

## ECONOMIC ANALYSIS

### A. Macroeconomic and Sector Context

1. Pakistan's economy grew at an average annual rate of 4.7% for the period fiscal year (FY) 2014–2018 but fell to 3.3% in FY2019 due to macroeconomic adjustment policies.<sup>1</sup> The country is implementing a structural reform program, which has contributed to higher growth and lower fiscal deficits. During FY2008-FY2017, the economy of Sindh Province grew at an annual average rate of 3.7%.<sup>2</sup> This growth rate was lower than that of the national economy, partly because of natural disasters, including flooding during 2010–2012. However, economic growth accelerated to 5.3% in FY2017. Sindh has the largest industry sector in the country and the second-largest agriculture and services sectors. The province's industry sector accounted for more than 42% of the national total and 29% of provincial gross domestic product (GDP) in FY2017. Karachi is the country's financial capital and its largest port. In FY2017, Sindh's GDP per capita was about \$1,800.

2. Despite improved economic conditions, education spending in Pakistan fluctuated between only 2.0% and 2.8% of GDP during 2004–2017.<sup>3</sup> This is well below the government's commitment to spend 4.0% of GDP on the sector. Pakistan spends a much lower proportion of its gross national product on education compared with other lower middle-income and even low-income countries.<sup>4</sup> Education spending in Sindh is estimated to be less than 1.5% of provincial GDP.<sup>5</sup> Although its Human Development Index rankings have improved, Pakistan's education indicators remain low.<sup>6</sup> About 43% of the population (age 15+) is illiterate and there are wide discrepancies across provinces. Despite achieving the highest Human Development Index score (0.565) among the four provinces, Sindh's education indicators remain grim and are much lower than all other provinces except Balochistan. As many as 80% of rural women in Sindh are illiterate.<sup>7</sup>

### B. Rationale for Investing in Secondary Education

3. Improvements in the quantity and quality of education can raise economic growth and reduce poverty in developing countries. Each additional year of schooling raises average annual GDP by about 0.37% and individual earnings by up to 10%.<sup>8</sup> There is strong evidence that cognitive skills of the population are closely related to long-run economic growth.<sup>9</sup> Conversely, poor learning outcomes and low educational attainment result in a labor force that lacks the skills to support economic growth and development.<sup>10</sup> With a growing economy and potentially bustling industry, agriculture, and services sectors in Sindh, it is essential that the government enables all

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<sup>1</sup> Government of Pakistan, Ministry of Finance. 2019. *Pakistan Economic Survey 2018–19*. Islamabad.

<sup>2</sup> World Bank. 2017. *Sindh Public Expenditure Review*. Washington, DC.

<sup>3</sup> World Bank Data. Government Expenditure on Education: Pakistan.

<https://data.worldbank.org/indicator/SE.XPD.TOTL.GD.ZS?locations=PK>. Last accessed 6 November 2018.

<sup>4</sup> United Nations Educational, Scientific and Cultural Organization. 2015. *Global Monitoring Report – Education for All 2000–2015: Achievements and Challenges*. Paris.

<sup>5</sup> The World Bank. 2013. *Pakistan: Punjab Social Sector Public Expenditure Review*. Lahore.

<sup>6</sup> The Human Development Index is a composite measure for assessing progress in three basic dimensions of human development: life expectancy at birth, educational attainment, and gross national income per capita.

<sup>7</sup> Government of Pakistan, Bureau of Statistics. 2016. *Pakistan Living Standards and Measurement Survey, 2014–15*. Islamabad.

<sup>8</sup> Global Partnership for Education. Education Data. <https://www.globalpartnership.org/data-and-results/education-data>. Last accessed 6 November 2018

<sup>9</sup> E. Hanushek and L. Wößmann. 2010. Education and Economic Growth. *International Encyclopedia of Education*. Vol. 2. Oxford: Elsevier.

