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Evaluation of Asian Development Bank's Funding Priorities on Poverty Reduction and Economic Growth in the Asia-Pacific Region

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Abstract

This paper evaluates the policy validity or empirical appropriateness of the Asian Development Bank (ADB) funding priorities on poverty reduction and economic growth. Specifically, the paper tested if the ADB funding priorities effectively reduce poverty and increase economic growth in the Asia-Pacific region. That is if the ADB funding priorities do vary inversely to poverty and directly to economic growth. The study uses panel data from 2006 to 2017 from 38 Asia-Pacific countries. The data is analysed with the random effect with linear regression correlated panels corrected standard errors (PCSEs) model. The paper finds that the effective bank priorities for poverty reduction

are education services, investment opportunities, and rule of law. However, health services increase the poverty rate in the region. Furthermore, the paper evidenced that bank funding priorities vary directly to economic growth and are inversely proportional to poverty reduction. The paper concludes that implementation of bank funding priorities-based projects improves economic growth through poverty reduction and vice versa. The paper recommends the adoption of the ADB funding priorities subject to the equalled or evenly policies on income and non-income opportunities distributions; particularly, education, health and water services to target the poor across the region.

Keywords: ADB Funding Priorities, Poverty, Asian Development Bank, Economic Growth, Asia-Pacific Region

1. Introduction

Poverty is a historical challenge in the Asia-Pacific region. The poverty in Asia and the Pacific region has dramatically reduced in some regions, and some regions remain poorer than others, this results in high inequality in the region (ESCAP, 2017; ADB, 2019a; 2019b) ^[14, 3, 4]. The economic and social survey of Asia and the Pacific (ESCAP) 2017 ^[14] reported that the poverty intensity in the Asia-Pacific region is still a strategic challenge. Some countries are reported to have an extremely high level of poverty. For example, the poverty headcount rate for data available in 2017, Papua New Guinea was 64.7 percent, Solomon Islands 69.3 percent in the Pacific region, India 58 percent and Bangladesh 56.8 percent in the South and South-West Asia region, and Timor-Leste 80 percent for the South-East Asia region (ESCAP, 2017) ^[14]. The survey 2017 shows the high variation/inequalities in the region from a poverty headcount ratio of 0.09 per cent in Thailand to 80 percent in Timor-Leste. The poverty headcount ratio is based on the threshold of \$3.10 a day, 2011 purchasing power parity (PPP). Moreover, the earlier study of the Asian Development Bank (ADB) (2008) ^[5] evidenced that poverty by Sub-region under the \$2 per day poverty line is still a challenge in Asia and the Pacific region. It found that in 2008, the poverty headcount ratios on average were 47.95 percent in Central and West Asia, 25.42 percent in East Asia, 52.42 percent in Pacific, and 75.57 percent in South Asia in 2005 and increased to 72.82 percent, 37.36 percent in Southeast Asia, and 47.43 percent in developing Asia in 2008. In South Asia and the Pacific sub-regions, the number of poor under the \$2 per day poverty line increased, as population growth outpaced the rate of poverty reduction (ADB, 2011) ^[6].

Working on this regional challenge of poverty in Asia and the Pacific countries, the ADB set its operational long-term strategy framework two (LTSF-II) 2008-2020 which is a successor of long-term strategic framework one for 2001-2015 (LTSF-I) that aimed to end the poverty by 2020. This strategy is replaced with the strategy 2030. In achieving the strategy 2030 the Asian Development Bank sets seven operation priority supporting areas, which are addressing the remaining poverty and reducing inequalities (the first priority). Other areas of priority include accelerating progress on gender inequality (the second priority); tackling climate change, building climate and disaster resilience, enhancing environmental sustainability (the third priority); making cities liveable (the fourth priority); promoting rural development and food security (the fifth priority); strengthening governance and institutional capacity (the sixth priority) and the last one is fostering regional cooperation and integration (the seventh priority). To operate these supporting areas ADB instituting a "One ADB" approach that brings together knowledge

and expertise across the organization to effectively implement Strategy 2030 (ADB, 2018). The bank aimed to address the remaining poverty by focusing on its comparative strength of funding and providing technical assistance on infrastructure, environment (climate change), regional cooperation and integration, financial sector development, and education (ADB, 2008; 2019b) ^[5, 4]. The emphasizing role of the ADB is to fund or provide technical assistance to the Asia-Pacific countries in the named priority areas (ADB, 2016; 2019a) ^[2, 3]. The ADB assumes that the implementation of its prioritised projects across the region will increase economic growth and reduce poverty (ADB, 2008; 2019b; Kaul, Grunberg and Stern, 1999; UNIDO, 2008; ADB, 2019a) ^[5, 4, 15, 20, 3].

The ADB funding priorities now are convincing priorities for both economic growth and poverty eradication for Asia-Pacific countries as they are set by an economic and financial influential organ in the region. Therefore, the paper is motivated to evaluate the effectiveness of projects that are given priority by ADB to be invested (funded) across the region. Specifically, the paper aimed to answer the question; does the ADB's funding prioritised projects in the Asia-Pacific region vary inversely proportional to poverty indicators and directly proportional to economic growth? The next sections of the paper cover the empirical studies, methodology, findings, discussion, and the last sections cover the conclusion and recommendation.

2 Empirical studies

The ADB funding priorities are the macroeconomic determinants of poverty reduction which are described by macroeconomic policy. The study of the macroeconomic determinants of poverty reduction particularly in the Asia-Pacific region has contradictory contributions or results. For example, McKinley (2003) ^[18] conducted a policy paper on analyzing the macroeconomics policy for prioritization of poverty reduction in 9 Asian countries. He found that focusing on public goods investment fosters both economic growth and reduces poverty. He suggested that improving financial institutions for direct credit, stronger regulations, employment generation and agricultural development will be the policy option. In contra, Krantz (2001) ^[17] examined the macroeconomics determinants of poverty reduction using the sustainable livelihood approach (SLA) and rejects the usual sectoral entry point (e.g., agriculture, water, or health) and instead begins with an analysis of people's current livelihood systems to identify an appropriate intervention for poverty eradication. In addition, Krantz (2001) ^[17] suggested that the intervention priority will be done on the bases of the personal and social characteristics of the poor.

