regulation, governance, human resources, and health information.

Legislation that forms the regulatory framework for health system functioning and public health in the Philippines [2] includes the following:

i) Organ Donation Act (1991)

ii) Hospital Licensure Act

iii) Pharmacy Act

iv) Dangerous Drugs Act (1972) and 2002

v) Generics Act of 1988

vi) Republic Act No. 7600 - Rooming-in- and Breastfeeding Act of 1992

vii) National Blood Services Act of 1994

viii) Magna Carta for Disabled Persons

ix) National Health Insurance Act of 1995

x) Traditional and Alternative Medicine Act (TAMA of 1997)

xi) HIV Prevention and Control of 1988 Philippine Food Fortification Act of 2000

xii) Tobacco Regulation Act of 2003

xiii) Expanded Senior Citizens Act of 2003

xiv) Newborn Screening Act of 2004

xv) Universally Accessible Cheaper and Quality Medicines Act (2008)

xvi) Food and Drug Administration Act (2009) [2]

The National Health Insurance Act of 1995 or the Republic Act 7875 that replaced the Medicare Act of 1969 governs Philippine Health Insurance (PhilHealth), the country's national health insurance program [2]. PhilHealth is mandated to provide health insurance coverage and ensure affordable, acceptable, available, and accessible health care services for all citizens of the Philippines and is mandated to regulate public and private healthcare providers through accreditation in compliance with its quality guidelines, standards, and procedures.

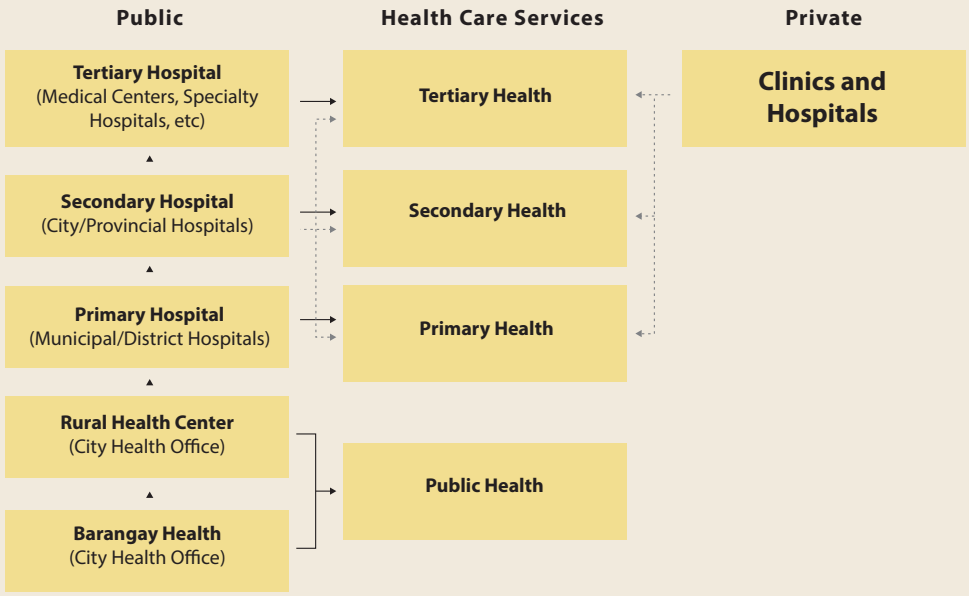
Service Delivery Model [1]

The Department of Health (DOH) is responsible for developing health policies and programs, regulation, performance monitoring, and standards for public and private sectors as well as provision of specialized and tertiary level healthcare. The DOH Centers for Health and Development (CHDs) are the implementing agencies in provinces, cities, and municipalities, and link national programs to local government units (LGUs). The CHDs are the DOH offices at the regional level. They assist the LGUs in the development of ordinances and localization of national policies, provide guidelines on the implementation of national programs at the LGU levels, monitor program implementation, and develop support system for the delivery of services by the LGUs.

Health service delivery has evolved into dual delivery systems of public and private provision, covering the entire range of interventions with varying degrees of emphasis at different health care levels. Public services are mostly used by the poor and near poor, including communities in isolated and deprived areas. Private services are used by approximately one-third of the population that can afford fee-for-service payments. PhilHealth outlines the service package that is supported by the government. Coverage is reported by PhilHealth to be 93.4 million or 92% of the population at end December 2015.

FIGURE 5.1

HEALTH SERVICE DELIVERY SYSTEM MODEL IN THE PHILIPPINES [3]



Profile of Public Hospitals

Number of Hospitals. A total of 1,222 hospitals were registered with the DOH as of 2014. Public hospitals (including corporate and local government hospitals) account for only 37% of the total number of hospitals but are usually bigger than private hospitals and have a higher number of beds. It is worth noting that there are more secondary hospitals than primary level hospitals. However, from 2011 to 2014, the total number of public and private hospitals went down by 38% and 29%, respectively.

Hospital Size. Hospitals in the Philippines are relatively small. On average, government hospitals are composed of 107 beds while private hospitals have 65 beds in 2014. Government bed capacity decreased from a total of 51,317 in 2010 to 48,384. The DOH devolved its hospitals, provincial, and district offices, and the staff of these offices to the provinces. The municipalities were given the responsibility of providing basic health services through rural health units and barangay health stations while the cities were in charge of health offices in the city. Out of 452 public hospitals, only 70 remained under the DOH as national government facilities in 2015.

Hospital Classification. The DOH classifies hospitals into four levels and these classification is covered through the DOH Administrative Order 205-0029 [4].

- Level 1 hospital is emergency hospital that provides initial treatment for cases that require immediate treatment and that covers primary care for prevalent diseases in the area. They provide general medicine, pediatrics, minor surgeries and nonsurgical gynecology, primary clinical laboratory, pharmacy, and first-level radiology. Also, nursing care for patients needing minimal supervised care are provided in these hospitals.
- Level 2 hospital is nondepartmentalized hospital with general medicine, pediatrics, surgery, anesthesia, obstetrics and gynecology, first-level radiology, secondary clinical laboratory, pharmacy, nursing care services for patients needing intermediate supervised care.
- Level 3 hospital are departmentalized hospital with all clinical services provided by Level 2 hospitals; specialty clinical care; tertiary clinical laboratory, pharmacy, second-level radiology and nursing care for patients needing total and intensive care.

- Level 4 hospital facilities include teaching and training services with all clinical services provided by Level 3 hospitals. It has specialized forms of treatments, intensive care and surgical procedures with tertiary clinical laboratory, third-level radiology, pharmacy, and nursing care for patients needing continuous and specialized critical care.

Data For Productivity Calculations

Output Growth of Selected Public Hospitals

Services. Public hospitals are used primarily for treatment and laboratory, and to some extent, for checkups and maternal care. It is highly probable that the poor utilizing hospitals for these services are suffering chronic diseases. Barangay health stations (BHS) and rural health units (RHU) are utilized primarily for immunization, family planning, health education, and maternal care.

Healthcare Output. The output of public health services was estimated based on the number of inpatient and outpatient served during the study period. Other than these measures of outputs, public hospitals also provide research and training services but related data were lacking. The inpatient services include pay-patients, service (indigent) patients, and patients covered by the PhilHealth. The outpatients include services given to emergency patients and outpatients.

Although public hospitals do gather and report the number of patients they served, there was no available data series on the aggregate number of patients served at the national level. Also, many of the data available from the hospitals vary in terms of type and level of disaggregation. Thus given the lack of data to disaggregate the inputs used for each type of health service delivered, the total number of services rendered was determined based on the relative shares of such services at the base period.

As shown in Figure 5.2, the calculated output indexes of inpatients services followed a fluctuating trend from 2006–16 but the number of inpatients services showed an upward trend. Considering the increasing number of outpatients availing to public health services from selected public hospitals, it was observed that the trend of total output generally followed the trend of services provided for outpatients.

Input Growth

The DOH Budget. The total budget of the DOH in 2015 was around PHP87 billion. The budget was 3.8% higher than the 2014 budget. Some 82% of the budget was allocated for the provision of technical support services while 16% was intended for hospital services and only 3% were allotted for policy and regulatory services. Table 5.5 shows that budget allocated for hospital services went down by 50% from 2013–15.

FIGURE 5.2

TRENDS IN OUTPUT INDEXES OF SELECTED HOSPITALS (2006–16)

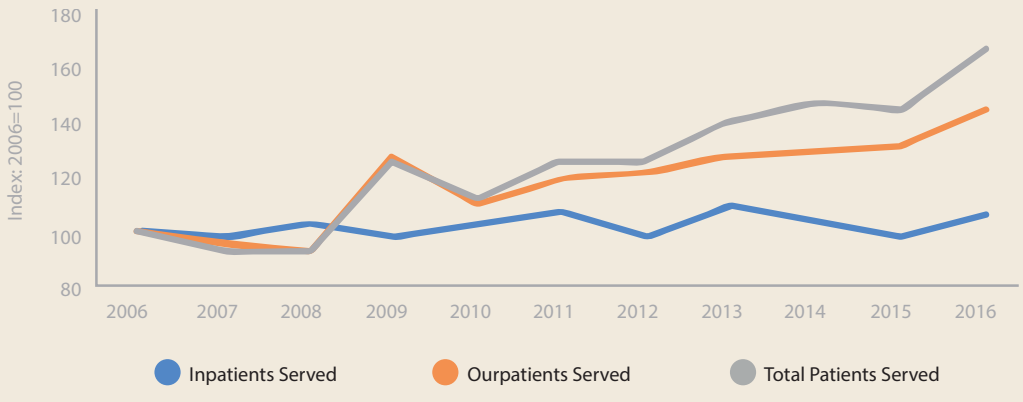


TABLE 5.1

NUMBER OF PATIENTS SERVED OF SELECTED PUBLIC HOSPITALS (2006–16)

Particulars	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Inpatients	**184,832**	**180,898**	**185,132**	**182,649**	**186,479**	**197,382**	**191,030**	**204,872**	**210,477**	**204,811**	**215,114**
Service patients	162,896	158,949	163,138	159,769	162,714	171,737	164,015	169,721	168,560	160,911	163,363
Pay patients	15,800	17,507	17,750	18,386	18,107	17,928	18,604	20,977	22,528	23,581	24,616
PhilHealth	6,136	4,442	4,244	4,494	5,658	7,717	8,411	14,174	19,389	20,319	27,135
Outpatients	**997,904**	**950,881**	**932,619**	**1,261,695**	**1,106,300**	**1,164,752**	**1,198,322**	**1,253,511**	**1,279,774**	**1,291,501**	**1,421,656**
Emergency patients	310,413	280,081	283,291	547,340	358,821	366,921	358,009	388,350	390,003	386,385	428,663
Outpatients	687,491	670,800	649,328	714,355	747,479	797,831	840,313	865,161	889,771	905,116	992,993

Source: Data provided by selected public hospitals

TABLE 5.2

WEIGHTED GROWTH OF OUTPUTS AT SELECTED PUBLIC HOSPITALS (2007–16)

Weighted Growth of Outputs	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Service patients	(0.021)	0.023	(0.018)	0.016	0.048	(0.039)	0.030	(0.006)	(0.036)	0.012
Pay patients	0.009	0.001	0.003	(0.002)	(0.001)	0.003	0.012	0.008	0.005	0.005
PhilHealth	(0.009)	(0.001)	0.001	0.006	0.011	0.004	0.030	0.025	0.004	0.033
Subtotal, inpatients	(0.021)	0.023	(0.013)	0.021	0.058	(0.032)	0.072	0.027	(0.027)	0.050
Emergency patients	(0.030)	0.003	0.283	(0.149)	0.007	(0.008)	0.025	0.001	(0.003)	0.033
Outpatients	(0.017)	(0.023)	0.070	0.026	0.046	0.036	0.021	0.020	0.012	0.068
Subtotal, outpatients	(0.047)	(0.019)	0.353	(0.123)	0.053	0.029	0.046	0.021	0.009	0.101
Weighted sum total, all patients	(0.068)	0.004	0.339	(0.102)	0.111	(0.003)	0.119	0.048	(0.018)	0.151

TABLE 5.3

OUTPUT INDEXES OF SELECTED PUBLIC HOSPITALS (2006–16)

Total Output Indexes	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Inpatients served	100	98	102	99	102	106	97	107	103	97	105
Outpatients served	100	95	93	126	111	117	120	126	128	129	142
Total patients served	100	93	94	125	112	125	125	139	146	144	165

Budget Distribution by Continuum of Care. For the past five years, more than 50% of the annual budget was provided for preventive and promotive health care activities while an average of 45% was extended for curative health care. The remaining 1% of the budget was mainly intended for health governance.

Depending on the type of health care services and size of operations, public hospital use different types of inputs to deliver their services. Among the critical inputs being monitored at the national level include the number of health professionals and bed capacity across the public hospitals in the country. The deployment of health professionals in the rural areas is one of the key inputs provided by the DOH to ensure the attainment of its goals.

Public Health Facilities

The provision of adequate health facilities was among the priorities of the DOH. Table 5.6 shows that while the number of public hospitals continued to increase from 702 in 2005 to 732 in 2011, it started to decrease in 2012 down to a low of 423 public hospitals in 2015. The said decrease in number was due to rationalization of public health facilities to ensure provision of adequate resources for effective functioning of public hospitals. Figure 5.4 shows that the bed capacity of public hospitals started to increase in 2010 with the consolidation of resources to support operations of hospitals with high demands for public-health services.

TABLE 5.4

DOH BUDGET BY CONTINUUM OF CARE IN PHILIPPINES '000 (2011–15)

Continuum of Care	2011	2012	2013	2014	2015
Preventive and promotive health care	18,080,819	19,465,376	26,155,583	49,111,183	47,988,397
Curative health care	12,941,476	21,900,679	26,257,895	33,820,774	38,119,949
Health governance	806,321	789,908	814,391	788,964	860,351
Total	**31,828,616**	**42,155,963**	**53,227,869**	**83,720,921**	**86,968,697**

Source: DOH Annual Report 2015 [4]

TABLE 5.5

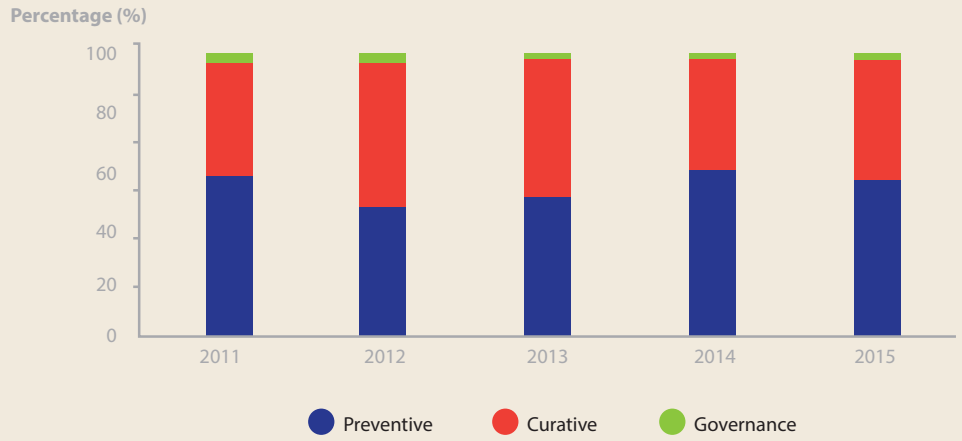
DOH BUDGET DISTRIBUTION PER MAJOR FINAL OUTPUT IN PHILIPPINES '000 (2013–15)

Major Final Outputs	2013	2014	2015
Technical services	32,870,854	60,396,248	69,146,791
Share (%)	64	76	82
Hospital services	16,767,511	16,531,484	13,390,370
Share (%)	32	21	16
Health sector policy services	1,383,403	1,343,670	1,356,626
Share (%)	3	2	2
Health sector regulation services	615,937	735,302	743,702
Share (%)	1.2	1	1
Total (PHP)	**51,637,705**	**79,006,704**	**84,637,489**

Source: DOH Annual Report 2015 [4]

FIGURE 5.3

DISTRIBUTION OF DOH BUDGET BY CONTINUUM OF CARE (2011–15)



Public Health Service Professionals

Despite the decreased number of public hospitals, the deployment of public health professionals grew from 2012 to 2015. Although the number of public hospitals continued to decline from 2012 to 2015, the number of doctors went up from 2,983 to 3,182 during the same period. The same trend was observed on the number of dentists, nurses, and midwives. This shows the level of importance given to the increasing demand for professionals in delivering preventive and promotive health care services to the public.