<sup>10</sup> World Bank. 2017. *World Development Report*. Washington, DC.

students to get a good education to equip them with the basic skills and knowledge they need to become productive workers. However, the province's education indicators, particularly at the secondary level, are poor. About 6.7 million children are out of school, of which 4.9 million are 10- to 16-year-olds who should be enrolled in secondary school.<sup>11</sup> The lack of access to secondary schooling in Sindh, particularly for girls in rural areas, is a major constraint to lifting enrollments. Only 10% of public schools in the province are secondary schools.<sup>12</sup> Poor education facilities also contribute to low participation and high dropout rates. At the middle school level, the 25% net enrollment rate in Sindh is below that of Punjab and Khyber Pakhtunkhwa provinces, and well below the average of 62% for lower middle-income countries and neighboring South Asian countries. This is partly because of low primary enrollments and partly due to high dropout rates, especially after primary school, when 31% of grade 5 public school students drop out.<sup>13</sup> Another reason for poor educational performance in Sindh is the low quality of the teaching workforce. The poor quality of schools adversely affects learning but also enrollments as households see little value in sending children to school. Weaknesses in teacher quality are exacerbated by an outdated secondary education examination system.

4. The province's education sector faces access, quality, and governance challenges. The Government of Sindh has initiated several reforms under its sector strategy, the Sindh Education Sector Plan (SESP), 2014–2018. The GOS is preparing the SESP, 2019–2023. The government and development partners have focused largely on primary education. Given this emphasis, and the tremendous need at the post-primary level, there are significant opportunities for the Asian Development Bank (ADB) to help improve access and quality at the secondary education level.

### **C. The Project**

5. The Sindh Secondary Education Improvement Project aims to increase the inclusiveness of the secondary education system in Sindh. The project plans to expand access to secondary education by financing the construction of about 160 secondary-level blocks (grades 6–10), which will be operated by private partners under the education management organizations (EMO) program to improve efficiency and quality. The construction of these school blocks, combined with private sector management, is expected to improve schools' infrastructure, management, and school and teacher accountability. This will help to lift access to, and the quality of, secondary education in the province. Increased grade 10 completion rates will mean more secondary school graduates who will attract a wage premium. Other quality-enhancing components of the project, including improved teacher training, increased use of information and communication technology, and reforms to the secondary education examination system, are also expected to lift completion rates and wage premiums by turning out graduates who are better prepared for the labor market or further studies. Newly constructed secondary school blocks will be equipped with solar panels, providing them with a secure source of electricity, and will reduce carbon dioxide emissions relative to conventional alternatives. The project will focus on girls in rural areas to reduce the inequities in education opportunities they face at the secondary level.

### **D. Economic Rate of Return and Sensitivity Analysis**

#### **1. Assumptions Applied in the Economic Analysis**

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<sup>11</sup> Ministry of Federal Education and Professional Training. 2017. *Pakistan Education Statistics 2015/16*. Government of Pakistan. Islamabad.

<sup>12</sup> Government of Sindh, School Education and Literacy Department. 2018. *Better Data, Better Governance: Sindh Educational Profile (2016/17)*. Karachi.

<sup>13</sup> Asian Development Bank (ADB). 2019. *School Education in Pakistan: A Sector Assessment*. Manila.

6. An economic internal rate of return (EIRR) analysis was undertaken to assess the economic viability of the project. All economic benefits and costs are in constant 2019 prices. Project economic life is 20 years, for which the EIRR is calculated based on a discount rate of 6%.<sup>14</sup> Table 1 summarizes the key assumptions.

**Table 1: Assumptions for Economic Analysis**

Category	Without Project	With Project	Increment
Students enrolled in grades 6 to 10 (number)	985,442	1,016,162	30,720
Students enrolled in grade 6 annually (number)	219,520	225,920	6,400
Grade 6 students who complete grade 10 (%)	78.5	80.0	1.5
Students who complete grade 10 annually (number)	172,300	180,736	8,436
Wage premium due to improved quality of education (%)	None	2	2

Note: "Without project" is the baseline school year 2016/17. Data are from the School Education and Literacy Department. 2018. *Better Data, Better Governance: Sindh Educational Profile (2016/17)*. Karachi. "With project" is based on the expected targets of the project.

Source: Asian Development Bank.