More recent studies are done in the Asia-Pacific region to examine the causes of poverty and the best strategies to undertake in the region. Chaltherjee (2017) ^[10] examined the strategies to combat poverty and generate decent employment in the Asia-Pacific region. He found that economic growth has been a major driver of poverty reduction in the Asia-Pacific region and had been closely associated with poverty reduction. Chaltherjee (2005) ^[13] addressed the poverty reduction strategies in the region. He found that the provision of the basic infrastructure such as water and sanitation, and electrification in the rural, health and education have a direct impact on reducing the poverty in the region. Additionally, Chaltherjee (2005) ^[13] found that

financial inclusion in the region increases the income of the individual and opens more opportunities for an individual to access health and education. Chaltherjee (2005) ^[13] supported by ADB (2008) ^[5], and ESCAP (2017) ^[14]. On the other hand, the improvement of rural roads opens more market opportunities by increasing the mobility of the goods and reducing the price (Chaltherjee, 2005; 2014; ESCAP, 2017; Warr, 2010) ^[13, 11, 14, 21]. Furthermore, Chaltherjee (2005) ^[13] confirms the provision of microcredit for women, proper use of information and communication technology (ICT), and effective climate change management reduce the poverty. Barichello (2004) ^[7] examined the impact of agriculture on poverty reduction in Asia-Pacific and found a positive correlation between them. He suggested investing more in rural areas whereby agriculture is conducive. ESCAP (2017) ^[14] addressing the policy paper on eradicating poverty and promoting prosperity in a changing Asia-Pacific suggested the improvement of the basic infrastructure such as rural roads and rural electrification will help to reduce the poverty in the region. ADB (2016) ^[2] confirms that the increases in rural productivity that are driven by a technology change foster both economic growth and poverty reduction. Empirical evidence suggests that improvements in infrastructure in countries with special needs contribute positively to the increasing human development by providing access to services such as health, education and sanitation and distributing their benefits much more equitable (ESCAP, 2017) ^[14]. Anderson, de Renzio, and Levy (2006) ^[1] using cross-country data found that government expenditure on education, agriculture and housing and amenities (water, sanitation and social security) has a negative and statistically significant impact on poverty. Chatterjee, *et al.* (2004) ^[12] examined the Asia-Pacific infrastructure, regional cooperation and poverty reduction. They found that road transportation reduces price, increases goods mobility, and opens more opportunities for the individual to generate income. Moreover, they evidenced that rural electrification helps to expand the rural economy and results to reduce the poverty in rural areas.

In general, the literature exhibits a contradictory gap on the macroeconomic determinants of poverty reduction in the region. McKinley (2003) ^[18], Khan and Weiss (2006) ^[22] and Chaltherjee (2014) ^[11] and others support the intervention of poverty reduction that is based on macroeconomic determinants but Krantz (2001) ^[17] rejects the intervention that is based on macroeconomic determinants and suggested that the intervention priority will be done on the bases of the personal and social characteristics of the poor. Therefore, this paper needs to intervene in the debate to increase the impact (return) assurance of the ADB funding priorities based on project implementation across the region.

3. Methodology

This empirical framework is built from the various studies' suggested strategies (e.g., ADB, 2016; Chaltherjee, 2017; Weiss and Khan, 2006; ESCAP, 2017; ADB, 2018) ^[2, 10, 22, 14]. According to ADB (2008 ^[5]; 2018), the projects prioritised are infrastructure (INFRA), environment (climate change) (ENVI), agricultural productivity (AGRP) and financial sector development (FID) which are assumed to reduce the poverty intensity (PoI) under the mediation effect of social services (education, health and water) (SOS), political and governance quality (PGQ), gender inclusion (GEI) and economic growth (EG). From this concept, we

establish the following econometric models,

Econometric model

Model: $PoI = F$ (INFRA, ENVI, AGRP, FID, INVP || SOS, PGQ, GEI, EG)

This study uses an exploratory research strategy that seeks to generate posterior hypotheses by examining a data set and looking for potential relations between variables (Kothari, 2009) [16]. This study describes the population as the Asia-Pacific region. The study was conducted in 38 Asia –Pacific countries. The study used simple random sampling techniques that offered equal chances of being selected in the study for Asia-Pacific countries. This study uses panel data from 2006 to 2017, because only quantitative data can be analyzed statistically and thus more rigorous assessments of the data are possible (Kothari, 2009) [16]. Data were extracted from various secondary sources, mainly from the household budget survey (HBS), World Bank, Asia Development Bank, and Central Intelligence Agency (CIA). The paper used the random effect regression with linear regression; correlated panels corrected standard errors (PCSEs) because the study aims to generalize the finding to the large population –the Asia- Pacific. The function relation that describes the econometric model is;

$$PoI(MPI,H,Z)_{it} = \beta_1 X_{it} + \alpha_i + u_{it}$$

Whereby,

β_1 is the coefficient value for the independent; $PoI(MPI,H,Z)_{it}$ is the dependent variable (poverty intensity-PoI), where i is an entity, and t is a time; X_{it} = the time-variant regressor (one independent variable); $\alpha_i(i = 1 \dots n)$ the unobserved individual effect (unknown intercept for each entity, and u_{it} is the error term.

The poverty intensity (PoI) was measured in the multidimensional poverty index (MPI), poverty headcount rate (H), and poverty gap index (Z). The poverty intensity (PoI) be an empirical function of ADB operational projects priorities indicated in infrastructure (INFRA) which is expressed in percentage of the paved road (PPR), percentage of the internet user (PICT) and electricity production capacity per year (EPC); environment(climate changes) (ENVI) measured in environmental performance index (EPI); agriculture productivity (AGRP) which expressed as an agriculture output ratio (AGR); investment opportunity (INVP) which is expressed as foreign direct investment

inflow (FDI Net); social services (SOS) provisions which are education, health and water services expressed as expenditures on education in percentage of GDP (EpEd), expenditure of health in the percentage of GDP (EpHe), and percentage of the population accessed improved water (PAW) respectively. On the other hand, financial sector development (FID) is measured by domestic credit claimed in the private sector (DCPr) and domestic credit claimed in the public/government sector (DCPu); gender inclusion (GEI) is measured in the female participation ratio (FeP), and the political and governance quality (PGQ) which measured by rule of law index (RuL) and governance effectiveness index (GoE). Economic growth is measured by GDP per capita (GDPp). This study includes the variables that mediate the impact of RPGs, which are social services (education, health, and water), economic growth, investment opportunity, agriculture productivity, political and governance quality, and gender inclusion.