Health Expenditures

Table 5.8 and Figure 5.7 show the total health expenditure, growth trends, and share to GDP from 2005 to 2014. Total health expenditure in 2014 almost tripled its level when compared to 2005. Health expenditure as proportion of GDP also went up from 3.4% in 2005 to 4.6% in 2014.

FIGURE 5.4

TRENDS IN THE NUMBER OF PUBLIC HOSPITALS AND BED CAPACITY (2005–15)

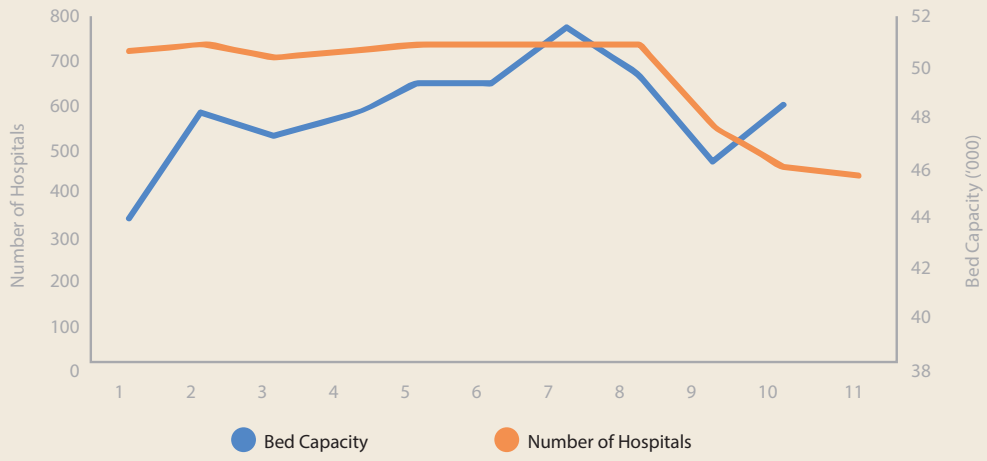


TABLE 5.6

NUMBER OF PUBLIC HOSPITALS AND BED CAPACITY (2005–15)

Particulars	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Number of hospitals	702	719	701	711	723	730	732	730	542	452	423
Bed capacity	43,739	47,897	47,141	47,889	49,093	49,372	51,317	49,557	46,054	48,384	ND

Source: Philippine Statistical Yearbook (2009–16) [5]

TABLE 5.7

NUMBER OF PUBLIC HEALTH SERVICE PROFESSIONALS (2006–15)

Particulars	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Doctors	2,955	3,047	2,838	2,901	2,682	2,944	2,983	2,927	3,002	3,182
Dentists	1,930	1,894	1,891	1,991	1,718	1,912	2,072	1,823	1,788	1,922
Nurses	4,374	4,577	4,576	4,729	4,495	5,294	5,596	5,632	6,061	6,520
Midwives	16,821	16,821	17,437	16,611	16,875	17,514	16,984	16,875	17,151	17,649

Source: Philippine Statistical Yearbook (2009–16) [5]

TABLE 5.8

GROWTH RATE AND SHARE OF TOTAL HEALTH EXPENDITURE TO GDP (2005–14)

Particulars	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
GDP (in PHP 'billion at current prices)	5,891	6,532	7,230	7,721	8,026	9,004	9,708	10,561	11,534	12,645
Total health expenditure (in PHP 'billion at current prices)	198	216	234	nd	342	381	417	471	530	585
Growth rate	20	9.1	8.3	-	-	11	9	13	13	10
Total health expenditure as % of GDP	3.4	3.3	3.2	-	4	4.20	4.30	4.50	4.60	4.60

Source: Philippine Statistical Yearbook (2009–16) [5]

FIGURE 5.5

TRENDS IN THE NUMBER OF DOCTORS AND DENTISTS (2006–15)

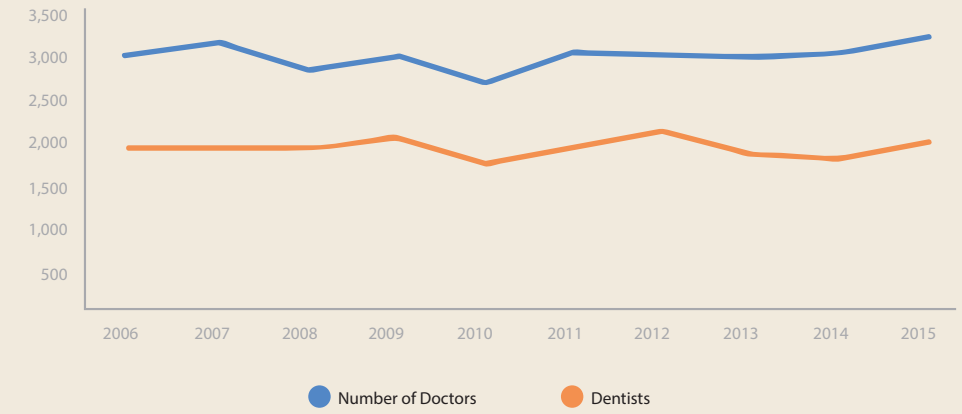
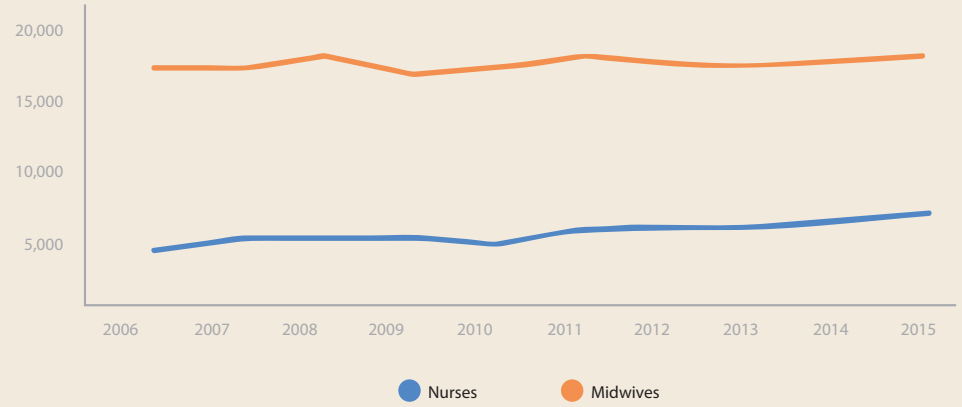


FIGURE 5.6

TRENDS IN THE NUMBER OF NURSES AND MIDWIVES (2006–15)



Hospital Expenditures of Selected Public Hospitals

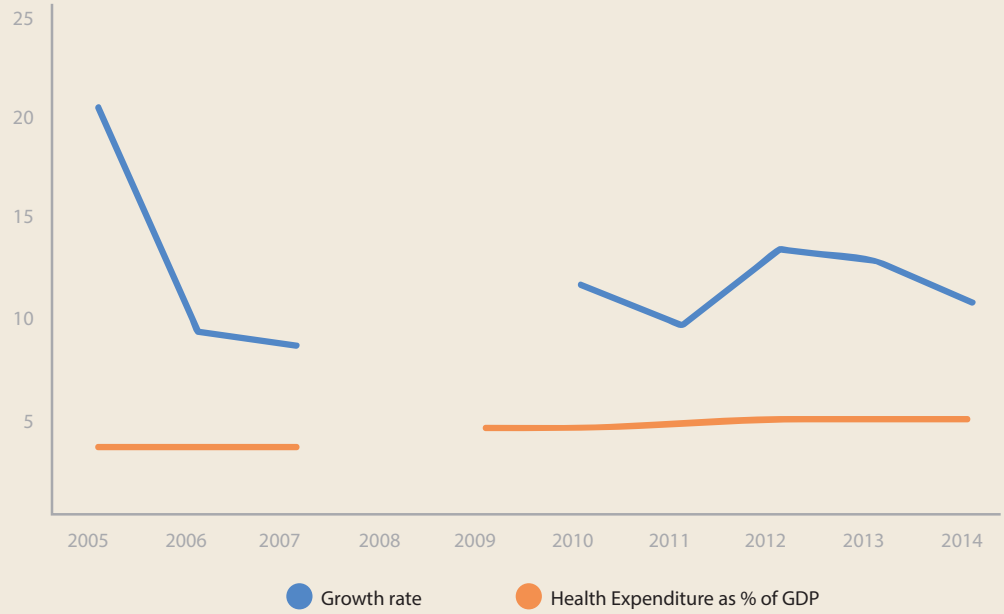
Given the limited data available, estimates of public hospital expenditures were based on sampled hospitals. The historical shares of selected expenditure items were limited to aggregate data on personnel costs, maintenance and other operating expenses, and cost of goods sold (CGS). Table 5.9 shows that about 50–60% of total expenditures were incurred for personnel costs and 30–35% were used for maintenance and other operating expenses. The cost of goods sold, such as medicines and other hospital supplies and materials account for about 5–13%. Except for the CGS that declined in 2015, all input items showed upward trends from 2006 to 2015.

Productivity and Quality

The DOH has developed a framework for Monitoring and Evaluation for Equity and Effectiveness (ME3). The system was designed to determine whether the government's health reforms are achieving the goals of equity and effectiveness. Progress on the MDG was regularly collected and monitored by the DOH and the Philippine Statistics Authority (PSA) through government surveys, administrative records, and annual routine collection of data [4].

FIGURE 5.7

GROWTH RATE AND SHARE OF TOTAL HEALTH EXPENDITURE TO GDP (2005–14)



Among the key outcome indicators related to the MDG are those presented in Table 5.14.

For DOH hospital operations, the measures of outcome are reported through the Major Final Output Report Card (MARC-1) of the hospital [6]. For instance, report card of some specialty hospitals under the DOH have indicated outcome measures related to the following:

i) Percentage of patients discharged as improved
ii) Net survival or death rate among inpatients
iii) Percentage of emergency (out) patients discharged as improved

While some hospitals have the above-cited information available, such information cannot be aggregated to come up with an overall data series for the last 5–10 years. Moreover, the output data related to the number of patient care services rendered were not readily available at the time of the study.

Public Hospital Productivity

The quality of public health services is foremost consideration in analyzing the productivity of public hospitals. Positive health outcome is the most important determinant of public-health service quality that analysis of productivity trends should consider in output estimation. However, given the data limitations, the estimates of productivity performance were focused on the count of patient services rendered without adjustments on whether such services resulted to positive healthcare results. Current estimates of productivity for selected public hospitals showed a generally declining trend.

From 2006–09, the labor productivity increased by 13%, intermediate input productivity went up by 21%, and hence total productivity climbed at 11%. However, from 2010–16, labor productivity dropped by 34% that brought the total productivity to a low 27% (Table 5.13).

Public Healthcare Quality

Considering that only few hospitals were included in the productivity estimation and related data on hospital outcomes cannot be aggregated, the national level healthcare outcomes were used to examine the overall

TABLE 5.9

INPUT DATA OF SELECTED PUBLIC HOSPITALS AT CURRENT PRICE IN PHILIPPINES (2005–16)

Particulars	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total Expenses	**2,566,053,382**	**2,618,139,911**	**2,834,767,226**	**2,777,492,859**	**3,357,316,560**	**3,743,264,615**	**4,004,102,734**	**4,558,580,119**	**5,176,911,948**	**5,706,724,206**	**6,621,206,410**	**8,190,525,191**
Cost of goods sold	134,722,487	236,890,512	320,518,105	362,604,351	450,583,923	440,714,901	450,806,194	563,808,618	684,426,748	752,098,035	892,011,496	636,915,523
Personnel services	1,295,446,480	1,387,503,614	1,491,413,553	1,354,557,513	1,790,373,334	2,020,561,190	2,208,552,388	2,393,449,686	2,559,104,047	2,868,968,240	3,732,920,249	4,956,442,576
MOOE	1,135,884,415	993,745,784	1,022,835,568	1,060,330,995	1,116,359,303	1,281,988,524	1,344,744,153	1,601,321,814	1,933,381,153	2,085,657,930	1,996,274,665	2,597,167,092

Source: Data provided by selected public hospitals

TABLE 5.10

INPUT DATA OF SELECTED PUBLIC HOSPITALS AT CONSTANT PRICE IN PHILIPPINES (2006–16)

Real Price of Inputs	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Cost of goods sold	236,890,512	308,784,302	328,445,970	388,434,416	366,042,277	362,675,940	439,445,533	518,112,602	551,391,521	640,352,833	446,644,827
Personnel services	1,387,503,614	1,436,814,598	1,226,954,269	1,543,425,288	1,678,206,968	1,776,791,945	1,865,510,278	1,937,247,576	2,103,349,150	2,679,770,458	3,475,766,182
MOOE	993,745,784	999,839,265	990,038,277	1,025,123,327	1,120,619,339	1,117,825,563	1,272,910,822	1,511,634,991	1,594,539,702	1,548,700,283	2,014,869,738

TABLE 5.11

ANNUAL SHARES OF INPUTS TO TOTAL HOSPITAL EXPENSES (2006–16)

Share in Total Cost	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Cost of goods sold	0.090	0.113	0.131	0.134	0.118	0.113	0.124	0.132	0.132	0.135	0.078
Personnel Services	0.530	0.526	0.488	0.533	0.540	0.552	0.525	0.494	0.503	0.564	0.605
MOOE	0.380	0.361	0.382	0.333	0.342	0.336	0.351	0.373	0.365	0.301	0.317

TABLE 5.12

WEIGHTED INDICES OF INPUTS OF SELECTED PUBLIC HOSPITALS (2006–16)

Indexes of Inputs	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Cost of goods sold	100	130.35	138.65	163.97	154.52	153.10	185.51	218.71	232.76	270.32	188.54
Personnel services	100	103.55	88.43	111.24	120.95	128.06	134.45	139.62	151.59	193.14	250.51
MOOE	100	100.61	99.63	103.16	112.77	112.49	128.09	152.11	160.46	155.84	202.76
Total	100	104.86	97.19	113.05	120.94	124.54	136.74	151.53	162.35	186.46	227.01

FIGURE 5.8

TRENDS IN INPUTS OF SELECTED PUBLIC HOSPITALS (2006–16)