## 2. Quantification of Benefits and Costs

7. **Benefits.** The EIRR analysis for the project incorporates two streams of incremental benefits generated by (i) increased access to, and completion of, secondary education; and (ii) improvements in the quality of secondary education. It incorporates the higher lifetime incomes expected because more people complete secondary school over the medium term. The enhanced access that the project is expected to provide by constructing about 160 new secondary school blocks (grades 6–10) will increase enrollments in public secondary schools by 30,720 students during 2020–2025 and 105,200 over 20 years (2020–2039), based on an average of 40 students enrolling in grade 6 in each school. Thus, about 6,400 students would be enrolled in grade 6 each year in newly constructed school blocks. Estimates consider the number of schools that will be built each year during the project.

8. In SY2016/17, 78.5% of students who entered grade 6 in public schools completed grade 10.<sup>15</sup> It is assumed that this will improve to 80.0% from 2026 onward once all project schools have been built. The improved quality of teaching and learning, infrastructure, and basic facilities in project secondary school blocks is expected to reduce dropouts and improve completion rates in Sindh. However, because these additional enrollments are only about 3.0% of the province's total secondary school enrollments, a conservative estimate of a 1.5% improvement in the overall completion rate has been assumed. The higher lifetime incomes of students who complete grade 10 are due to the 5 additional years of schooling they will acquire compared to their previous schooling attainment of primary school (grade 5). The rate of return to each additional year of schooling in Pakistan is estimated at 7.3%.<sup>16</sup>

<sup>14</sup> ADB. 2017. *Guidelines for the Economic Analysis of Projects*. Manila. For social sector projects a lower discount rate of 6%–9% may be applied as the minimum required EIRR. Use of a lower social discount rate for these projects is justified because social sector and poverty-targeting projects often have unquantifiable benefits.

<sup>15</sup> Government of Sindh, School Education and Literacy Department. 2018. *Better Data, Better Governance: Sindh Educational Profile (2016/17)*. Karachi.

<sup>16</sup> Z. Nasir and H. Nazli. 2000. *Education and Earnings in Pakistan*. Working Paper Series No. 177. Islamabad: Pakistan Institute of Development Economics.

9. The second stream of benefits incorporated in the EIRR is a modest 2% expected wage premium for 25% of grade 10 completers resulting from an improvement in the quality of secondary education. The new secondary school blocks constructed under the project will be operated by private sector partners under the Government of Sindh's EMO model. These schools are expected to deliver higher-quality secondary education than non-EMO schools because of their improved resources, school management, and school and teacher accountability. In addition, the project will finance activities to improve the quality of teaching and learning in the province's secondary schools. Finally, examination reforms under the project may improve the quality of education as they will promote 21st century competency-based learning over the rote memorization that underpins the current examination system.

10. The EIRR analysis is based on narrowly defined, easily quantifiable benefits of secondary education. There are substantial positive externalities from investing in secondary education, including less social unrest due to lower youth unemployment rates, decreased fertility rates, and improved nutrition and health outcomes for households with educated girls. The project also incorporates the use of solar technology in newly constructed schools. This will have environmental benefits as it would lead to lower carbon dioxide emissions relative to conventional power sources. Therefore, the EIRR presented here is a lower limit on the returns to the project.

11. **Costs.** The EIRR analysis incorporates the capital and recurrent costs of the project. Only new capital and recurrent costs have been included in 2020–2025. These are the incremental costs of the project. Additional recurrent costs that will continue to accrue from 2026 are based on the costs of running the newly constructed EMO-operated schools and the recurrent costs of maintaining equipment acquired under the project. The analysis assumes an inflation rate of 5%, as projected by ADB. Standard discounting techniques are applied and a conservative period of 20 years (until 2039) is assumed for the benefits and costs streams. A domestic price numeraire is used. Capital costs are adjusted by a shadow exchange rate factor of 1.06 because 21% of the project costs are expected to be for imported goods, equipment, and consulting services.<sup>17</sup> It is assumed that 10% of the labor used in the project will be unskilled since most labor in an education project is skilled and a shadow wage rate of 0.8 is applied to arrive at the economic cost of the project.