4. Findings

Empirically, this study examines if the ADB’s prioritised projects on the infrastructure (INFRA), environment (climate change) (ENVI), agricultural productivity (AGRP) and financial sector development (FID) which are assumed to reduce the poverty intensity (PoI) under the mediation effect of social services (education, health and water) (SOS), political and governance quality (PGQ), gender inclusion (GEI) and economic growth (EG). The findings are presented in the next subsections.

4.1 Model justification and data cleaning

The study applied Hausman and Breusch and Pagan Lagrangian multiplier tests for modelling justification. The Hausman test shows the random fixed effect is the best choice for modelling the variables (Torres-Reyna, 2007) [19]. Furthermore, the Breusch and Pagan Lagrangian multiplier test (LM) model shows that the use of the random effects model is better than the use of the simple OLS regression because of panel effects (Torres-Reyna, 2007) [19]. The linear multicollinearity test was done across the variables. It found no more than 0.50 inter-variables correlations, but the intra-variables correlation of financial sector development measures. The intra-variable correlation has no impact on multicollinearity because it has the same impact on the dependent variable.

Table 1: The outputs of the panel effect test by Hausman Coefficients

Variable	(b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
PPR	-.0010523	-.001491	.0004387	.000767
PICT	.0020433	.0020264	.0000169	.0002293
EPC	-5.79e-10	-5.94e-10	1.54e-11	1.01e-10
FeP	-.0001398	-.0000695	-.0000703	.0002796
DCPr	-8.84e-13	-1.51e-12	6.22e-13	8.52e-13
DCPu	-6.18e-13	-5.83e-13	-3.59e-14	3.62e-13
AGR	-.0017687	-.0016117	-.0001571	.0005382
EpEd	-.0030178	-.003234	.0002162	.0008082
EpHe	.0073579	.0075063	-.0001484	.0016334
EPI	.0000985	-.0005734	.000672	.0008454
GoE	-.0000279	-.0000357	7.82e-06	.0000832
GDPp	-1.47e-11	-1.17e-11	-3.02e-12	1.17e-11

Source: Author’s analysis (2019)

b = consistent under Ho and Ha; B = inconsistent under Ha, efficient under Ho;

Ho: difference in coefficients not systematic; $\chi^2(8) = (b-B)'[(V_b-V_B)^{-1}](b-B) = 1.35$

Prob> $\chi^2 = 0.9949$, (V_b-V_B is not positive definite).

Table 1 shows the Hausman test on the panel data sampled from 2006 to 2017 in the Asia-Pacific region. The test shows that there is no correlation between regressor and time effects on the panel data, and it is significantly at a 0.05 level of significance, since the computed probability value, $\text{Prob}>\chi^2=0.9949$ is greater than a critical value. Therefore, the null hypothesis is accepted that the difference in coefficients is not systematic (Table 1). Therefore, the random fixed effect is the best choice for modelling the variables.

4.2 Empirical profiling of poverty and ADB funding prioritised based-projects

The empirical description of the poverty and ADB prioritised projects in the Asia-Pacific region was profiled in Table 2. The descriptive statistics of the panel data from 38 countries of Asia-Pacific were established to indicate the empirical evidence on poverty and bank prioritised projects in the region. The main selected statistics are the mean, maximum, minimum and standard deviation of both dependent and independent variables (Table 2).

Table 2: Descriptive statistics on poverty and ADB's RPGs indicators

Variable	Obs	Mean	Std. Dev.	Min	Max
PPR	418	0.5421	0.2796	0.0810	1.0000
PICT	418	0.5000	0.2413	0.1100	0.9200
EPC	418	90941.96	229053.2	72.000	1195000
MPI	418	0.0854	0.0958	0.0020	0.3220
FeP	418	0.5119	0.1664	0.1320	0.8480
DCPr	418	3.51e+07	1.20e+08	100.5	5.80e+08
DCPu	418	2.29e+07	1.04e+08	-5.17e+07	6.06e+08
AGR	418	0.1358	0.0909	0.0060	0.3710
EpEd	418	0.0370	0.0179	0.0070	0.0880
EpHe	418	0.0238	0.0184	0.0020	0.0760
EPI	418	49.9169	16.0751	21.5700	82.4000
GoE	418	0.1145	0.8646	-1.3400	2.2500
PAW	418	0.9081	0.1005	0.6440	1.0000
H	418	0.1930	0.1183	0.0060	0.4990
Z	418	0.1499	0.1201	0.0100	0.4180
GDPp	418	505501.8	1455810	798.00	7891000
FDINet	418	3.2018	2.8925	0.0300	10.3100
RuL	418	0.4982	0.1497	0.2200	0.8100

Source: Author's analysis (2019)

Table 2 shows the empirical profiles of the ADB's funding prioritised projects for a range from 2006 to 2017. The table shows that the poverty in Asia-Pacific region is still a challenge. The percentage of the population living below \$1.25 a day (headcount poverty rate, H) in the region is averaged at 19.30 percent with a range of 0.6 to 49.9 percent. This study evidences the high poverty status disparities across the region. For example, Timor-Lester in 2010 had a headcount poverty rate of 46.8 percent and reduced it to 41.8 percent in 2014 (CIA, 2017) [8]. Also, it evidences that about 8.5 percent of the population in the Asia-Pacific region has an average multidimensional poverty index (MPI) of 8.54 percent, with a range of 0.2 to 32.2 percent which indicates a high variation in multidimensional poverty status across the region. On the other hand, the poverty gap (Z) average is 14.99 percent, with a high variation, that ranges from 1.00 percent to 41.8 percent across the region. Moreover, the study evidences the remarkable success of water and sanitation, the percentage of the population that access improved water (PAW) in the Asia-Pacific region is averaged at 90.8 percent, with a range of 64.4 percent to 100 percent. The countries such as Georgia, Bhutan, Japan, New Zealand, Australia, and Armenia offer improved water to their entire population. There are few countries which had not performed well in water and sanitation infrastructure. For example, Mongolia in East Asia has 64.4 percent which is the minimum level among the countries surveyed.