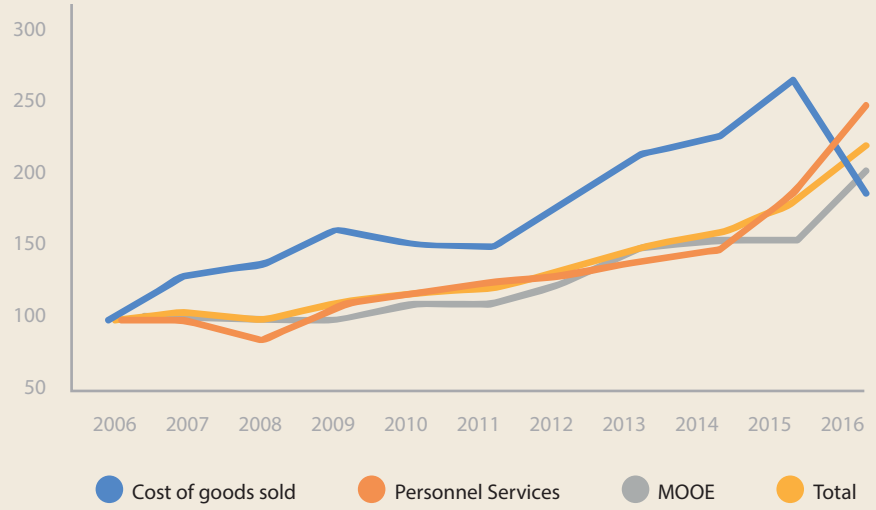
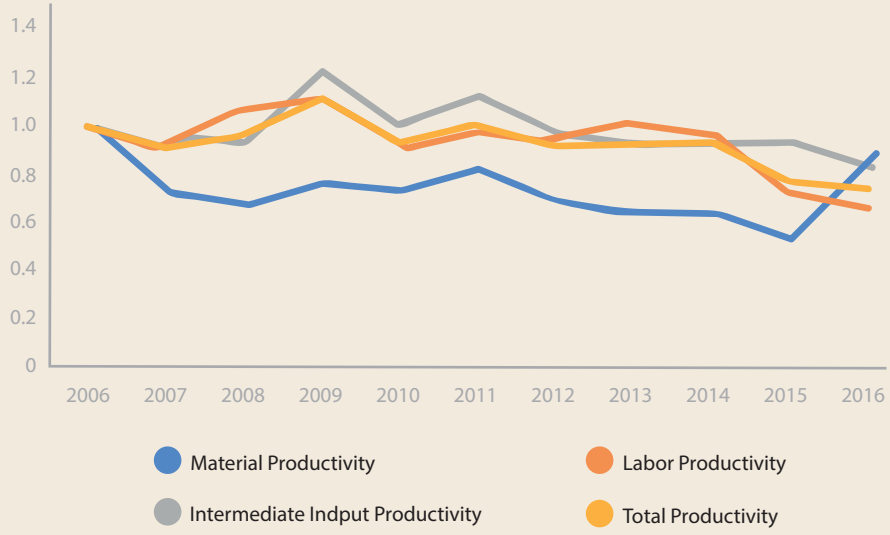


FIGURE 5.9

PRODUCTIVITY TRENDS OF SELECTED PUBLIC HOSPITALS (2006–16)



trends in the quality of healthcare services in the country. Table 5.14 shows the key outcome indicators related to the MDG. Fertility rate was seen to be declining as it dropped from 7.7 in 2005 to 6.9 in 2013. However, the mortality rate (per 1,000 population) showed a slightly increasing trend, from 5.1 to 5.4 for the same period. Also for the same period, both infant death rate and maternal death rate showed positive results. Infant death rate went down from 12.8 (per 1,000 livebirths) in 2005 to 7.92 in 2015 while maternal mortality rate declined from 1.0 to 0.74 (per 1,000 livebirths) for the same period.

Improving Public Hospital Productivity and Quality

The delivery of public-health services was devolved to the local government units but specialty and tertiary hospitals remain under the DOH supervision. It is designed as a referral network, wherein BHS, manned

TABLE 5.13

PARTIAL AND TOTAL PRODUCTIVITY INDEXES OF SELECTED PUBLIC HOSPITALS (2006–16)

Particulars	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Material productivity	1	0.71	0.67	0.76	0.73	0.82	0.67	0.64	0.63	0.53	0.88
Labor productivity	1	0.90	1.06	1.13	0.93	0.98	0.93	1.00	0.96	0.74	0.66
Intermediate input productivity	1	0.93	0.94	1.21	1.00	1.11	0.97	0.92	0.91	0.92	0.81
Total productivity	1	0.89	0.96	1.11	0.93	1.00	0.91	0.92	0.90	0.77	0.73

TABLE 5.14

KEY HEALTHCARE OUTCOME INDICATORS RELATED TO THE MDG (2005–15)

Particulars	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Fertility rate*	7.70	7.40	7.80	7.60	7.30	7.30	7.10	7.20	6.90	nd	nd
Mortality rate**	5.10	5.10	5.00	5.10	5.20	5.20	5.30	5.40	5.40	5.40	nd
Infant death rate***	12.80	13.10	12.40	12.50	12.40	12.60	12.80	12.40	12.50	8.30	7.92
Maternal mortality rate***	1.00	1.00	1.00	1.00	0.90	1.00	0.80	0.80	0.90	0.74	0.74

* Number of children per 100 female population (15–49 years) ** Per 1,000 population *** Per 1,000 livebirths

Source: Philippine Health Statistics, 2009–13 [7]

FIGURE 5.10

TRENDS IN FERTILITY AND MORTALITY RATES (2005–14)

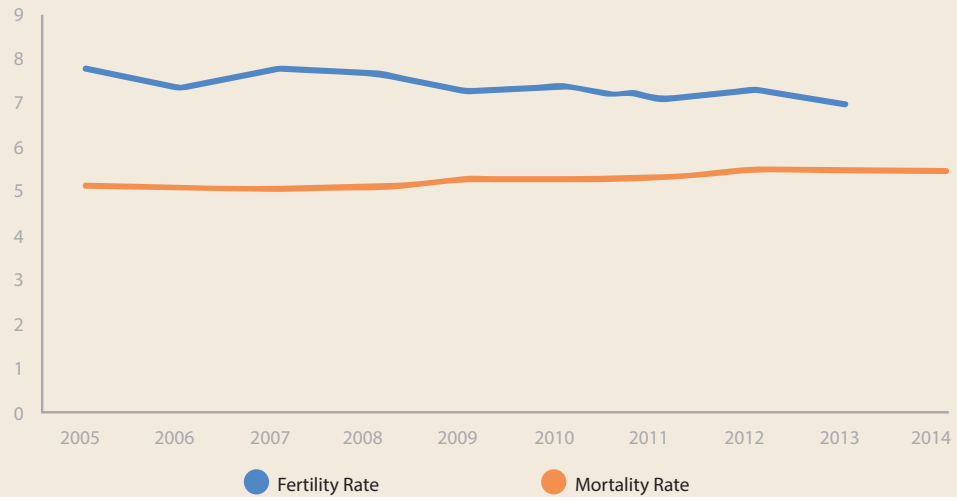
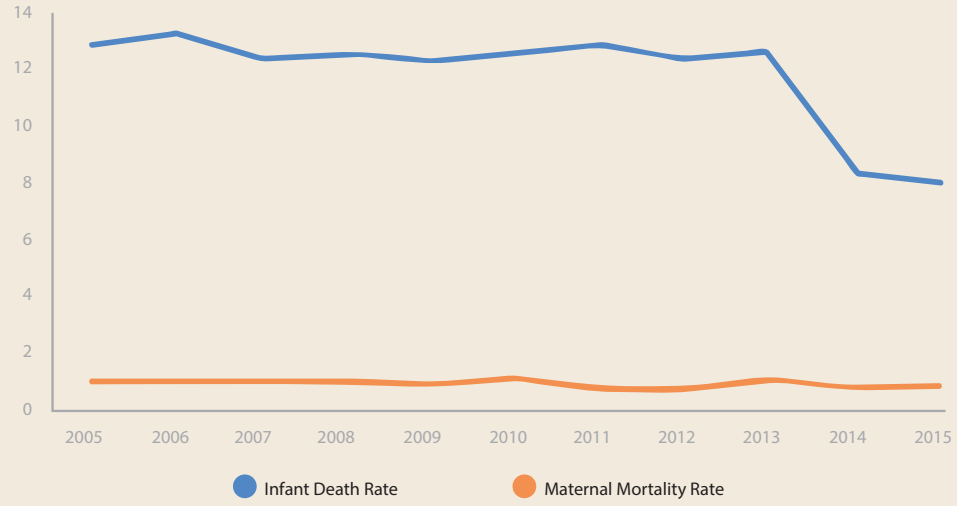


FIGURE 5.11

TRENDS IN INFANT AND MATERNAL DEATH RATES (2005–15)



by Barangay health workers (BHWs), serve as the base [3]. They report to City Health Offices (CHOs) or RHUs usually located in a city or in a town proper. The CHOs/RHUs are usually staffed by physician, nurses, a sanitary inspector, trained midwives, affiliated traditional birth attendants, and BHWs. The RHUs refer patients to primary hospitals, usually composed of 25 beds. Large provinces usually have secondary hospitals composed of provincial and city hospitals. Final referral hospitals are composed of medical centers, regional hospitals, and specialty care hospitals. With the devolution of health services in 1992, Lavado [3] observed that the referral network failed to work as envisioned. For instance, tertiary hospitals normally attend to all the cases, even primary ones [3].

With the breakdown of referral networks, tertiary-level hospitals, which are designed to cater to more serious diseases, are also accommodating cases that can be handled by lower-level facilities. This leads to tertiary hospitals requiring more resource allocation to be able to attend to all its patients. Aside from being more expensive, the current arrangement leads to overcrowding of tertiary facilities, which entails longer waiting

time for patients. This mismatch in the capability of tertiary facilities and the severity of cases they cater to makes costs of seeking health care higher not only for the facilities but for the patients as well. On the other hand, the primary and secondary hospitals may not be fully utilized under such situation. The health system is therefore plagued with many challenges that undermine the efficiency and effectiveness of public hospitals.

Release of funding support for indigent patients may also be considered a critical factor that affects productivity of public hospital. In many cases, indigent patients tend to overstay at the hospital until funding support for their hospitalization and post care requirements are settled. Overstaying patients not only incur additional costs for the hospital, the facility could not attend to other patients waiting as overstaying patients continue to stay in the hospital. Also, given limited funding support from the government, public hospitals are allowed to cater to service or paying patients. However, government hospitals are expected to charge lower than the private hospitals. Such lower rate allows the hospital to generate some funds that may not be enough, even when combined with government funding, to meet their human capital, operational, and capital outlay requirements to improve efficiency and effectiveness. Hence, it is necessary to gather and maintain related data to effectively measure, deploy, track, and improve public hospital productivity and quality.

Conclusion

The findings and observations noted are aligned with the health sector reform agenda of the government. Improving health risk financing, expanding preventive and promotive healthcare, and intensifying the provision of technical services could bring positive health sector outcomes. With slowly improving trends in health sector outcomes, provision of more government resources to achieve its MDGs is expected. The downward trend in productivity of selected public hospitals could be expected as the government pours in more resources to effect actual improvements in health sector outcomes. Analysis of public hospital productivity can be more useful when results are examined in relation to factors that affect productivity trends.

Determining the effective levels of patient-doctor and bed capacity utilization rates and making health facilities adequate and accessible to the public are important productivity parameters for government to focus efforts on policies that will enhance the quality and productivity of every public hospital in the country. These may include measures to broaden preventive and promotive healthcare services, rationalize the health referral system, bring down the cost of health risk financing, address the healthcare capacity and capability gaps, and intensify measures to adopt international standards on patient safety to meet the growing demands for affordable and effective healthcare services in the country.

Public Schools

Educational System, Legislations, Objectives, and Strategies

The Article 14, Section 2 of the Philippine Constitution mandates the establishment, maintenance, and support of a complete, adequate, and integrated system of education relevant to the needs of the people. Hence, the Philippines education functions are assigned to three national agencies namely; i) Department of Education (DepEd), ii) Commission on Higher Education (CHED), and iii) Technological Education and Skill Development Authority (TESDA).

In the Aquino administration, the country's vision of inclusive growth and development entails investment in human capital, particularly through the provision of quality basic education, competitive technical vocational skills training, and relevant and responsive higher education as stated in the Philippine Development Plan 2011–16.

The government has placed a high regard for education and has pushed for educational reforms that promote inclusive education especially for the marginalized. Education, being the priority of the government, has produced active public-private partnerships over the years both at the national and school levels.

Legislations that forms the regulatory framework for education system functioning and public education in the Philippines include the following:

i) The Education Act of 1982 created the Ministry of Education, Culture and Sports, which later became the Department of Education, Culture and Sports in 1987 by virtue of Executive Order No. 117. The structure of DECS as embodied in EO No. 117 has practically remained unchanged until 1994 when the

Commission on Higher Education (CHED), and 1995 when the Technical Education and Skills Development Authority (TESDA) were established to supervise tertiary degree programs and nondegree technical-vocational programs, respectively.

ii) The Congressional Commission on Education (EDCOM) report provided the impetus for Congress to pass Republic Act (RA) 7722 and RA 7796 in 1994 creating the Commission on Higher Education (CHED) and the Technical Education and Skills Development Authority (TESDA), respectively.

iii) The trifocal education system refocused DECS' mandate to basic education which covers elementary, secondary, and nonformal education, including culture and sports. TESDA now administers the postsecondary, middle-level manpower training and development while CHED is responsible for higher education.

iv) Governance of Basic Education Act of 2001 (RA 9155) confirmed the constitutional right to free basic education among the school-age population and young adults to provide them with skills, knowledge, and values to become caring, self-reliant, productive, and patriotic citizens (Section 2 or the Declaration of Policy of RA 9155 [2]).

v) The Kindergarten Act (RA 10157 [2]) widened the scope of education, as it makes preschool for five-year-old Filipinos free, mandatory, and compulsory.

vi) In line with this development is the curricular and education cycle reform that has been legally instituted through the Enhanced Basic Education Act of 2013 (RA 10533 [2]) or the K to 12 law that mandates the government to "create a functional basic education system that will develop productive and responsible citizens equipped with the essential competencies, skills and values for both lifelong learning and employment [8]."

Service Delivery Model

The trifocal education system in the Philippines is shown in Figure 5.12. Both public and private schools provide education services. The trifocal education system refocused DECS' mandate to basic education which covers elementary, secondary, and nonformal education, including culture and sports. TESDA now administers the postsecondary, middle-level manpower training and development while CHED is responsible for higher education.

The Department of Education (DepEd) was established through the Education Decree of 1863 as the Superior Commission of Primary Instruction under a Chairman. The education agency underwent many reorganization efforts in the 20th century in order to better define its purpose vis-a-vis the changing administrations and charters. The present-day DepEd was eventually mandated through Republic Act 9155, otherwise known as the Governance of Basic Education Act of 2001 [2], which establishes the mandate of this agency.

The DepEd formulates, implements and coordinates policies, plans, programs, and projects in the areas of formal and nonformal basic education. It supervises all elementary and secondary education institutions, including alternative learning systems, both public and private; and provides for the establishment and maintenance of a complete, adequate, and integrated system of basic education relevant to the goals of national development.

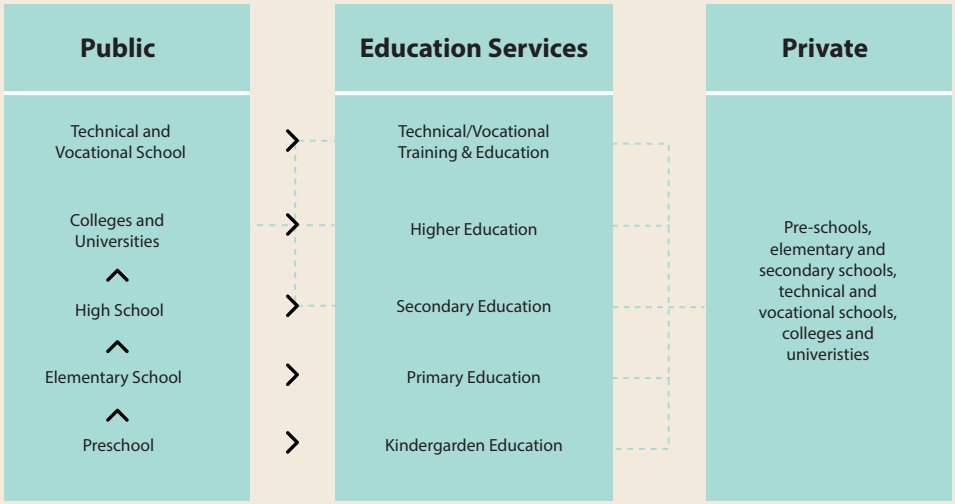
To carry out its mandates and objectives, the department is organized into two major structural components. The Central Office maintains the overall administration of basic education at the national level. The Field Offices are responsible for the regional and local coordination and administration of the Department's mandate.