### 3. Results of the Economic Analysis

12. The EIRR analysis reveals that the project has a moderately high rate of return of 11.92% and a net present value of \$58.6 million when the standard 6% discount rate is used.

**Table 2: Economic Internal Rate of Return Analysis**  
(\$ million)

Year	Investment Cost	Recurrent Cost	Total Cost	Benefits from Increased Number of Grade 10 Completers	Benefits from Wage Premium due to Better Quality	Total Benefits	Net Benefits
	(1)	(2)	(3) = (1) + (2)	(4)	(5)	(6) = (4) + (5)	(7) = (6) – (3)
2019	0.0	0.1	0.1	0.0	0.0	0.0	-0.1

<sup>17</sup> The shadow exchange rate and shadow wage are drawn from ADB's Punjab Intermediate Cities Infrastructure Investment Project (ADB. 2017. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Islamic Republic of Pakistan for the Punjab Intermediate Cities Infrastructure Project*. Manila).

2020	1.1	0.6	1.7	0.0	0.0	0.0	-1.7
2021	8.9	1.7	10.5	0.0	0.0	0.0	-10.5
2022	21.4	3.5	24.9	0.0	0.0	0.0	-24.9
2023	14.9	4.5	19.4	0.0	0.0	0.0	-19.4
2024	4.9	5.9	10.8	0.0	0.0	0.0	-10.8
2025	6.2	9.2	15.4	2.4	1.4	3.7	-11.7
2026	0.0	9.8	9.8	4.9	2.9	7.7	-2.0
2027	0.0	12.8	12.8	7.6	4.4	12.0	-0.8
2028	0.0	14.7	14.7	10.4	6.2	16.5	1.8
2029	0.0	15.5	15.5	13.3	7.9	21.2	5.7
2030	0.0	16.2	16.2	16.4	9.8	26.2	9.9
2031	0.0	17.1	17.1	19.6	11.8	31.3	14.4
2032	0.0	17.9	17.9	23.0	13.8	36.8	18.9
2033	0.0	18.8	18.8	26.6	16.0	42.6	23.8
2034	0.0	19.8	19.8	30.3	18.3	48.6	28.8
2035	0.0	20.7	20.7	34.2	20.6	54.9	34.1
2036	0.0	21.8	21.8	38.4	23.2	61.6	39.8
2037	0.0	22.8	22.8	42.7	25.8	68.4	45.6
2038	0.0	23.9	23.9	47.3	28.6	75.8	51.9
2039	0.0	25.2	25.2	52.1	31.4	83.5	58.3
					<b>Economic Internal Rate of Return</b>		<b>11.92%</b>
					<b>Economic net present value at 6%</b>		<b>\$58.6 million</b>

( ) = negative.

Source: Asian Development Bank estimates. Exchange rate: 1 USD = 139.8 PKR (January 2019).

13. A sensitivity analysis conducted to test how robust the rate of return is to changes in the underlying assumptions demonstrates that the EIRR remains robust (Table 3). The EIRR is not very sensitive to changes in grade 10 completion rates since the EIRR is 11.6% even with no improvement. The EIRR is somewhat sensitive to changes in the assumption of a lower wage premium of 1% due to better-quality education. The EIRR is 7.8% in this scenario. If both scenarios are combined and no change in the completion rate and a 1% increase in wage premium are assumed, the EIRR drops to 7.5%. Nevertheless, the project remains economically viable (footnote 14).

**Table 3: Sensitivity Analysis**

<b>Assumption</b>	<b>Economic Internal Rate of Return (%)</b>	<b>Net Present Value (\$ million)</b>
No improvement in grade 10 completion rate	11.6	54.8
Lower (1%) wage premium	7.8	15.6
No improvement in grade 10 completion rate and 1% wage premium	7.5	12.6

Source: Asian Development Bank estimates.

#### **4. Project Impact Assessment**

14. The economic benefits generated from the project are estimated at \$228.6 million. The project investment costs and the additional long-term recurrent costs (in economic terms) that the government is expected to incur are estimated at \$170.0 million. Project net benefits are therefore \$58.6 million.