Another area in that Asia-Pacific performed well is the production of energy, in this case, only the electricity production capacity per year (EPC) was considered. The study evidenced that the electricity production capacity per

year in Asia-Pacific is averaged 90941.96 kW million, with a range of 72 kW million to 1195000kW million. This range value shows the high variation of the electricity production capacity across the region. For example, in 2007 Japan produces electricity of about 1195000kW million which offers the maximum level of electricity produced in the Asia-Pacific from 2006 to 2016, however, in 2016 Japan produces 105400kW million less to compare in 2007 (CIA, 2017) [8]. This means that as a country gets or innovates to substitute energy such as coals, gases, and others, produces less electricity; Cambodia, Japan, Bhutan, and Armenia, are some of the countries that are highly substituted electricity energy to other forms of energy use. The study evidenced that most of the countries in Asia-Pacific still highly depends on electricity source of energy, and their production yearly or periodically increases. For example, China, Afghanistan, Bangladesh, Fiji, Australia, and others in the region are still highly dependent on electricity sources of energy. Timor-Leste produced the least amount of electricity in 2006, that was 72 kW million, which is almost 16597 times the amount produced by Japan in 2007 (CIA, 2017) [8]. The Timor-Leste improved its production up to 350.3kW million in 2016, almost 5 times the production in 2006, ten years ahead.

The transportation infrastructure in the Asia-Pacific region is partially (not well) improved. In this case, only the paved roads (PPR) are considered an indicator of good and reliable transportation. The study evidenced that paved roads in the region averaged 54.21 percent, with a range of 8.1 percent to 100 percent. This indicates the high disparities in the road infrastructure in the region. The study evidenced fewer countries in the region have improved road transportation,

for example, according to the CIA (2017)^[8], Georgia with 100 percent of the paved road, has 19,109 km roadways network have paved all the kilometres by 2010. In China with a total roadway of 4,577,300 km, about 88.4 percent are paved by 2015; in Uzbekistan, with a total of 86,496 km about 82.3 percent are paved roads by 2000; Malaysia with a total of 144,403 km (excludes local roads) paved, 116,169 km (includes 1,821 km of expressways) unpaved, 28,234 km (2010), equal to 80.4 percent of the paved roads, and Brunei Darussalam with total 3,029 km roadways network, paved 2,425 km and unpaved 604 km (2010), equal to 80 percent of the paved roads. In general, most of the countries in the Asia-Pacific region have poor roadway infrastructure, for example, in Bangladesh, only 9.5 percent of the 21,269 km roadways network is paved, equal to 2,021 km, Mongolia with 9.7 percent of the paved roads, with a total of 49,249 km of the roadway network, paved is 4,800 km and unpaved is 44,449 km (2013) (CIA, 2017)^[8].

Another component of the governmental priority infrastructure is ICT. In this study, only the populations who access or use the internet (PICT) are used to measure the intensity of ICT or application of ICT in the Asia-Pacific region. The study finds that in the Asia-Pacific region, about 50 percent of the population access or uses the internet. The range of internet users in the region ranges from 11 percent to 92 percent. This indicates also the problem of inequality or disparities across the region. For example, according to the CIA (2017)^[8], Japan in the year 2016 estimated a total 116,565,962 of the people in the country used the internet, equal to 92.0 percent of the population (July 2016 est.), and New Zealand estimated a total of 3,958,642 of its people use the internet, equal to 88.5 percent of the population (July 2016 est.). Moreover, Malaysia estimated a total of 24,384,952 people in a country use internet, equal to 78.8 percent of the population (July 2016 est.) (CIA, 2017)^[8]. Fewer countries evidenced to have a low number of people who use the internet, for example, Nepal, 19.7 percent, Bangladesh 18.2 percent, but most of the rest countries are above 45 percent (CIA, 2017)^[8].

Another prioritised area/project by the ADB in the region is environmental issues; in this case, the study used the environmental performance index (EPI) as an indicator of the environmental issues in the Asia-Pacific region. The study finds that environmental performance is averaged at 49.92 scores, with a range of 21.57 to 82.40 scores. This implicates the challenge of environmental management in the region. Fewer countries perform well above the region mean in environmental issue management; in two years from 2017 to 2018, some countries increase their performance. For example, Armenia increases her performance scores from 61.67 to 62.07 and Japan from 72.35 to 74.69 scores. However, Australia drops from 82.4 to 59.30 scores and Brunei Darussalam from 66.49 to 63.57 scores (Wendling, *et al.* 2018)^[23]. Contrarily, most of the countries that perform less than the regional average increased their performance, for example, Afghanistan's scores increase from 21.57 to 37.74, and Timor-Leste's from 39.41 to 49.54 scores. The study evidenced that the issues of the environment are still a challenge and should be given priority by the policymakers in the region.

On the other hand, education services are other prioritized areas by the bank in the region. The study profiles that the expenditure allocated to education (EpEd) in the region is averaged 3.7 percent of their GDPs, with a range of 0.7 to

8.8 percent. This means most of the countries in the region education are a strategic priority. For example, according to the CIA (2022)^[9], Japan expends about 3.2 percent of its GDP on education in 2017, Armenia spends about 2.7 percent of its GDP in 2020, and China spends about 3.5 percent of its GDP in 2018. This also indicates the high variation of education provision services as the expenditure on education varies across the region. On the other hand, the health service is measured by the percentage of the expenditure on health in GDP (EpHe). It is averaged at 2.38 percent and ranges from 0.2 to 7.6 percent. In countries such as China expenditure on health service were about 5.4 percent (2019, ests.), Japan about 10.7 percent (2019, ests.) and Armenia about 11.3 percent (2019 ests.). This implies that the health service is improving as the expenditure increases about the range value of the estimation of 2017. However, there is a high variation in the health provision services as indicated by the high range of health expenditure estimates in 2017.