The Commission on Higher Education (CHED) was created on 18 May 1994 through the passage of Republic Act No. 7722, or the Higher Education Act of 1994 [2]. The CHED is an attached agency to the Office of the President for administrative purposes and is headed by a chairman and four commissioners, each having a term of office of four years. The Commission En Banc acts as a collegial body in formulating plans, policies, and strategies relating to higher education and the operation of CHED.

The CHED formulates and recommends development plans, policies, priorities, and programs on higher education; sets the minimum standards for and monitor and evaluate the performance of programs and institutions

FIGURE 5.12

EDUCATION SERVICE DELIVERY SYSTEM MODEL IN THE PHILIPPINES



of higher learning; and administer the Higher Education Development Fund, as described in Section 10 of R.A. 7722 [2], which will promote the purposes of higher education, and of other related functions.

The Technical Education and Skills Development Authority (TESDA) was established through the enactment of Republic Act No. 7796 otherwise known as the "Technical Education and Skills Development Act of 1994" [2], which was signed into law by President Fidel V. Ramos on August 25, 1994. This Act aims to encourage the full participation of and mobilize the industry, labor, local government units, and technical-vocational institutions in the skills development of the country's human resources.

The TESDA formulates manpower and skills plans, sets appropriate skills standards and tests, coordinates and monitors manpower policies and programs, and provides policy directions and guidelines for resource allocation for the technical-vocational education and training (TVET) institutions in both the private and public sectors.

The delivery of education services in the Philippines has evolved into dual delivery systems of public and private provision, with the public sector as dominant player covering the entire range of interventions with varying degrees of emphasis at different education levels. The formal education is hierarchically structured, chronologically graded 'education system', running from primary school through the university and including, in addition to general academic studies, a variety of specialized programs and institutions for full-time technical and professional training. Public education services are mostly used by the poor and near poor, including communities in isolated and deprived areas. The dominant private sector is made up of large education institutions and smaller providers.

From 1945 to 2011, basic education took 10 years to complete - six years of elementary education and four years of high school education for children aged six up to 15. However, after the implementation of the K-12 Program of DepEd and subsequent ratification of Kindergarten Education Act of 2012 and Enhanced Basic Education Act of 2013, the basic education today takes 13 years to complete - one year of kindergarten, six years of elementary education, four years of junior high school, and two years of senior high school for children aged five up to seventeen. As of 2016, the implementation of Grade 11 has started [9].

Meanwhile, higher education requires even as little as two years (e.g., associate degree) or much longer (e.g., bachelor's degree, master's degree, doctorate) to complete in universities and colleges, and much shorter in technical and vocational schools. University of the Philippines serves as the country's national university and widely regarded as the top higher education institution in the Philippines. There are also a large number of state universities and colleges and privately run ones, and can either be for-profit or not-for-profit and secular or religious.

Profile of Public Schools in the Philippines

i) *Number of Schools.* DepEd recorded a total of 62,618 schools in 2015. About 78% of these are elementary schools of which the public schools dominate with a total number of 38,648. Despite the 15.3% increase in elementary enrolment from 2007–15, the number of schools increased only by about 4%. For secondary level, the 6% increase in enrolment was supported by expansion in the number of schools by about 6% for the same period.

ii) *Classification of Schools.* Schools in the Philippines are classified through the level of education services they deliver.

   a) *Elementary School.* Sometimes called primary school or grade school is the first part of educational system and it includes kindergarten and the first six years of compulsory education (Grades 1–6).

   b) *Secondary School.* Secondary school in the Philippines, more commonly known as high school, consists of four lower levels and two upper levels. It formerly consisted of only four levels with each level partially compartmentalized, focusing on a particular theme or content. Because of the K-12 curriculum, the high school system now has six years divided into two parts. The lower exploratory high school system is now called Junior High School (Grades 7–10) while the upper specialized high school system is now called Senior High School (Grades 11 and 12) [8].

   c) *Vocational School.* Formal technical and vocational education starts at secondary education, with a two-year curriculum, which grants access to vocational tertiary education. However, there is also nonformal technical and vocational education provided as alternative learning programs.

   d) *Tertiary School.* All tertiary education matters are outside of the jurisdiction of DepEd, which is in charge of primary and secondary education, but is instead governed by the Commission on Higher Education (CHED). As of 2013, there are over 2,229 higher education institutions (HEI's) in the country that can be divided into public and private institutions. There are 656 public higher education institutions that account for 28.53% of all HEI's. While 1,643 private institutions account for 71.47% of all HEI's.

Data for Productivity Calculations

Trends in Basic Education Outputs

Table 5.16 shows that the number of students enrolled in public elementary schools (including preparatory level) increased form 12.9 million in 2007 to 14.9 million in 2015. For secondary level, enrolled students jumped from 5.1 to 6.2 million for the same period. The relative growth in number of students in primary and secondary education has increased at an average of 8–9% per year. This is lower compared to the rate of increase in the number of graduates per year with an average of about 13% increase. These trends in basic education outputs confirm the improving educational outcomes in the country.

Inputs for Education

Depending on the type of education services and size of operations, public schools use similar types of inputs to deliver their services. Among the critical inputs being monitored at the national level include the number of teachers and school facilities across the public schools in the country.

Education Budget. In 2015, the DepEd budget rose to PHP319 billion that is 27.5% higher than 2013 budget. Such increase was much lower compared to 72% increase in the budget appropriation for TESDA, which was increased from PHP3.1 billion in 2013 to PHP5.3 billion in 2015. The positive movements in the budget for DepEd and TESDA were a reverse situation in the case of higher education. The CHED allocation went down from PHP3.6 billion in 2013 to PHP2.4 billion in 2015. Although the budget shifts may have been affected by the implementation of K-12 Program, budget movements are important perspectives for review in analyzing the factors affecting the productivity of public schools.

TABLE 5.15

NUMBER OF STUDENTS AND GRADUATES PER LEVEL (2007–15)

Grade Level	2007	2008	2009	2010	2011	2012	2013	2014	2015
					Number of Students				
Preparatory	591,445	746,448	1,054,200	1,233,313	1,671,254	1,773,505	1,865,807	1,812,960	1,737,313
Elementary	12,318,505	12,574,506	12,799,950	13,005,459	13,226,888	13,259,489	13,245,848	13,301,248	13,157,333
Subtotal: Prepatory & Elementary	**12,909,950**	**13,320,954**	**13,854,150**	**14,238,772**	**14,898,142**	**15,032,994**	**15,111,655**	**15,114,208**	**14,894,646**
Secondary	5,173,330	5,421,562	5,465,623	5,530,370	5,576,065	5,641,898	5,772,578	5,928,042	6,012,761
Total	**18,083,280**	**18,742,516**	**19,319,773**	**19,769,142**	**20,474,207**	**20,674,892**	**20,884,233**	**21,042,250**	**20,907,407**
					Number of Graduates				
Elementary	1,671,024	1,675,267	1,697,896	1,695,597	1,817,627	1,850,738	1,880,220	1,929,935	1,998,426
Secondary	855,028	1,068,479	1,020,813	1,051,711	1,153,767	1,172,659	1,215,104	1,282,380	1,266,712
Total	**2,526,052**	**2,743,746**	**2,718,709**	**2,747,308**	**2,971,394**	**3,023,397**	**3,095,324**	**3,212,315**	**3,265,138**

Source: DepEd Enhanced Basic Education Information System (EBEIS) generated report [10]

TABLE 5.16

GROWTH INDICES OF THE NUMBER OF STUDENTS AND GRADUATES PER LEVEL (2007–15)

Grade Level	2007	2008	2009	2010	2011	2012	2013	2014	2015
					Growth Indices of Number of Students per Level				
Elementary	100.00	103.18	107.31	110.29	115.40	116.45	117.05	117.07	115.37
Secondary	100.00	104.80	105.65	106.90	107.78	109.06	111.58	114.59	116.23
Total (Weighted)	100.00	103.63	106.85	109.33	113.19	114.31	115.54	116.60	116.06
					Growth Indices of the Number of Graduates per Level				
Elementary	100.00	100.25	101.61	101.47	108.77	110.75	112.52	115.49	119.59
Secondary	100.00	124.96	119.39	123.00	134.94	137.15	142.11	149.98	148.15
Total (Weighted)	100.00	107.04	106.74	107.56	116.08	118.13	120.75	125.11	127.49

School Facilities. Provision of adequate learning facilities is among the objectives of Enhanced Education Act of 2013. From 2007 to 2015, Table 5.17 shows that the number of secondary schools increased by almost 60% while elementary schools grew by only 3.5%. Similarly, the number of school rooms for secondary education was increased by more than 80% while school rooms for primary education rose from 327,623 in 2007 (Table 5.18) to 467,155 class rooms in 2014, or about 43% increase. These rapid expansions in school facilities were among the priority concerns of the Aquino Administration. Such effort has decongested the number of pupil per room bringing it down from an average of 43 students per room to a low of 33 per room.

Teaching Capacity. As with the need for adequate facilities, there is the need to increase the teaching capacity in primary and secondary schools. This concern is particularly relevant given the limited number of public school teachers who are deployed to deliver basic education services. Such need is apparent given the rapidly growing number of student population who are dependent on public education services. Hence, a significant increase in the number of teachers was observed from 2007 to 2015. Notable increase in the total number of teachers was observed when it grew by 14% in 2012 and 44% in 2015 compared to its level in 2007. A much higher capacity expansion was allocated in secondary education wherein the total number of teachers rose from 131,865 in 2007 to 243,321 in 2015 (Table 5.19), or 84.5% growth.

Basic Education Expenditures. Data on expenditures show how resources were allocated in the delivery of basic education services. Looking at the historical shares of selected expenditure items, Tables 5.20 and 5.21 show that over 90% of DepEd's expenditures were used to cover the personnel expenses of the department. Total expenditures for personal services went up by more than 57% in 2015 compared to the base period. Maintenance and other operating expenses, excluding depreciation, also went up by 74% in 2015. Increases in basic education expenditures were necessary to support the implementation of Enhanced Basic Education Program of the administration.

Productivity and Quality

Productivity Perspective in School Operations

The quality of education services is an important concern that may need to be considered in measuring the productivity of public schools. Since positive learning outcome is the most important determinant of school service quality, productivity estimates may need to consider this particularly in determining the measures of outputs. To the extent possible, the measures of outputs should be corrected by considering relevant available

FIGURE 5.13

ENROLMENT TRENDS IN ELEMENTARY AND SECONDARY SCHOOL LEVELS (2007–16)

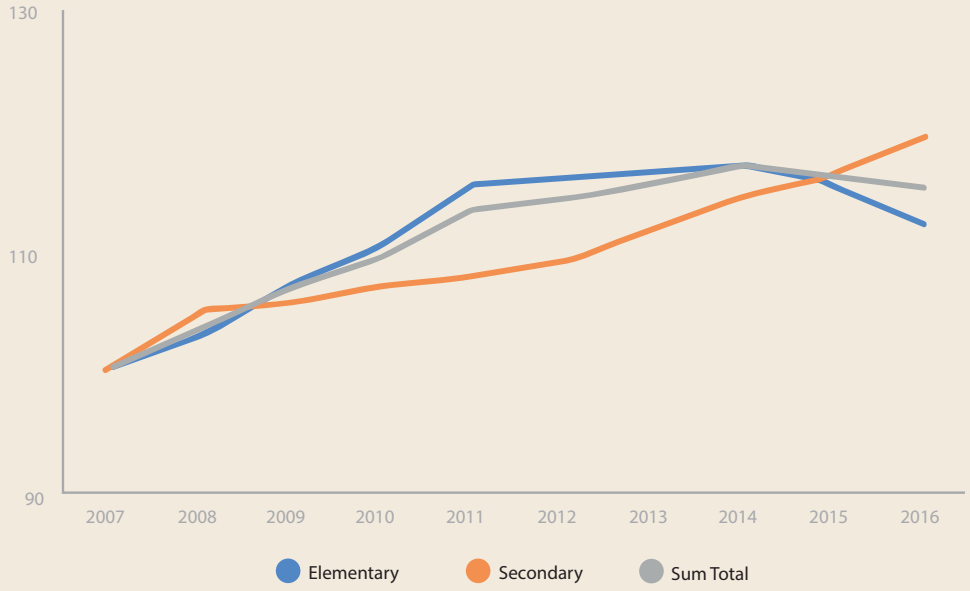


FIGURE 5.14

GROWTH TRENDS OF GRADUATES PER SCHOOL LEVEL (2007–15)

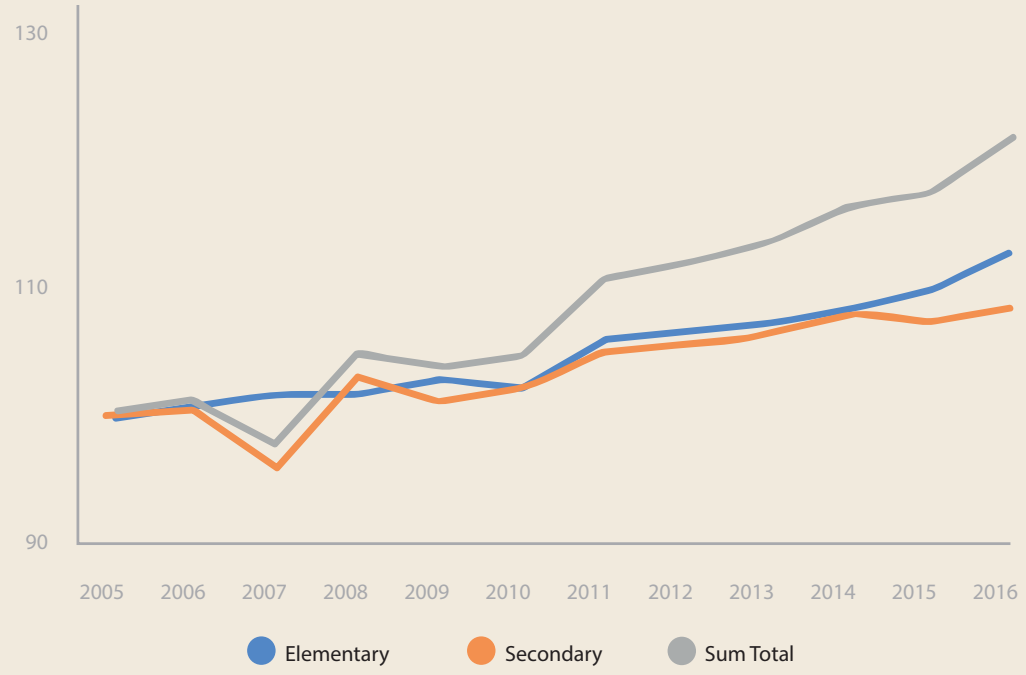


FIGURE 5.15

GROWTH IN NUMBER OF SCHOOL ROOMS (2007–14)

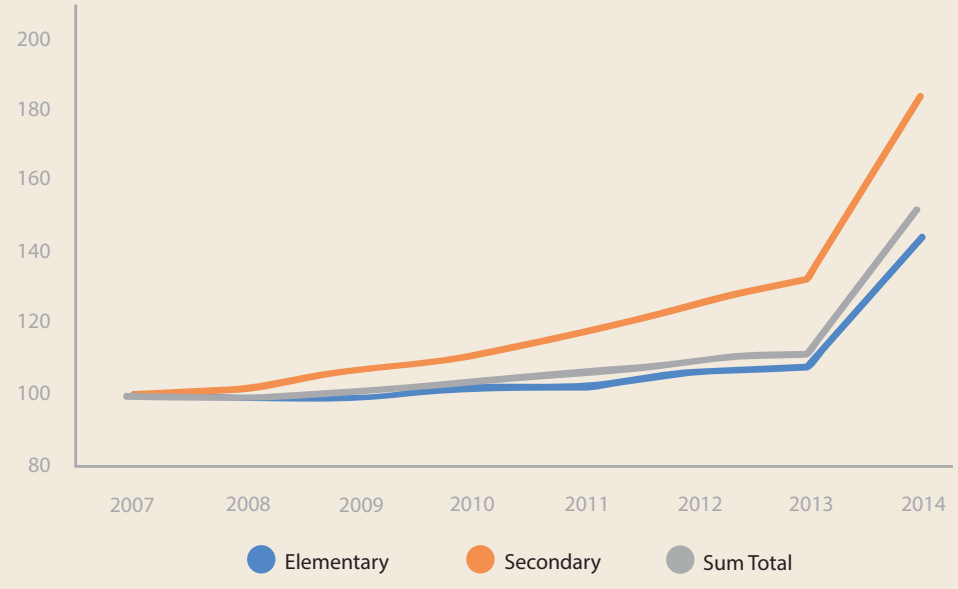


TABLE 5.17

NUMBER OF SCHOOLS PER LEVEL (2007–15)