In addition, gender inclusion, which is measured by the female participation ratio (FeP) is averaged at 51.19 percent and varies from 13.2 to 84.8 across the region. Although there is a high variation of gender inclusion in economic participation, the study evidenced most countries involve females in decisions making. The agricultural productivity (AGR) was averaged at 13.58 percent and ranges from 0.6 percent to 37.10 percent across the region. The average value is not satisfactory, it indicates that agricultural productivity is not effective and highly varies across the region. The profile of political and government quality was described by two indices, the government effectiveness index (GoE) and rule of law index (RuL). The GoE was averaged at 0.1145 and ranges from -1.3400 to 2.2500, and the RuL was averaged at 0.4982 and ranges from 0.22 to 0.81. This means that the region was performing better in exercising the rule of law than exercising good governance. Moreover, there is a high disparity or variation in the degree of good governance across the region. The investment opportunity measured by FDINet is averaged at 3.2018 million US Dollars and ranges from 0.03 to 10.31 million US Dollars. The region has a high variation of investment opportunities. Moreover, the GDP per capita was averaged at 505501.8 million US Dollars and ranges from 1455810 to 7891000 million US Dollars. Also, the regions are characterised by a high variation in economic growth.

The financial sector development was examined by analyzing two main strategic plans, i.e., domestic credit claimed to the private sector (DCPr) and domestic credit claimed to the government/public (DCPu). The study profiles that on average in the region the domestic credit claimed to the private sector is 3.51e + 07 million US dollars, with a range of 100.5 to 5.80e+08 million US dollars. The domestic credit claimed to government sectors is averaged 2.80e+07 million US dollars, with a range of -5.17e+07 to 6.06e+08 million US dollars. These facts imply that the regional priority is to improve the private sector more than the government sector; the private sectors are given priority. The government financial sector is not the priority of the Asia-Pacific region. Japan is one of the countries where the priority is to develop the government financial sector than the private sector. Only Japan offered more to the public sector than the private sector, in 2016 offers 5,762 billion Japanese yen to the private sector and offers 605,820 billion to the public sector, which equals a

ratio of 1 to 105 for private to public sectors (ESCAP, 2017) [14].

4.3 The impacts of ADB funding priorities and poverty intensity

The paper uses random effects linear regression, correlated panels corrected standard errors (PCSEs) model. Poverty is measured in poverty headcount rate, multidimensional poverty index, and poverty gap index. On the other hand,

bank prioritised projects are selected from the ADB considerations (choices).

4.3.1 Impacts of ADB funding priorities on the multidimensional poverty index

The multidimensional poverty was examined concerning the cause-effects of the bank funding priorities in the region. The study finds not all bank funding priorities are effective for multidimensional poverty reduction in the region (Table 3).

Table 3: Linear regression, PCSEs on MPI and ADB funding priorities

Group variable: id	Number of obs.	=	418
Time variable: year	Number of groups	=	38
Panels: Correlated (balanced)	Obs. per group:		
Autocorrelation: No autocorrelation	Min.	=	11
	Avg.	=	11
	Max.	=	11
Estimated covariance = 741	R-squared	=	0.2729
Estimated autocorrelations = 0	Wald chi2(13)	=	43310.63
Estimated coefficients = 16	Prob.> chi2	=	0.0000

MPI	Coef.	Panel-corrected		P> z	[95% Conf.	Interval]
		Std.Err.	z			
PPR	-0.1384	0.0034	-40.4800	0.0000	-0.1451	-0.1317
PICT	-0.1051	0.0062	-17.0000	0.0000	-0.1172	-0.0930
EPC	0.0000	0.0000	0.4300	0.6660	0.0000	0.0000
FeP	-0.0584	0.0092	-6.3600	0.0000	-0.0764	-0.0404
DCPr	0.0000	0.0000	-1.4400	0.1510	0.0000	0.0000
DCPu	0.0000	0.0000	-3.4600	0.0010	0.0000	0.0000
AGR	-0.2888	0.0242	-11.9100	0.0000	-0.3364	-0.2413
EpEd	-1.6053	0.1888	-8.5000	0.0000	-1.9753	-1.2354
EpHe	2.1335	0.2010	10.6100	0.0000	1.7395	2.5274
EPI	-0.0019	0.0001	-18.7300	0.0000	-0.0021	-0.0017
GoE	0.0071	0.0021	3.3100	0.0010	0.0029	0.0113
PAW	0.1684	0.0191	8.8300	0.0000	0.1311	0.2058
GDPp	0.0000	0.0000	-3.0500	0.0020	0.0000	0.0000
FDINet	-0.0028	0.0005	-5.8000	0.0000	-0.0037	-0.0018
RuL	-0.0685	0.0119	-5.7700	0.0000	-0.0918	-0.0452
_cons	0.2863	0.0240	11.9200	0.0000	0.2392	0.3334

Source: Author's analysis (2019)

Table 3 shows the linear regression, correlated panels corrected standard errors (PCSEs) model. The model analyzed the panel data from 38 Asia-Pacific countries sampled from 2006 to 2017. The table profiles that the bank funding priorities and multidimensional poverty are explained by RPGs at 27.29 percent at 99 percent of the level of confidence. The model evidenced that the multidimensional poverty will be reduced if the region increases the equally shared returns on the regional projects based on improving paved roads (PPR) (cf. Warr, 2010; ESCAP, 2017; Chatterjee, *et al.* 2004) [21, 14, 12], environmental performance (EPI), agricultural productivity (AGR), education (EpEd) (cf. Anderson, 2006; ESCAP, 2017) [1, 14], rule of laws (RuL), investment opportunities (FDINet), application of ICT (PICT) and gender inclusion (FeP) because they negative coefficients and p-values which are less than a critical value of the significant level of 0.05. On the other hand, government effectiveness (GoE) improved health (EpHe) and water services (PAW) increase

the multidimensional poverty contrarily to ESCAP (2017) [14] and ADB (2017) because they have positive coefficients and their p-values are less than the critical value of significance level of 0.05. The energy production capacity (EPC), domestic credit to the private sector (DCPr) and domestic credit to public/government (DCPu) and the GDPp have a negligible impact on multidimensional poverty because their coefficients values are zero in four decimal points; hence it is statistically insignificant since their p-values are greater than a critical value of significance level of 0.05.