Particulars	2007	2008	2009	2010	2011	2012	2013	2014	2015
Elementary	37,476	37,607	37,762	38,351	38,503	38,659	38,694	38,684	38,657
Secondary	5,207	5,359	5,677	7,268	7,470	7,748	7,917	7,976	8,082
Total	**42,683**	**42,966**	**43,439**	**45,619**	**45,973**	**46,407**	**46,611**	**46,660**	**46,739**

Source: Philippine Statistical Yearbook, 2009–16 [11]

TABLE 5.18

NUMBER OF SCHOOL ROOMS AND COMPUTED STUDENT-SCHOOL ROOM RATIO PER LEVEL (2007–14)

Particulars	2007	2008	2009	2010	2011	2012	2013	2014
				Number of School Rooms*				
Elementary	327,623	323,595	328,354	332,659	335,424	345,795	351,677	467,155
Secondary	94,253	96,202	101,005	104,208	110,909	118,027	124,977	171,553
Total	**421,876**	**419,797**	**429,359**	**436,867**	**446,333**	**463,822**	**476,654**	**638,708**
				Computed Number of Students per School Room				
Elementary	39	41	42	43	44	43	43	32
Secondary	55	56	54	53	50	48	46	35
Total	**43**	**45**	**45**	**45**	**46**	**45**	**44**	**33**

Source: Philippine Statistical Yearbook, 2009–16 [11]

TABLE 5.19

NUMBER OF TEACHERS AND COMPUTED STUDENT-TEACHER RATIO PER LEVEL (2007–15)

Particulars	2007	2008	2009	2010	2011	2012	2013	2014	2015
					Number of Teachers				
Elementary	348,028	353,280	358,078	361,564	363,955	377,831	401,913	417,848	448,966
Secondary	131,865	138,058	142,518	146,269	150,619	169,743	201,651	219,710	243,321
Total	**479,893**	**491,338**	**500,596**	**507,833**	**514,574**	**547,574**	**603,564**	**637,558**	**692,287**
					Number of Students per Teacher*				
Elementary	37	38	39	39	41	40	38	36	33
Secondary	39	39	38	38	37	33	29	27	25
Total	**38**	**38**	**39**	**39**	**40**	**38**	**35**	**33**	**30**

Source: Philippine Statistical Yearbook, 2009–16 [11]
*Computed data based on number of students per level.

TABLE 5.20

SELECTED ANNUAL EXPENDITURE ITEMS OF THE DEPED IN PHILIPPINES '000 (2007–15)

Particulars	2007	2008	2009	2010	2011	2012	2013	2014	2015
Personal services	114,773,528	126,787,444	144,427,394	167,346,405	186,054,329	202,973,903	226,772,994	236,502,442	265,765,105
Other MOOE	14,277,086	15,813,740	17,617,654	14,903,287	15,209,955	17,804,920	20,724,086	17,950,439	27,606,872
Depreciation	1,931,078	1,691,288	2,044,086	2,311,633	2,516,026	3,220,502	2,662,942	2,360,313	2,699,568
Total Expenditures	130,981,693	144,292,471	164,089,134	184,561,325	203,780,309	223,999,325	250,160,022	256,813,194	296,071,546

Source: COA Annual Audit Report [12]

TABLE 5.21

PERCENTAGE SHARE OF SELECTED EXPENDITURE ITEMS TO TOTAL ANNUAL EXPENDITURE (2007–15)

Particulars	2007	2008	2009	2010	2011	2012	2013	2014	2015
PS Cost	88.9	88.9	89.1	91.8	92.4	91.9	91.6	92.1	89.8
MOOE	9.6	9.9	9.6	6.9	6.3	6.6	7.3	7.0	9.3
Depreciation	1.5	1.2	1.3	1.3	1.3	1.5	1.1	0.9	0.9

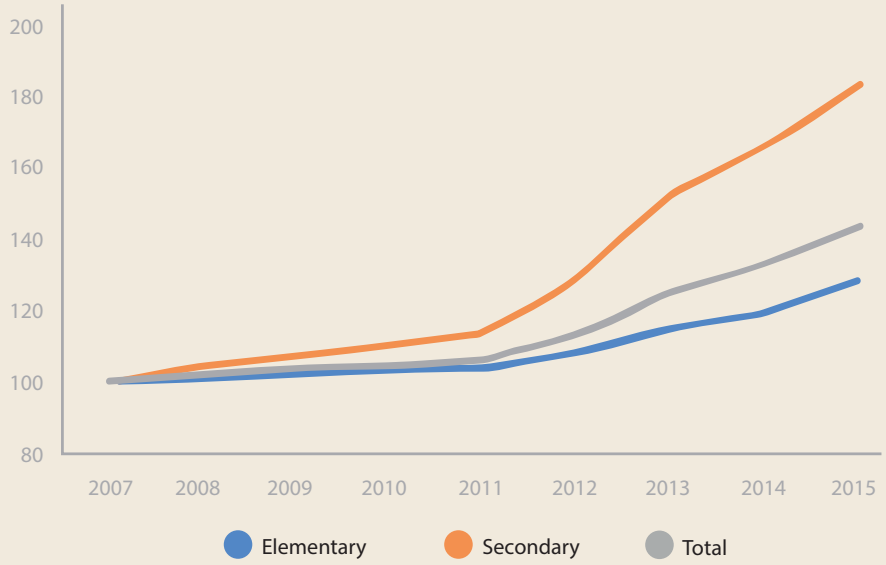
TABLE 5.22

GROWTH INDICES OF SELECTED EXPENDITURE ITEMS OF DEPED (2007–15)

Particulars	2007	2008	2009	2010	2011	2012	2013	2014	2015
PS Cost	100	103.37	112.31	124.59	132.25	137.92	147.39	146.52	157.99
MOOE	100	109.26	118.50	91.20	87.43	96.06	117.01	113.71	174.75
Depreciation	100	87.58	104.19	117.83	128.24	164.15	135.73	111.91	93.47
Total	100	103.70	112.77	121.45	128.10	134.42	144.50	143.15	158.62

FIGURE 5.16

GROWTH IN THE NUMBER OF TEACHERS PER LEVEL (2007–15)



data. Estimates of productivity using the number of students as measure of output show downward trend from 2007 to 2015. Such findings demonstrate the effects of expansion in budget allocation for education to address the limited number of teachers and school facilities affecting the quality of basic education.

Estimates of total productivity show a decline of about 23% from 2007 to 2015 (Table 5.23). This was influenced mainly by the labor productivity trend since over 90% of education expenditures were allocated to cover personal services. Similarly in Table 5.24, the student-teacher ratio went down from about 39 to 30 students per teacher. These trends are consistent with the recent basic education reform initiatives to improve educational outcomes by increasing the resources necessary to meet the growing demands for basic educational services.

Basic Education Outcomes

Considering the trifocal education system in the Philippines, responsible agencies perform separate monitoring and evaluation functions with different measures of outcome as viewed relevant to the mandates of these agencies. Basic education outcomes have improved during the study period. Table 5.25 shows that the primary education dropout rate has gone down from about 6% in 2007 to 2.7% in 2015 while secondary education dropout rate also went down from 7.5% to 6.6% in the same period. Likewise, both transition and completion rates were observed to have improved over the same period of study. The enhanced effectiveness of basic education services may be attributed to the improvement in student-teacher ratio that went down from about 39 to 30 students per teacher.

Improving Public School Productivity and Quality

The delivery of basic education services is critical in shaping the quality of human capital in the country. Issues related to slow improvements in the quality of education may persist if productivity-related issues are ignored. Public school productivity and quality are equally important performance indicators that need to be measured, deployed, tracked, and improved. Although measures of basic education quality are generally available through a number of outcome indicators, estimates of public school productivity was limited. The student-teacher and student-classroom ratios are good productivity indicators that need to be constantly monitored in relation to education outcomes. As observed from the preceding section, efforts to lower the number of students per teacher and number of students per schoolroom showed positive results in dropout rate, exam/test success rate, and completion rate. Hence, it is important to gather, analyze, and maintain data

FIGURE 5.17

TRENDS IN PRODUCTIVITY OF PUBLIC SCHOOLS (2007–15)

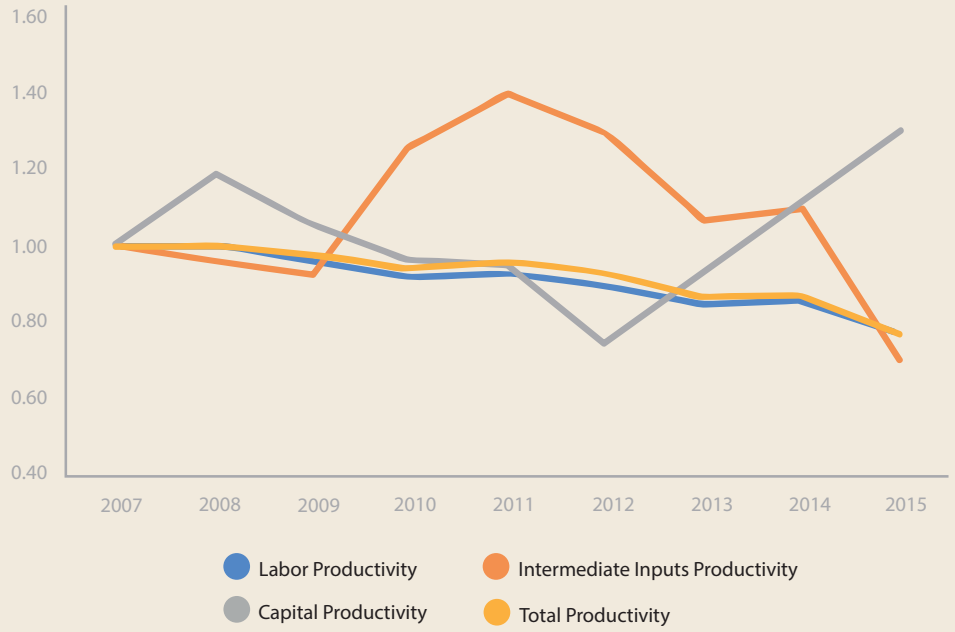


FIGURE 5.18

TRENDS OF NUMBER OF STUDENTS PER TEACHER (2007–16)

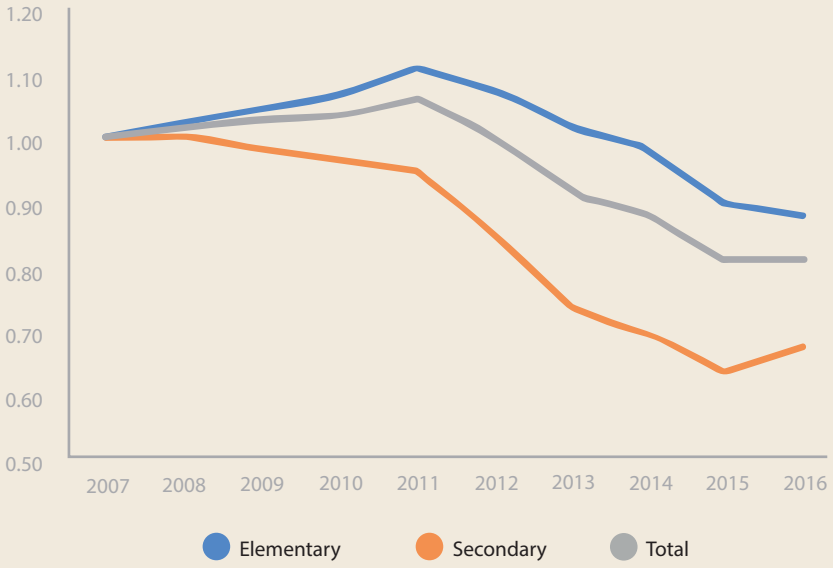


TABLE 5.23

ESTIMATES OF SCHOOL PRODUCTIVITY BASED ON NUMBER OF STUDENTS PER LEVEL (2007–15)

Particulars	2007	2008	2009	2010	2011	2012	2013	2014	2015
Labor Productivity	1.00	1.01	0.98	0.92	0.93	0.90	0.85	0.85	0.78
Intermediate Input Productivity	1.00	0.96	0.93	1.26	1.40	1.29	1.07	1.10	0.70
Capital Productivity	1.00	1.19	1.06	0.98	0.96	0.76	0.92	1.12	1.31
Total Productivity	1.00	1.01	0.98	0.95	0.96	0.92	0.87	0.87	0.77

TABLE 5.24

INDICES OF STUDENT-TEACHER RATIO PER LEVEL (2007–15)

Grade Level	2007	2008	2009	2010	2011	2012	2013	2014	2015
Elementary	1.00	1.02	1.04	1.06	1.10	1.07	1.01	0.98	0.89
Secondary	1.00	1.00	0.98	0.96	0.94	0.85	0.73	0.69	0.63
Total	1.00	1.01	1.02	1.03	1.06	1.00	0.92	0.88	0.80

TABLE 5.25

INDICES OF STUDENT-CLASS ROOM RATIO PER LEVEL (2007–14)

Grade Level	2007	2008	2009	2010	2011	2012	2013	2014
Elementary	1.00	1.03	1.02	1.02	1.02	1.00	0.98	0.74
Secondary	1.00	1.00	0.98	0.97	0.94	0.89	0.84	0.62
Total	1.00	1.05	1.09	1.11	1.16	1.13	1.11	0.83

FIGURE 5.19

TRENDS IN NUMBER OF STUDENTS PER SCHOOL ROOM IN THE PUBLIC SCHOOLS (2007–15)

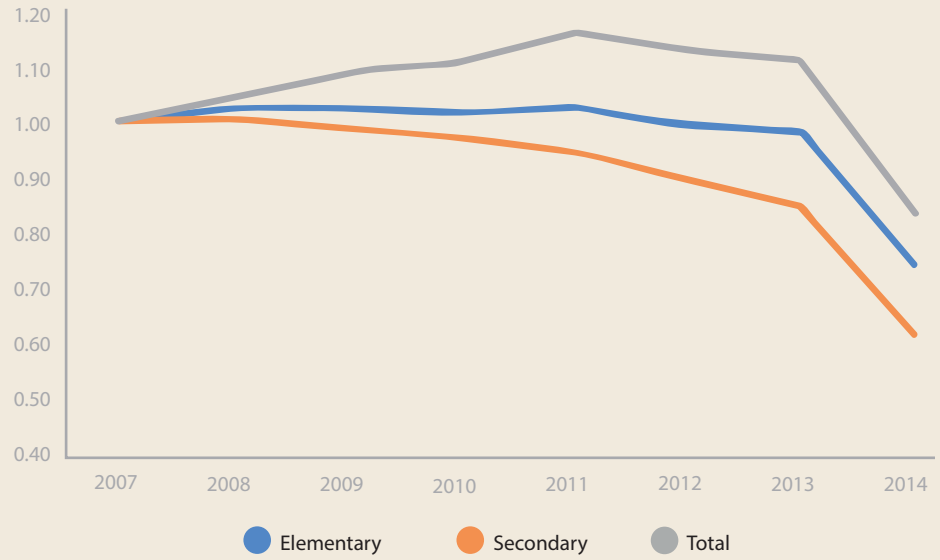


FIGURE 5.20

ANNUAL DROP-OUT RATE IN PUBLIC ELEMENTARY AND SECONDARY SCHOOLS (2007–15)