4.3.2 Impacts of ADB funding priorities on poverty headcount rate

The bank funding priorities are regressed to the poverty headcount rate, with the PCSEs model. Table 4 depicts the model determined at 39.96 percent of variation (linearity fitness), and it is significant at 99 percent of level confidence.

Table 4: Linear regression PCSEs on poverty headcount and ADB funding priorities

Group variable: id		Number of obs.	=	418
Time variable: year		Number of groups	=	38
Panels: Correlated(balanced)		Obs. per group:		
Autocorrelation: No autocorrelation		Min.	=	11
		Avg.	=	11
		Max.	=	11
Estimated covariance	= 741	R-squared	=	0.3996
Estimated autocorrelation	= 0	Wald chi2(13)	=	6916.87
Estimated coefficients	= 16	Prob. > chi2	=	0.0000

H	Coef.	Panel-corrected Std.Err.		z	P> z	[95% Conf.	Interval]
PPR	0.0486	0.0082		5.9200	0.0000	0.0325	0.0646
PICT	-0.0692	0.0164		-4.2300	0.0000	-0.1013	-0.0372
EPC	-0.0000	0.0000		-1.9100	0.0560	0.0000	0.0000
FeP	0.0537	0.0133		4.0400	0.0000	0.0277	0.0798
DCPr	-0.0000	0.0000		-0.7800	0.4340	0.0000	0.0000
DCPu	-0.0000	0.0000		-0.6300	0.5310	0.0000	0.0000
AGR	-0.1998	0.0402		-4.9800	0.0000	-0.2785	-0.1211
EpEd	-3.5721	0.3746		-9.5400	0.0000	-4.3060	-2.8379
EpHe	6.1647	0.3819		16.1400	0.0000	5.4160	6.9132
EPI	0.0002	0.0002		1.4200	0.1570	-0.0001	0.0005
GoE	-0.0301	0.0030		-9.8900	0.0000	-0.0361	-0.0241
PAW	0.0756	0.0420		1.8000	0.0720	-0.0066	0.1579
GDPp	-0.0000	0.0000		-1.4700	0.1420	0.0000	0.0000
FDINet	-0.0039	0.0011		-3.6800	0.0000	-0.0059	-0.0018
RuL	-0.5283	0.0229		-23.0600	0.0000	-0.5732	-0.4834
_cons	0.4036	0.0428		9.4200	0.0000	0.3196	0.4875

Source: Author's analysis (2019)

Table 4 shows the random effect linear regression, correlated panels corrected standard errors (PCSEs) model on the poverty headcount rate and bank funding priorities. The data was sampled from empirical practices of 38 Asia-Pacific countries from 2006 to 2017. The model evidenced that to reduce the poverty headcount rate in the region, the regional policy priority is to increase or improve the regional equally-shared returns (benefits) on the regional projects that aim to improve the government effectiveness (GoE), investment opportunity (FDINet), energy (electricity production capacity) (EPC), agricultural productivity (AGR), education services (EpEd), application of ICT (PICT), and rule of law (RuL) which empirically reduce the poverty because they have negative coefficients and p-values which are less than the critical values of the significance level of 0.05 (cf. McKinley, 2003; Chatterjee, *et al.*, 2004; Anderson, *et al.*, 2006; ESCAP, 2017; ADB, 2008) [18, 12, 1, 14, 5]. However, the deterrence of the increase

the paved roads (PPR), gender inclusion (FeP), and improved health (EpHe) are likely to favour the eradication of the poverty headcount rate in the region because they have a positive coefficient and their p-values are less than that of critical values of the significance level of 0.05. Other bank funding priorities such as water services (PAW), environmental issues (EPI), financial development (DCPr and DCPu), energy/electricity production capacity (EPC) and GDP per capita (GDPp) are statistically insignificant as their p-values are greater than that of the critical value of 0.05; hence are rejected in the model.

4.3.3 Impacts of ADB funding priorities on the poverty gap

The study uses random effect with PCSEs model to analyze the data, sampled from 38 Asia-Pacific countries. The model has an R-squared of 0.3159, and significantly at a 99 percent level of confidence (Table 5).

Table 5: Linear regression PCSEs on the poverty gap and ADB funding priorities

Group variable: id		Number of obs.	=	418
Time variable: year		Number of groups	=	38
Panels: Correlated(balanced)		Obs. per group:		
Autocorrelation: No autocorrelation		Min.	=	11
		Avg.	=	11
		Max.	=	11
Estimated covariance	= 741	R-squared	=	0.3159
Estimated autocorrelations	= 0	Wald chi2(13)	=	4902.13
Estimated coefficients	= 16	Prob. > chi2	=	0.0000

Z	Coef.	Panel-corrected		P> z	[95% Conf.	Interval]
		Std. Err	z			
PPR	0.1219	0.0117	10.4200	0.0000	0.0990	0.1448
PICT	0.0389	0.0231	1.6800	0.0930	-0.0065	0.0842
EPC	0.000	0.0000	-0.9600	0.3360	-0.0000	0.0000
FeP	-0.1773	0.0144	-12.3200	0.0000	-0.2055	-0.1491
DCPr	0.0000	0.0000	-1.9300	0.0540	-0.0000	0.0000
DCPu	0.0000	0.0000	-0.8700	0.3830	-0.0000	0.0000
AGR	0.4779	0.0616	7.7600	0.0000	0.3571	0.5986
EpEd	-4.0924	0.4748	-8.6200	0.0000	-5.0230	-3.1619
EpHe	4.4871	0.3714	12.0800	0.0000	3.7591	5.2151
EPI	0.0003	0.0001	2.2100	0.0270	0.00003	0.00054
GoE	0.0189	0.0030	6.2300	0.0000	0.0130	0.0249
PAW	-0.0876	0.0393	-2.2300	0.0260	-0.1646	-0.0106
GDPp	0.0000	0.0000	1.4300	0.1540	-0.0000	0.0000
FDINet	-0.0111	0.0009	-12.0400	0.0000	-0.0129	-0.0093
RuL	-0.3981	0.0232	-17.1800	0.0000	-0.4436	-0.3527
_cons	0.4405	0.0407	10.8100	0.0000	0.3606	0.5203