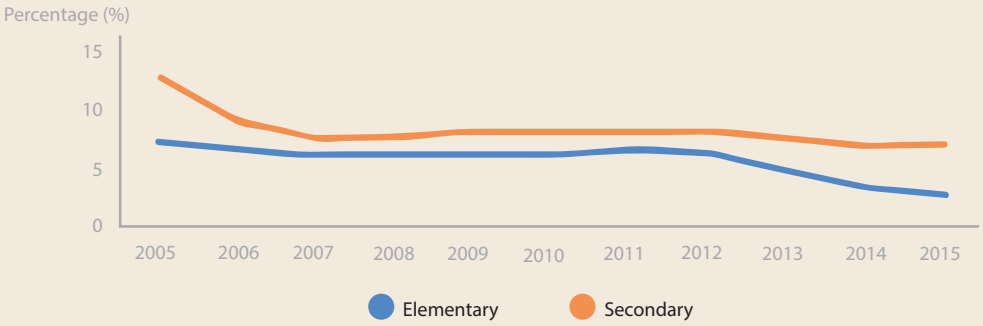


FIGURE 5.21

ANNUAL TEST SUCCESS RATE IN PUBLIC ELEMENTARY AND SECONDARY SCHOOLS (2007–14)

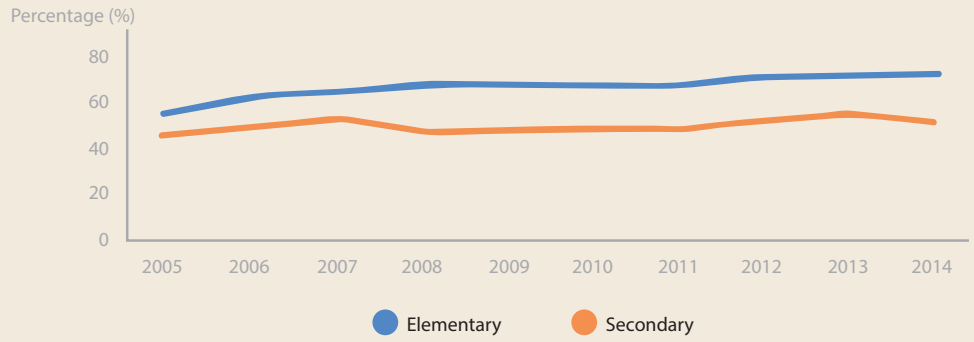


TABLE 5.26

BASIC EDUCATION OUTCOMES PER LEVEL IN PERCENTAGE (2005–15)

Grade Level	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Dropout Rate											
Elementary	7.33	6.37	5.99	6.02	6.28	6.29	6.36	6.24 4.85	3.26	2.69	
Secondary	12.51	8.55	7.45	7.45	7.95	7.79	7.79	8.10	7.58	6.90	6.62
Test/Exam Success Rate											
Elementary	54.66	59.94	64.81	65.55	68.01	68.14	66.79	68.88	69.97	69.10	nd
Secondary	44.33	46.64	49.26	46.71	45.56	47.93	48.90	51.41	53.77	49.48	nd
Completion Rate											
Elementary	68.11	71.72	73.06	73.28	72.18	72.11	71.01	72.66	77.67	83.74	84.02
Secondary	61.66	72.14	75.37	75.24	73.55	75.06	74.40	74.64	76.25	77.77	74.03
Transition Rate											
Elementary	95.65	96.19	96.97	97.05	96.99	96.87	96.60	95.81	96.45	97.32	97.50
Secondary	102.55	97.53	99.32	98.45	99.79	100.41	99.71	98.30	97.18	97.19	96.31

Source: DepEd Enhanced Basic Education Information System, 2006–16 [10]

FIGURE 5.22

ANNUAL COMPLETION RATE IN PUBLIC ELEMENTARY AND SECONDARY SCHOOLS (2007–15)

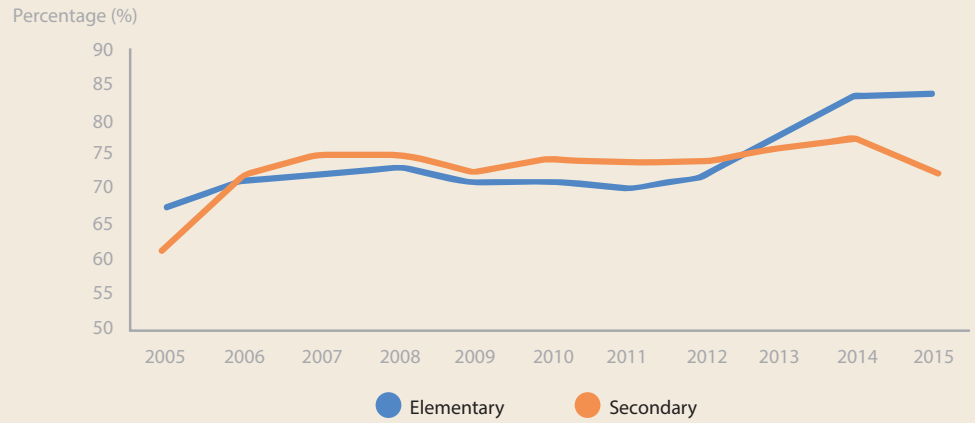
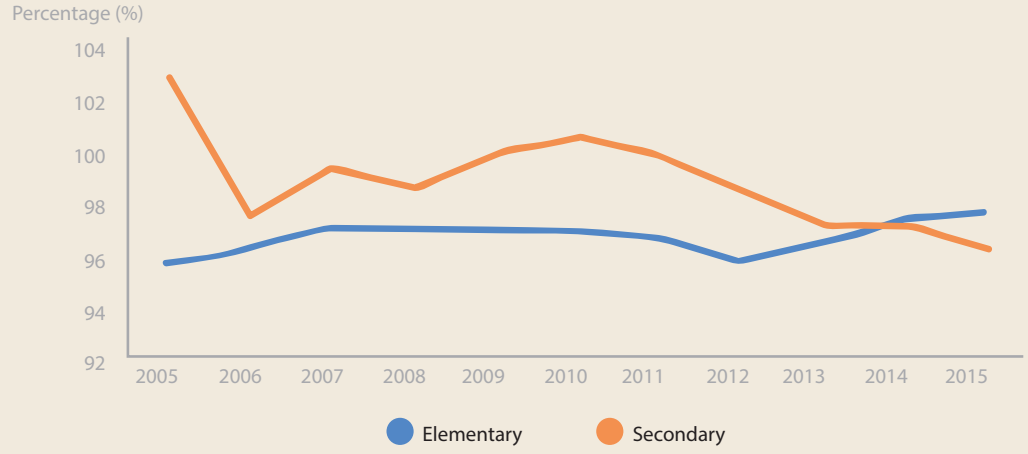


FIGURE 5.23

ANNUAL TRANSITION RATE IN PUBLIC ELEMENTARY AND SECONDARY SCHOOLS (2007–15)



on basic education outputs and inputs to support the generation of productivity estimates. These are necessary to ascertain the optimum productivity levels that would yield the highest positive education outcomes.

Conclusion

The findings augur well with the basic education reforms implemented, particularly from 2011 to 2015. It may be expected that the basic education still have to continue reforms to prevent recurrence of the problems related to limited resources allotted in basic education services to cope with rapidly expanding student population. The downward trends in productivity may be offset by the improving trends in basic education outcomes. Estimates of productivity can be meaningful when results are examined in relation to the quality of basic education services.

Maintaining effective levels of student-teacher and student-classroom ratios and making education facilities accessible to the public are important productivity parameters for government to focus efforts on policies that will enhance the quality and productivity of every public school in the country. These may include measures to improve the learning environment, to bring down the cost of education, address the teaching capacity and capability gaps, and intensify measures to align basic education curriculum to meet the changing demands for higher education and gainful employment.

CHAPTER 6

THAILAND

Patcharasri Dangthongdee
Productivity Researcher
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Introduction

Thailand's Ministry of Public Health (MOPH) is the main organization responsible for the nation's health promotion, prevention, disease control, treatment, and rehabilitation as well as be involved in other official functions in Thailand. There are some small overlaps as other ministries do oversee health-care provision.

The MOPH administrative structure is divided into two levels - central and provincial. The central administration consists of the Office of the Permanent Secretary and three clusters of technical departments. The central ministry also delegates functions to regional health offices and regional technical centers under technical departments in order to monitor and support the work of provincial health offices. The regional health offices are coordination bodies across provinces within a geographical region, responsible for integration of planning and mobilization of resources within a region.

The provincial health office oversees the administration of the province. It also manages and supports the regional and general hospitals, district hospitals and its health promotion centers. Various district hospitals also coordinate with each other in managing the health system. There are also other public healthcare facilities under other ministries and local government, but these make up a very small proportion. Private clinics and hospitals also play a role in providing mostly curative services to match the demand (Figure 6.1).

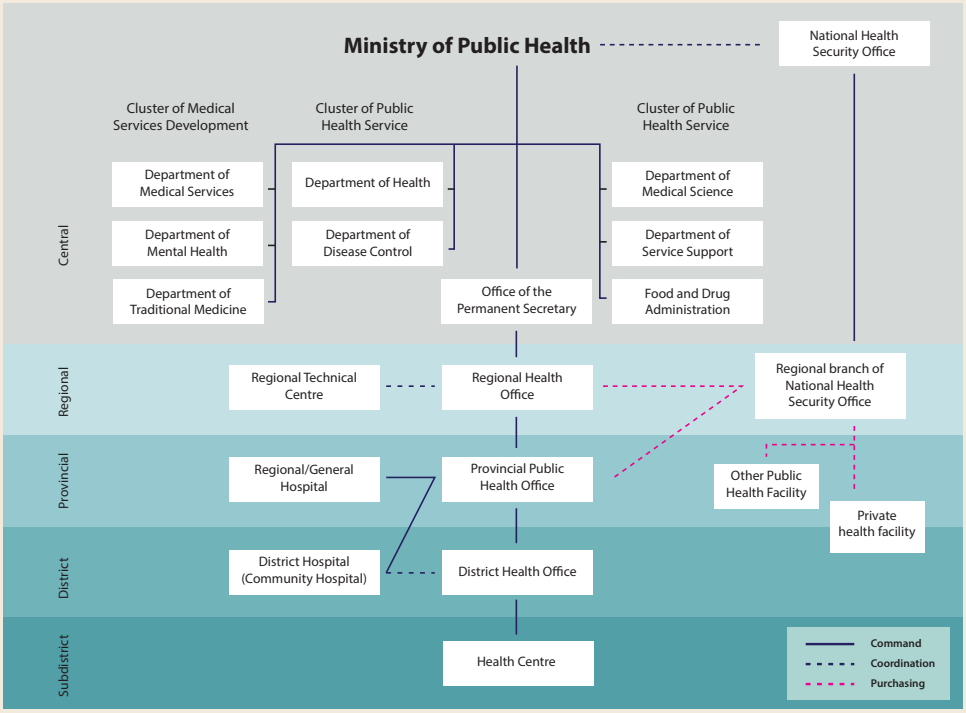
Hospitals in Thailand can be broadly broken down to two sectors - public and private. The public sector consists of the MOPH, Ministry of Defense, Ministry of the Interior, and Ministry of Education. MOPH oversees the largest number of hospitals compared to other organizations.

i) MOPH runs the central hospitals under its Department of Medical Services. A few of the central hospitals are Lerdsin Hospital, Rajavithi Hospital, and Priest Hospital. Regional hospitals also encompasses general hospitals, community hospitals, district health promotion centers, and specialized hospitals.

   - Regional hospitals are hospitals under MOPH and they give tertiary care with more than 500 beds. There are 28 regional hospitals in Thailand
   - General hospitals are also parked under the MOPH. Regional and general hospitals provide tertiary and other specialized care depending on their size and capacity. They may also be general provincial hospitals or large district hospitals with secondary care of 120 to 500 beds. There are 88 general hospitals in Thailand
   - District or community hospitals are under the purview of MOPH. All district hospitals have clinical capacity to provide admission services. The district hospitals provide primary or secondary care in some hospitals with 10 to 120 beds. There are 770 community hospitals in Thailand
   - District health promotion centers which were formerly health centers or community health centers are hospitals may be under MOPH or local government. They offer primary health care services, nearly all patients are sent to the Outpatient Department and the doctors may not be be present at

FIGURE 6.1

THAI PUBLIC HEALTH SYSTEM



Source: The Kingdom of Thailand Health System Review[1]

all times. These centers will cooperate with doctors from community hospitals when there is a case. There are around 10,012 district health promotion hospitals in Thailand

- Specialized hospital - there are five such hospitals in the country

ii) The Ministry of Defence runs the central hospitals and army hospitals from regions one to four. There are six such hospitals in Thailand.

iii) The Ministry of Education manages the university hospitals that are also medical schools (Faculty of Medicine or College of Medicine). These hospitals provide advanced tertiary care (super tertiary care) to their patients. There are 12 university hospitals in Thailand.

iv) The Ministry of Interior oversees the Bangkok Medical Bureau. There is only one hospital which is Vajiira Hospital, also a university hospital that is directly managed by the Faculty of Medicine, BMA Medical College.

The private sector runs the private hospitals, owned by both limited companies and public companies. Some private hospitals are specialized hospitals, such as ophthalmic hospitals or dental hospitals, etc. Some have more than one establishment under one hospital.

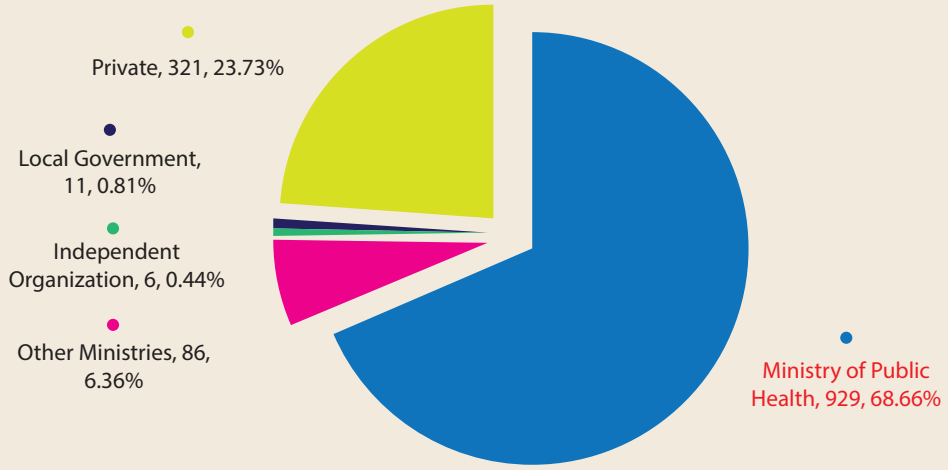
Therefore, the hospitals can be divided into four major sectors: public sector, state enterprises, municipalities (local government), and private sector. Total number of hospitals and medical establishments with beds in Thailand are around 1,300 hospitals, of which approximately 1,000 are under public sector (77%), followed by private sector around 300 (24%). The rest are independent organizations (0.5%) (Figure 6.2).

For total number of beds, there are 150,123 beds of which nearly 77% are owned by public sectors, including MOPH and other ministries. About 20% of beds are owned by private hospitals (Figure 6.3). When classified

[1] Asia Pacific Observatory on Health Systems and Policies. The Kingdom of Thailand Health System Review: Health Systems in Transition; 2015.