Source: Author’s analysis (2019)

Table 5 shows the random effects of the PCSEs model on the poverty gap index and the bank funding priorities. The data was sampled from 38 Asia-Pacific countries from 2006 to 2017. The model shows that the improvement of regional policy or initiatives on equally and shared regional projects returns on the rule of law (RuL), gender inclusion (FeP) access to improved water and sanitation (PAW), investment opportunity (FDINet), and education services (EpEd) reduce the poverty gaps in the region, because they have negative significant coefficients, with p-values of 0.000 which is less than a critical value of significance level of 0.05. On the other hand, regional policy deterrence of environmental management and control (EPI), health services (EpHe), agricultural productivity (AGR), government effectiveness (GoE), and paved roads (PPR) increase the effect of poverty alleviates and improved water services (PAW), energy (electricity) (EPC) and education services (EpEd) which have a positive coefficient and their p-values are less than

that of the critical value of the significance level of 0.05. This contradicts McKinley (2003) [18], ESCAP (2017) [14], Chatterjee, *et al.* (2004) [12], and Anderson, *et al.* (2006) [1]. On the other hand, economic growth (GDPp), financial development (DCPr and DCPu), energy (EPC), and uses of ICT (PICT) have p-values which are greater than that of the critical values of the significance level of 0.05, and therefore they rejected in the model.

4.4 The ADB funding priorities, poverty and economic growth nexus

The paper re-examined the *empirical fitness* of ADB’s model of poverty reduction that links its funding priorities and economic growth and poverty. The study used correlation and the partial first derivative of the PCSEs model and evidenced the strong empirical fitness of the ADB’s model (Table 6).

Table 6: Correlation analysis of ADB funding priorities, economic growth and poverty

Variable	Pearson product-moment correlation coefficients			
	Z	H	MPI	GDPp
PPR	0.0779 (0.1219)	0.112((0.0486)	-0.2065(-0.1384)	-0.4621
PICT	-0.1852(0.0389)	-0.2743(-0.0692)	-0.2205(-0.1051)	0.0444
EPC	-0.0323(-0.0000)	-0.2636(-0.0000)	-0.1448(0.0000)	0.4669
FeP	-0.1602(-0.1773)	0.0201(0.0537)	-0.0802(-0.0584)	0.0433
DCPr	0.0215(0.0000)	-0.2013(-0.0000)	-0.1679(-0.0000)	0.5606
DCPu	0.0216 (0.0000)	-0.1741(-0.0000)	-0.1490(-0.0000)	0.559
AGR	0.1267(0.4779)	0.0825(-0.1998)	0.0359(-0.2888)	-0.0204
EpEd	-0.2023(-4.0924)	-0.2124(-3.572)	-0.2206(-1.6054)	0.1184
EpHe	-0.0429(4.4871)	-0.1230(6.1647)	-0.1736 (2.1335)	0.3979
EPI	-0.051(0.0003)	-0.1595(0.0002)	-0.2524(-0.0019)	0.1513
GoE	-0.0671(0.0189)	-0.2618(-0.0301)	-0.1819 (0.0071)	0.2225
PAW	0.0086 (-0.0876)	-0.0448(0.0756)	-0.0989(0.1684)	-0.3113
FDINet	-0.1623(-0.0111)	0.0153(-0.0039)	-0.0264(-0.0028)	-0.1654
RuL	-0.2189 (-0.3981)	-0.3206(-0.5283)	-0.1756(-0.0685)	0.1942

Source: Author’s analysis (2019)

Table 6 shows the correlation and analysis of the coefficients of the random effect (presented in brackets), with the PCSEs model. This analysis aims to re-examine the ADB’s model of poverty eradication which links its funding priorities and poverty and economic growth. The study used Pearson product-moment correlation analysis; it found that most of the bank priorities fit ADB’s model. For example, education (EpEd), health (EpHe), government effectiveness

(GoE), and environmental issues (EPI) are negatively correlated/associated with the poverty indicators and positively related to the economic growth indicator. *It means that ADB funding priorities are inversely related to poverty and directly to economic growth.* This empirical evidence fits ADB’s model. That is, the higher the economic growth, the less the poverty reduction due to the investment in the ADB funded projects. Moreover, other bank’s prioritised

projects such as water services (PAW), energy (electricity) (EPC), and others in Table 6 show contradicted effects among the poverty indicators. For example, water services have a positive impact (increases poverty intensity) on multidimensional poverty and headcount poverty rate, but it reduces the poverty gap. Moreover, the energy has a negligible negative impact (reduces the poverty intensity) on poverty headcount poverty and poverty gap but increases the multidimensional poverty, this is due to the effect of measurement used to measure the poverty gap, headcount poverty and multidimensional poverty which are measured with different indicators.

4.5 Impacting sensitivity analysis of ADB's funding priorities

The paper analysed the impacting sensitivity of the ADB's funding priorities. This is very important because it leads to optimal selection or choice of effective ADB funding priorities in the region. The only coefficients (slopes or unit impact value) of the PCSEs model are considered. The impact is determined for each unit of the bank funding priorities consumed concerning poverty indicators (Table 3, 4 & 5). The most bank funding priorities for the reduction of multidimensional poverty (non-income poverty) are health and education services. A unit increase in health expenditure increases multidimensional poverty by 2.13 indexes. Education reduces multidimensional poverty by 1.6 indexes by a unit increase in its expenditures. Other funding priorities projects which are sensitive to multidimensional poverty are paved roads which signify the transportation status in a country. The unit increase in paved roads and agriculture expenditure reduce the multidimensional poverty by 0.14 and 0.29 indexes respectively. The least effective funding priorities are energy, financial development, and economic growth. These variables are measured in a larger number (quantity) concerning other variables, which others are expressed as the ratio or percentage; hence, a unit impact is negligible (Table 3). This does not mean that they are not important, but should be consumed in large quantities to have an optimal unit impact.