FIGURE 6.2

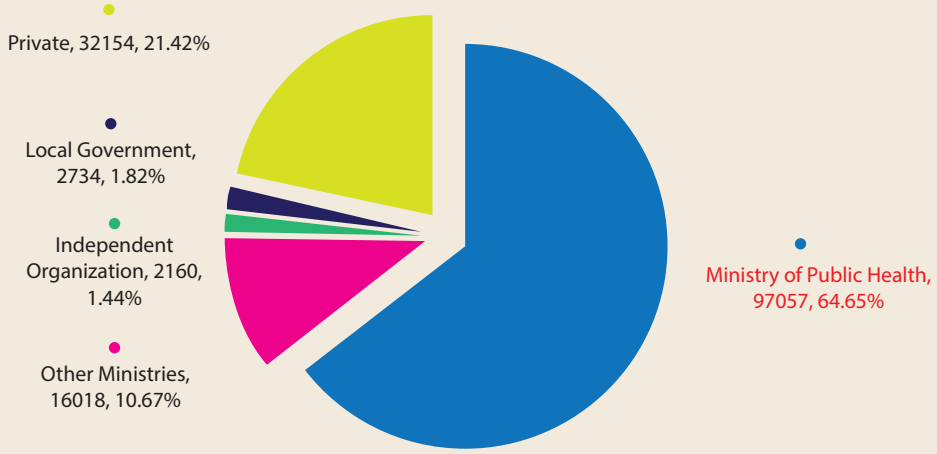
HOSPITAL AND MEDICAL ESTABLISHMENTS BY TYPE OF ADMINISTRATION IN 2015



Source: Bureau of Policies and Strategy (Survey data) [2]

FIGURE 6.3

BEDS BY TYPE OF ADMINISTRATION IN 2015



Source: Bureau of Policies and Strategy (Survey data)

by region, 81% of beds in hospitals are in rural areas. The remaining 19% is in the central area (Bangkok provinces) (Figure 6.4).

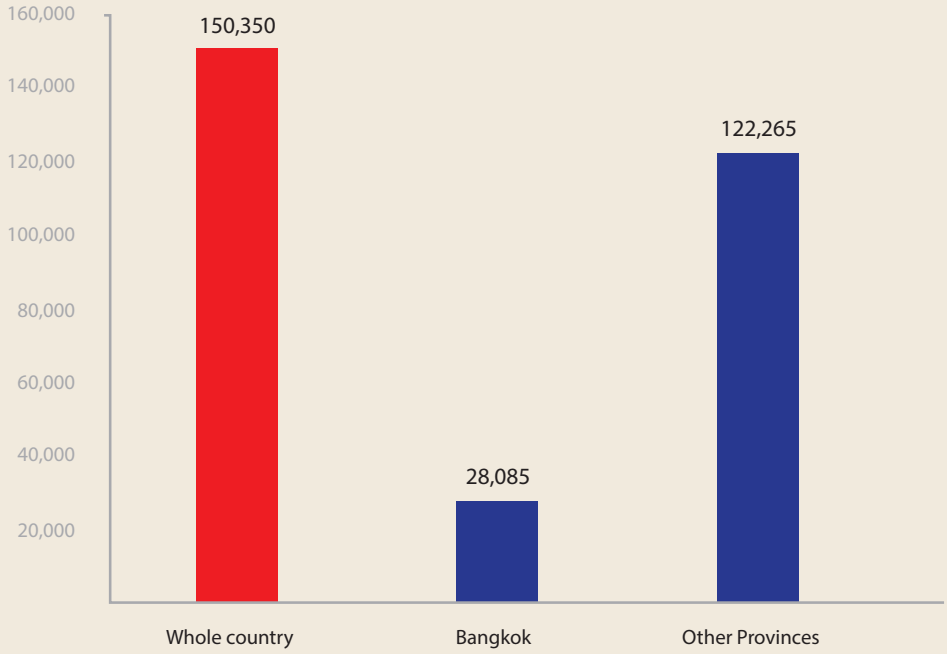
When considering bed occupancy rate, it can be measured be utilization in each hospital. It is found that population in rural area (other provinces) has higher bed rate than the population in Bangkok area. It was about 500 people per bed, while bed occupancy rate in Bangkok was only about 200 people per bed (Figure 6.5).

The distribution of five categories of medical personnel including doctors, dentists, pharmacists, professional nurses, and technical nurses per population shows that these personnel concentrate in Bangkok whereas the rural area has the minimal distribution for every category of medical personnel.

[2] Bureau of Policies and Strategy, Permanent Secretary Offices, Ministry of Public Health. Public Health Statistics, 2003:2015.

FIGURE 6.4

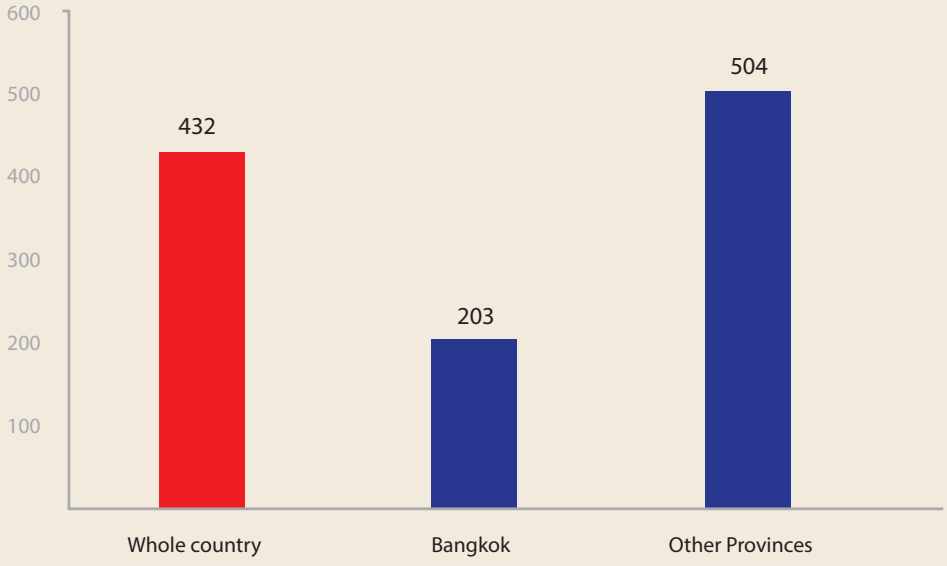
TOTAL BEDS FOR GENERAL SERVICES IN 2014



Source: Bureau of Policies and Strategy (Survey data)

FIGURE 6.5

NUMBER OF POPULATION PER BED FOR GENERAL SERVICES IN 2014

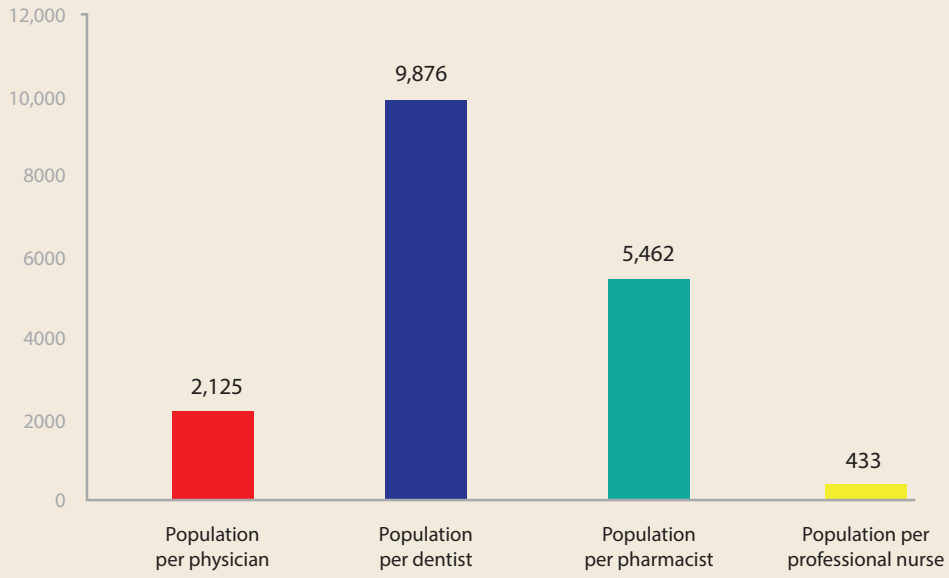


Source: Bureau of Policies and Strategy (Survey data)

Thailand's doctor and population ratio is about 2,000 people per doctor. The ratio for other medical profession are 5,500 people per pharmacist, 433 per professional nurse, and the smallest proportion is approximately 10,000 people per dentist (Figure 6.6).

FIGURE 6.6

PROPORTION POPULATION AND MEDICAL AND HEALTH PERSONNEL OF EACH CATEGORY IN 2014



Source: Bureau of Policies and Strategy (Survey data)

Scope of Study

The study looks into Thai public hospitals which are located in provincial areas, particularly the regional hospitals, general hospitals, and community hospitals. In Thailand, these public hospitals are under the Permanent Secretary Office, Ministry of Public Health.

Ministry of Public Health Strategy in 2016

MOPH shared its vision for its people, where "Within the next decade, all Thai people will be healthier in order to increase economic growth sustainably."

The mission of the ministry is as follows:

i) Defining policies, standards, laws, and manage based on quality database and knowledge management as well as monitoring and evaluation (Regulator)

ii) Set up an efficient health service system that encompasses primary to comprehensive tertiary health service (provider)

MOPH's set two specific goals; i) the average life expectancy at birth is not less than 80 years and ii) the expected average age of health is to be not less than 72 years.

The specification of vision, mission, and goals enabled the ministry to come up with a strategy of managing the public health of the country.

- Develop health by age group
- Develop quality service systems that people can access to services
- Develop management system to support the provision of services

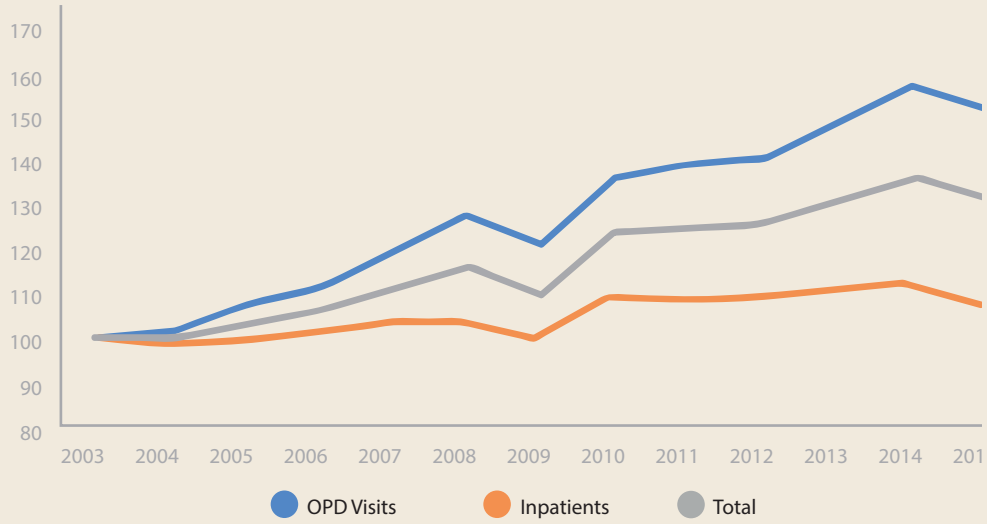
Productivity Analysis

For outputs, the total number of patients in provincial hospitals increased in the past 12 years from 1.0 time in 2003 to 1.3 times in 2015. Patients of public hospitals are classified into two groups: inpatients and outpatients.

For inpatients, the figure is derived from the number of patients who were admitted into a hospital. For outpatients, they are based on the total number of patient visits who enter a hospital for diagnosis or treatment at the Outpatient Department (OPD). Figure 6.7 shows that the increase in outpatients (OPD visits) was 1.5 times higher in the last 12 years while inpatients' rise was slightly less at 1.1 times in the same period.

FIGURE 6.7

PRODUCTIVITY ANALYSIS



Source: Calculations from Health Statistics [3]

For labor productivity, when the five health personnel - doctors, dentists, pharmacists, professional nurses, and technical nurses - are incorporated as inputs, the figure was around 100,000 in 2003, and it rose up to 1.4 times in 2015. According to MOPH data, the increase in the number of these important personnel has led to a slight decrease in labor productivity to 94.5% over the past 12 years (Figure 6.8).

Capital productivity in this report refers to the total number of patients treated from a given volume of capital input. The capital productivity in the past 12 years has fallen to about 0.16 times in 2015. This is due to huge investment made in infrastructure over the past 12 years. A public health policy called National Health Security Policy using the National Health Accounts (a tool that demonstrates how a country's health resources are spent, on what services, and who pays for them) showed that public health expenditure compared to the proportion of total government expenditures, increased from 15% to 20%. The national health security accounted for 22% of the total government expenditure in 2008[4] .

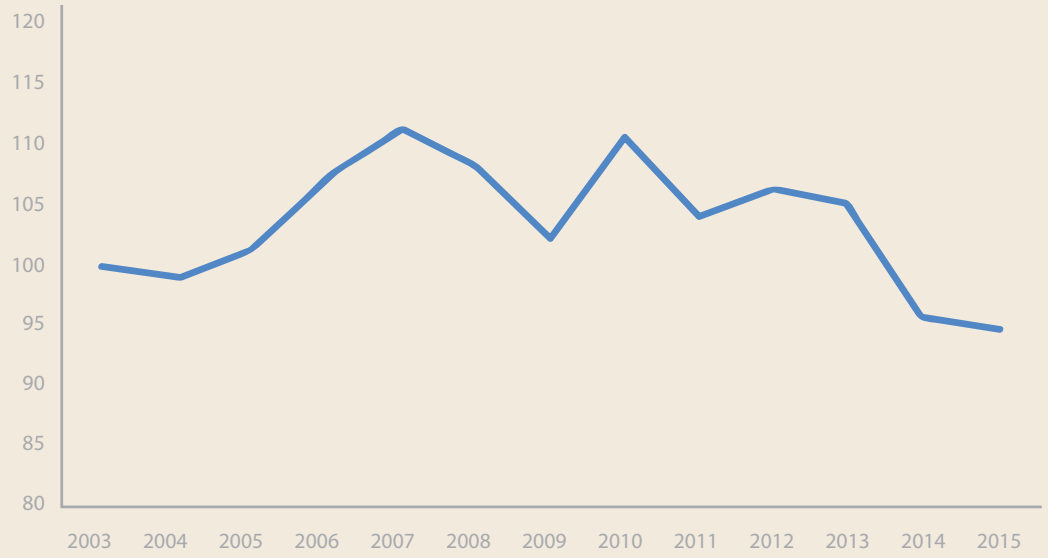
Healthcare spending per capita has also shown a dramatic increase. Capital expenditure included land, equipment, and buildings expenditure. The government invested 8.5 times more while number of patients increased by 1.1–1.5 times in 2015 (Figure 6.9).

For intermediates productivity, the value has also decreased over the past 12 years. It is a significant decrease, 14.7 times from 2003 to 2015. The government's operating cost (remuneration, utilities, or materials cost) increased from USD20 million in 2003 to nearly USD220 million in 2015. All OPD visits and inpatients output over that period increased in smaller percentage, so intermediates productivity had drastically decreased (Figure 6.10).

[3] Bureau of Policies and Strategy, Permanent Secretary Offices, Ministry of Public Health. Public Health Statistics, 2003:2015.
[4] National Health Security Office. The Health Insurance System, 2012

FIGURE 6.8

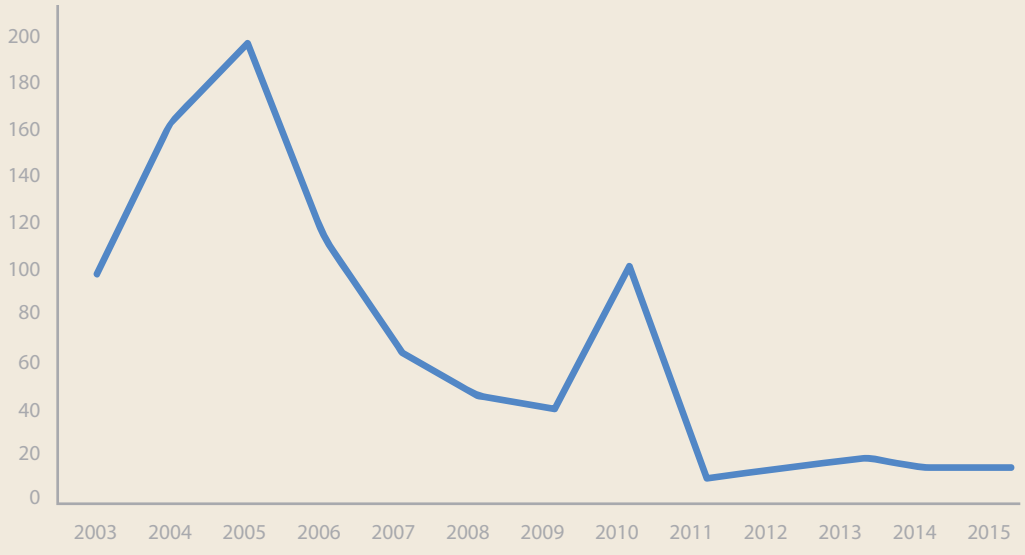
LABOR PRODUCTIVITY



Source: Calculations from Health Statistics

FIGURE 6.9

CAPITAL PRODUCTIVITY

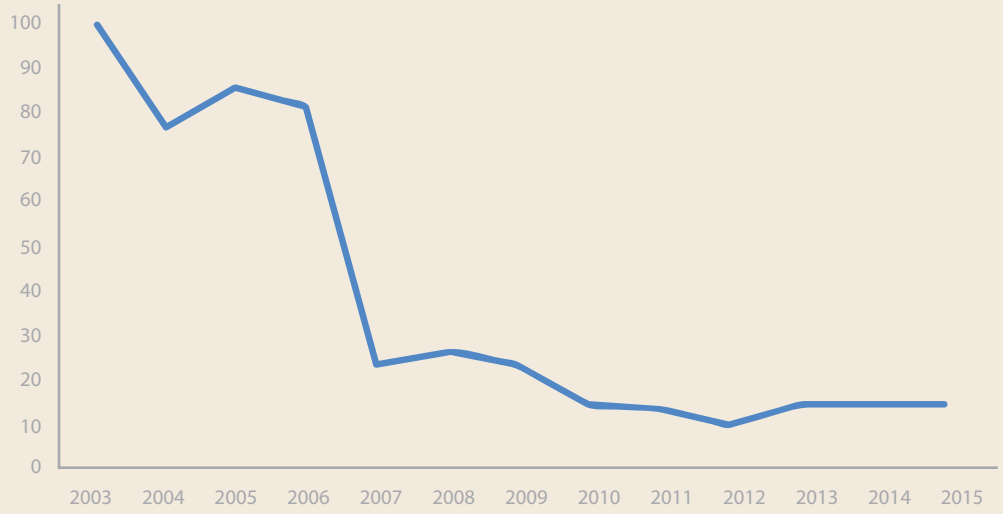


Source: Calculations from Health Statistics and Bureau of Budget[5]

[5] Bureau of the Budget, The Prime Minister's Office. Budget Document, 2003:2015.

FIGURE 6.10

INTERMEDIATES PRODUCTIVITY

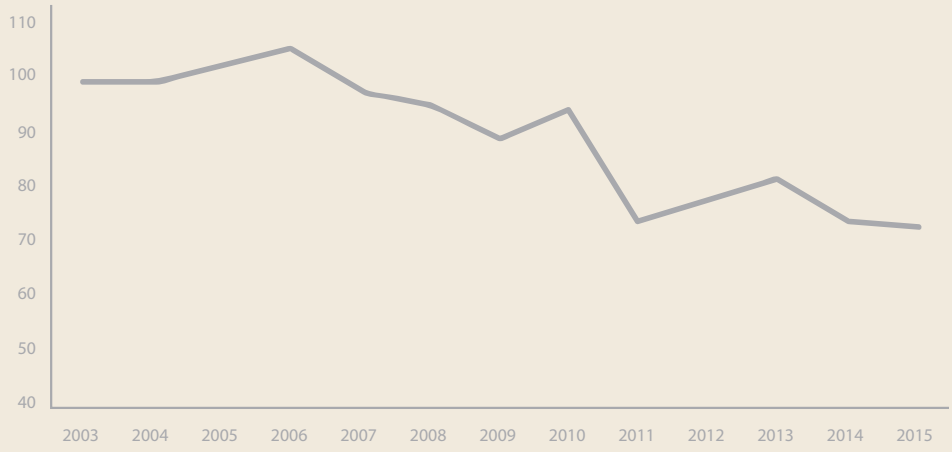


Source: Calculations from Health Statistics and Bureau of Budget

When the three types of inputs - labor, capital, and intermediate - are compared with output (all types of patients), it was found that multifactor productivity decreased from 1.0 to 0.74 times between 2003 and 2015 (Figure 6.11).

FIGURE 6.11

MULTIFACTOR PRODUCTIVITY



Source: Calculations from Health Statistics and Bureau of Budget

For 2015, the goal in its strategic plan was to achieve life expectancy at birth of no less than 80. This can happen only if the public health system has access and quality, and achieving this will make Thai people live longer. According to health statistics, the life expectancy at birth for male is about 72 years in 2015, while female is about 79 years. It can be seen that although life expectancy at birth has been increasing for three years since 2000, it has not reached the goal (Table 6.1). However, according to the National Economic and Social Development Board, it is expected that the female will have a life expectancy at birth of up to 80 years after 2015 (during 2015–20).

In addition, the indicator related to quality of public health services is crude death rate, which refers to inpatient mortality rate per 1,000 population. It is calculated by the number of inpatient deaths per total

TABLE 6.1

LIFE EXPECTANCY AT BIRTH

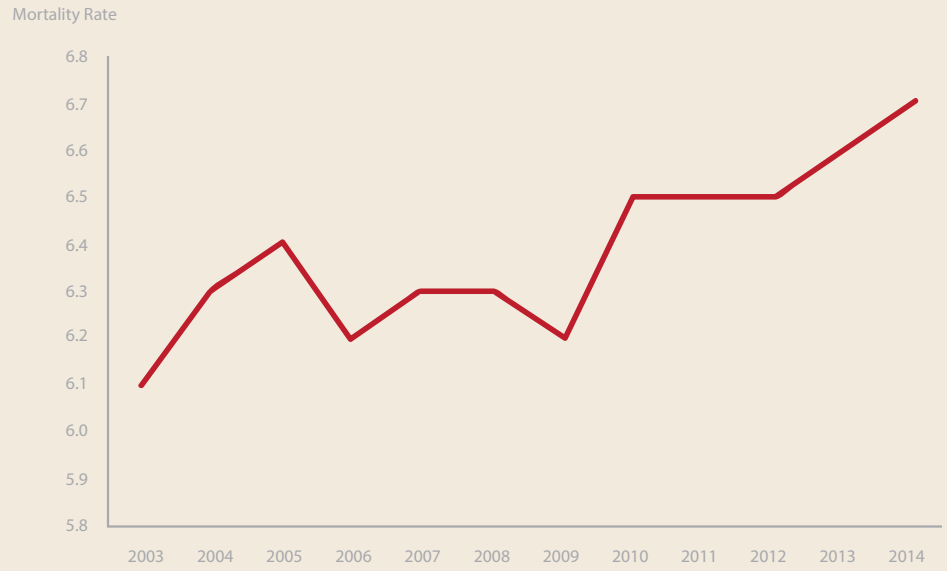
Time Period	Male	Female
2000–05	68.51	75.82
2005–10	70.59	77.54
2010–15	71.93	78.82
2015–20	73.28	80.1
2020–25	74.62	81.38
2025–30	75.96	82.66

Source: Population Projections for Thailand 2000–2030[6]

number of inpatients X 1,000. This indicator is used as a baseline for identifying causes which affect inpatients. If the quality of service is better or improved, crude death rate will be lower. On the other hand, if service performance decreases, crude death rate will increase. In 2003, the crude death rate is 6.1 per 1,000 population and increased slightly to 6.7 per 1,000 population in 2014 (Figure 6.12).

FIGURE 6.12

CRUDE DEATH RATES PER 1,000 POPULATION



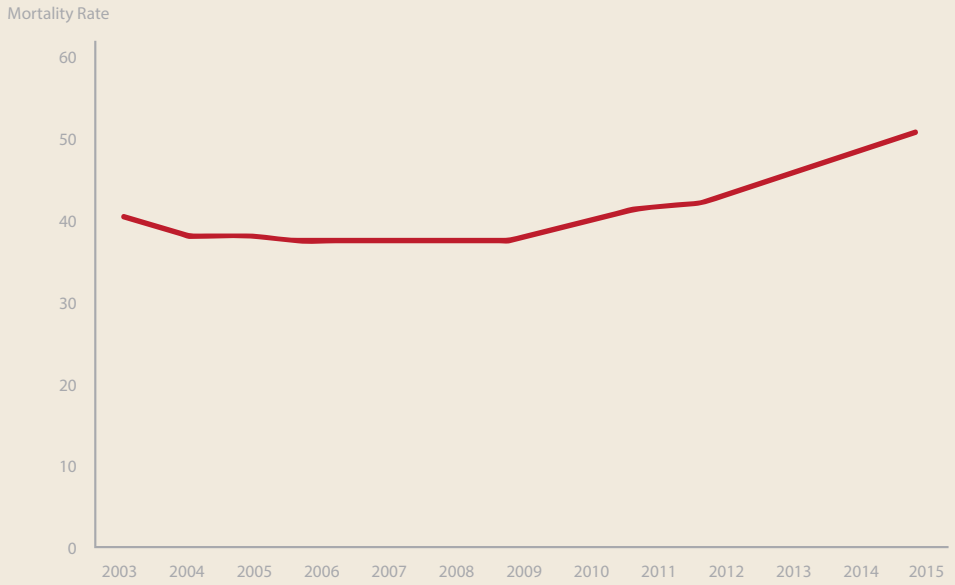
Source: Health Information Unit, Bureau of Policies and Strategy[7]

Mortality rate of complex diseases represents the potential of public hospital's ability to treat sophisticated disease[8]. In 2003–2015, the mortality rate of complex diseases decreased from 40 per 100,000 population in 2003 to 37 per 100,000 population in 2009, however the number increased to 50 per 100,000 population in 2015 (Figure 6.13).

[6] National Economic and Social Development Board. Population Projections for Thailand, 2010:2040.
[7] Bureau of Policies and Strategy, Permanent Secretary Offices, Ministry of Public Health. Public Health Statistics, 2003:2015.
[8] Mortality rate of complex disease can be measured by inpatients deaths with the five-digit system DRGs which has number 3 or 4 as compared to inpatients using a similar system. DRGs means diagnostic related group. It is a patient classification system that is based on information about the disease. Patients in the same group spend time and resources of hospital not much differently.

FIGURE 6.13

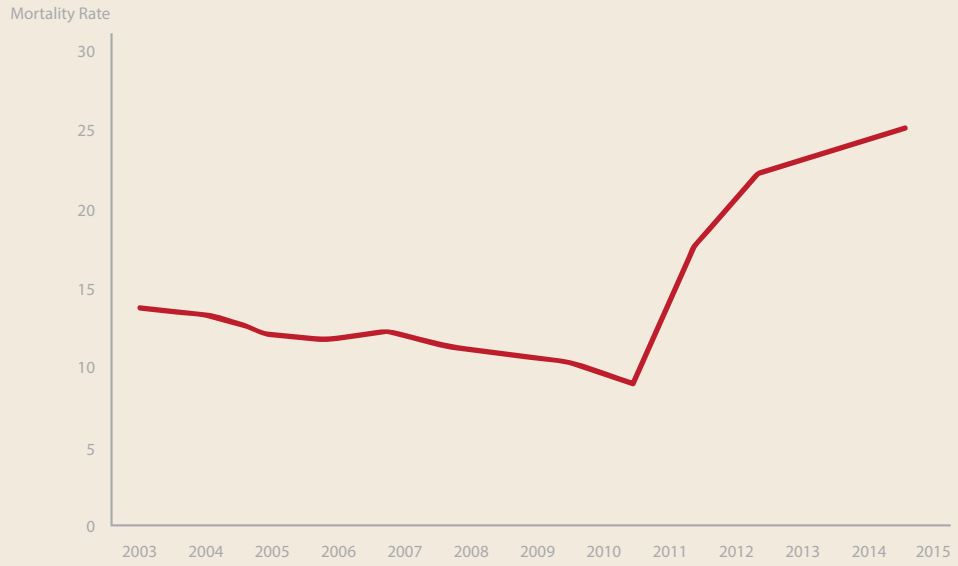
MORTALITY RATE FOR COMPLEX DISEASES PER 100,000 POPULATION



Source: Health Information Unit, Bureau of Policies and Strategy

FIGURE 6.14

MATERNAL MORTALITY RATE PER 100,000 POPULATION



Source: Health Information Unit, Bureau of Policies and Strategy

Another important indicator in identifying the quality of public hospital is services of maternal health during pregnancy and childbirth. Maternal mortality refers to the death of pregnant women, or women in childbirth, or has an abortion less than 42 days, regardless of the cause (excluding deaths from accidents). From 2003 to 2015, the maternal mortality rate decreased from 14 per 100,000 population in 2003 to 9 per 100,000 population in 2011, but increased to nearly 25 per 100,000 population in 2015.

Conclusion

For Thai's public health sector, productivity measured by the impact of maternal mortality rate gives an indication that the level of productivity increase when the maternal mortality rate decrease. This occurred despite the fact that labor, intermediates, capital, and multifactor productivity shows a declining pattern. The Thai government has employed the strategy of creating a conducive environment to increase productivity in the public-health sector, such as by developing a management system to support the provision of healthcare services is considered crucial as a way to increase efficiency in delivering the service.

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ABBREVIATIONS

ADB	Asian Development Bank
AIDS	acquired immunodeficiency syndrome
ANM	auxiliary nurse midwife
APO	Asian Productivity Organization
AYUSH	Ayurveda, Yoga and Naturopathy, Unani, Siddha, and Homeopathy
BHS	Barangay Health Stations
BHWs	Barangay Health Workers
CGS	cost of goods sold
CHC	community health centre
CHDs	Centers for Health and Development
CHED	Commission on Higher Education
CHOs	City Health Offices
COFC	consumption of fixed capital
CPI	Consumer Price Index
DECS	Department of Education, Culture and Sports
DepEd	Department of Education
DHs	district hospitals
DOH	Department of Health
DOSM	Department of Statistics, Malaysia
DRG	diagnosis-related group
ECE	early childhood education
EDCOM	Congressional Commission on Education
GDP	Gross Domestic Product
GPs	general medical practitioners
HEI	higher education institution
HIV	human immunodeficiency virus
ICT	information and communication technology
IPD	intelligent power device
IUCD	intrauterine contraceptive device
JE	Japanese encephalitis
JKN	national health insurance (in Indonesian)
JPA	Public Service Department (in Malay)
LGUs	local government units
LPTK	Teacher Training Institute (in Indonesian)
MARC-1	Major Final Output Report Card

MDGs	Millennium Development Goals
ME3	Monitoring and Evaluation for Equity and Effectiveness
MFP	multifactor productivity
MoEC	Ministry of Education and Culture
MoH	Ministry of Health
MOOE	Maintenance and other Operating Expenses
MOPH	Ministry of Public Health
NCD	National Clinical Database
NGO	nongovernmental organization
NITI	National Institution for Transforming India
OECD	Organisation for Economic Co-operation and Development
OOP	out-of-pocket
OPD	One Patient Detailing
PHC	primary health center
PhilHealth	Philippine Health Insurance
PHS	Primary Healthcare Services
PSA	Philippine Statistics Authority
RA	Republic Act
RHU	Rural Health Units
SC	Sub-centers
SDGs	Sustainable Development Goals
SDH	subdivisional hospitals
TB	tuberculosis
TESDA	Technological Education and Skill Development Authority
TVET	Technical and Vocational Education and Training
UNESCO	United Nations Educational, Scientific and Cultural Organization

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