The most effective funding priorities that influence poverty gaps are health and education services. A unit increase in expenditure on education reduces the poverty gap by a ratio of 1 to 4.1, and the unit increase in health expenditure increases the poverty headcount rate by a ratio of 1 to 4.5. Other funding priorities that are effectively reducing the poverty gap are rule of law and water services, which have a unit impact of -0.398 and -0.0875 respectively (Table 5). Moreover, the most impactful funding priorities for the effective reduction of the poverty headcount are health and education services. A unit increase in health expenditure increases the poverty headcount rate by 6.2, and a unit increase in education expenditure reduces the poverty headcount rate by a ratio of 1 to 3.6 (Table 5). Generally, the most impacting sensitivity bank funding priorities concerning the poverty indicators are rule of law, investment opportunity, financial development, and education services which reduce the poverty and the health services which increase the poverty rate in the region.

5. Discussion

The contra-impact of ADB funding priorities on poverty reduction is noted that should be carefully interpreted to avoid confusion. For example, improving the road network

and environmental issues increase the poverty gap and poverty headcount rate but reduces the multidimensional poverty. This indicates that a road network as measured in a non-monetary metric contributes positively and negatively to the actual individual income/expenditure and living standard respectively. This phenomenon is due to either disparities of the regional or national policies on poverty reduction across the region. Also, internet accessibility, agriculture productivity and economic growth reduce the headcount poverty rate and multidimensional poverty and increase the poverty gap. This finding supports Anderson, de Renzio, and Levy (2006) ^[1] and Chatterjee (2014) ^[11]. This paradoxical effect can be explained as due to the policies' miss-targeting the poor (Chatterjee, 2014) ^[11]. In other words, this phenomenon implies that these bank funding priorities are extremely varied and unevenly across the region. For example, agriculture outputs vary from 0.006 to 0.371, GDP per capita varies from 798 to 7891000 US dollars million, and internet users vary from 18.2 percent (Bangladesh) to 92 percent in Japan (July 2016 est.).

Government effectiveness describes the quality of public services, including policies and independence from political pressure. Government effectiveness was found to increase the poverty gap and multidimensional poverty and reduces the poverty headcount rate. The finding is supported by Khan and Weiss (2006) ^[22] and Chatterjee (2014) ^[11]. The study evidences the high miss targeting of the ADB funded projects and services across the region, that, the government effectiveness varies in large scores from -1.34 to 2.25; this means that most of the income opportunities of the poor are unleveraged through the uneven distribution of public services. For example, in Venezuela, RB has a government effectiveness score of -1.40 and in Chile, has 0.85 scores (2017 est.) (ESCAP, 2017) ^[14]. Also, the paper evidenced that energy (electricity) production which proxies for the affordability of energy used by individuals, reduce the poverty gap, and poverty rate and increases multidimensional poverty.

Moreover, the consumption of electricity is tied to the monetary metric (level of individual income) that has a positive effect on the living standard (household energy uses). Another bank funding priority that has a contra-effect on poverty indicators is gender inclusion (empowerment) which increases the poverty headcount rate and reduces the poverty gap and multidimensional poverty. Gender empowerment improves the skills (education) and income (economic) impact of females, which are the most vulnerable groups to poverty. This intentional regional and national support of females broadens the supporting target and reaches poorer, hence reducing the poverty gap and multidimensional poverty (education and income are improved for females). Water improvement reduces the poverty gap but increases the poverty headcount rate and multidimensional poverty. Water is one of the composite elements of multidimensional poverty which is evenly distributed in the region and behaves as impure/private goods as evidenced by this study. Because water is a non-metric indicator of poverty and behaves as impure/private goods does not increase the individual income and improve the living standard of an individual (i.e., its accessibility depends on the purchasing power of an individual, in most cases in the Asian-Pacific region). For example, this study finds most of the urban areas in the Asia-Pacific countries use bottled water which is privately serviced (priced).

Empirically, health services increase the poverty gap, headcount poverty rate and multidimensional poverty, this is due to fact that health services in the region are almost offered privately, and it has no direct impact on individual income. However, financial development, education services, investment opportunity, and rule of law reduce all poverty measures across the region. In general, the paradoxical or contra-effect of the bank funding priorities on poverty indicators is due to the nature of the different measurements of the poverty indicators and the policies that determine a national or regional demand and supply of bank funding priorities.

6 Conclusions and recommendations

This paper evidences that the implementation of the ADB funding priorities projects in the region has a contra-effect on the poverty indicators. This contra-effect is due to either different measurements of the poverty indicators or influences of regional and national demand and supply policies (preferences and selection). For example, increasing health expenditure in a region was found to increase all the poverty indicators. However, the improvement of financial development in public and private sectors, investment opportunities, rule of law, and education services reduce all the poverty indicators. Also, the paper confirms the empirical bidirectional links chain of either from the bank funding priorities to poverty via economic growth or from bank funding priorities to economic growth via poverty reduction. In other words, bank funding priorities improve the economic growth then the poverty is reduced, or the bank funding priorities reduce the poverty, then an economy grows. Hence, bank funding priorities and economic growth vary directly from economic growth and are inversely proportional to poverty intensity.

Fundamentally, the paper recommends that for effective poverty reduction in the Asia-Pacific region most sensitive bank funding priorities which are education, health and water services should be implemented subject to the equalled or evenly policies. Moreover, the effective poverty reduction strategies are those increase the targeting group of the poor, which would be achieved by restructuring the policy, particularly on health, education, and water services which in most Asia-Pacific countries are distributed unevenly

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