



THE ROLE OF DEMAND-SIDE FINANCING INTERVENTION IN FORMULATING HUMAN CAPITAL IN INDONESIA

Zahar, Angga Setiawan

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**THE ROLE OF DEMAND-SIDE FINANCING INTERVENTION IN
FORMULATING HUMAN CAPITAL IN INDONESIA**

(インドネシアの人的資本形成における需要側への財政介入の役割)

Graduate School of International Cooperation Studies

Academic Advisor: Professor Keiichi Ogawa

Name: Zahar Angga Setiawan

ABSTRACT

The importance of education in human capital formation is widely acknowledged by scholars and policymakers. Yet, the gap in educational attainment between children of different socioeconomic statuses persists in many countries. To address this issue, demand-side financing schemes in education have been implemented in recent years by a number of countries to close the educational attainment gap by channeling public funding through students/households instead of through schools. These kinds of public interventions are intended to encourage investment in education by households and primarily target the poor because financial constraints are often the main barriers for them to send household members to continuing education.

In Indonesia, many attempts have been made by the government to expand school enrollment. A massive school construction program in the 1970s, namely the *Sekolah Dasar INPRES* program, is considered as one of the notable supply-side interventions in education. Other important educational policies include the compulsory and free basic education policy and the national constitution which mandated that central and regional governments have to spend at least 20 percent of their respective budgets on education. In addition, demand-side financing interventions in education have also been made available, including the most recent financial assistance program introduced in 2014, namely the *Program Indonesia Pintar* (Smart Indonesia Program), which acted as an enhancement of the *Bantuan Siswa Miskin* (Cash Transfer for Poor Students) program established in 2008.

However, despite the implementation of such policies by the Indonesian government, there remain challenges in the country in expanding secondary school enrollment and closing the gap in educational attainment between children from different socioeconomic backgrounds. The lack of empirical evidence of the impact of financial assistance on the schooling of students at junior and senior secondary levels in Indonesia raises concerns about the urgent needs for such a study. Although there are evidences of the positive impact of various kinds of demand-side financing

intervention programs on children's schooling in other countries, the design and implementation of such programs are greatly varied so that the findings of existing studies cannot be generalized to the Indonesian context.

Motivated by the above-mentioned background, this study firstly aims to investigate the influence of demand-side factors on the schooling enrollment of junior and senior secondary school-aged children in Indonesia. Furthermore, this study also intends to examine the effect of the *Program Indonesia Pintar* (Smart Indonesia Program) on school enrollment, school continuation and child work participation of junior and senior secondary school-aged children. In addition, this study explores the cost-efficiency of such kinds of demand-side financing intervention as well as the heterogeneity of the impact by gender, location and household consumption group.

The following are the six research questions of this study: (1) What is the association between key demand-side factors and schooling enrollment of junior and senior secondary school-aged children in Indonesia? (2) To what extent does the provision of the *Kartu Indonesia Pintar* (Smart Indonesia Card) affect schooling enrollment in junior and senior secondary education? (3) What is the cost-efficiency of the *Program Indonesia Pintar* (by the provision of Smart Indonesia Card) in increasing school enrollment between junior and senior secondary education? (4) To what extent does the provision of financial assistance through the *Program Indonesia Pintar* (Smart Indonesia Program) affect schooling continuation in junior and senior secondary education? (5) What is the cost-efficiency of the *Program Indonesia Pintar* (by the provision of financial assistance) in increasing school continuation between junior and senior secondary education? (6) To what extent does the provision of financial assistance through the *Program Indonesia Pintar* (Smart Indonesia Program) affect child labor participation of junior and senior secondary school-aged children?

This study is significant because it makes an academic contribution in the following respects. First, this study attempts to update and confirm the findings of previous empirical studies investigating the factors associated with the schooling of junior secondary and senior

secondary school-aged children in Indonesia by utilizing a more recent dataset. This is necessary to understand whether socioeconomic background remains an important predictor of children's schooling in the current context. Second, this study attempts to fill the knowledge gap regarding the understanding of the effect of the *Program Indonesia Pintar* (Smart Indonesia Program) on the schooling of children at junior and senior secondary levels in Indonesia, by using a number of quantitative methods which is rarely found in earlier studies. Third, this study extends the investigation by including child labor as an outcome of interest, which is much less available in previous literature. This is necessary since previous studies show inconclusive findings regarding this issue. Fourth, this study explores the difference in findings between junior secondary and senior secondary levels in the investigations mentioned above. In addition, this study also explores the examination of the cost-efficiency issue of the provision of the demand-side financing intervention among junior secondary and senior secondary levels, which is difficult to find in earlier studies.

The analytical framework of this study is designed mainly based on human capital formation literature. The hypotheses of this study are as follows: (1) Socioeconomic background influences school enrollment, especially for senior secondary school-aged children in Indonesia; (2) Children having received *Kartu Indonesia Pintar* (Smart Indonesia Card) are more likely to be enrolled in school than their counterparts; (3) *Program Indonesia Pintar* (by the provision of Smart Indonesia Card) is more cost-efficient in increasing the likelihood of school enrollment at senior secondary than junior secondary education; (4) Children receiving financial assistance through the *Program Indonesia Pintar* (Smart Indonesia Program) are more likely to continue schooling than their counterparts; (5) Providing financial assistance through the *Program Indonesia Pintar* is more cost-efficient for senior secondary students than for junior secondary students in increasing the likelihood of school continuation; and (6) Children receiving financial assistance through the *Program Indonesia Pintar* (Smart Indonesia Program) are less likely to participate in child labor than their counterparts, especially for senior secondary school-aged children.

The data used in this study are drawn from the Core Module and the Social Cultural Education Module of the National Socioeconomic Survey (Susenas), a nationally representative survey collected by the Central Bureau of Statistics in 2015, which covers 271,345 individuals from 71,568 households in total. Of the sample contained in the survey, only children aged 13-18 are selected and used in this study. In the context of this study, the socioeconomic background is mainly represented by two variables, which is the education of the head of household and the household consumption level.

To answer the first research question, this study employs the logistic regression method. The results show that a number of individual, household and community characteristics are associated with school enrollment. Children from higher socioeconomic backgrounds are more likely to attend schooling than those from lower socioeconomic backgrounds. Moreover, the influence of socioeconomic backgrounds on school enrollment is stronger for senior secondary school-aged children compared to junior secondary school-aged children. The findings of this study suggest that children from a low socioeconomic background are still disadvantaged despite the implementation of a compulsory and free basic education policy in the country, implying that other government intervention alternatives are still necessary to close the schooling gap between the poor and the non-poor.

To answer the second research question, several methodological approaches are used, namely the ordinary least squares (OLS) regression, the Heckman's two-stage model, the propensity score matching (PSM), the inverse probability weighted regression adjustment (IPWRA) and the IPWRA that incorporates the inverse Mill's ratio. Those various approaches are mainly performed to address the sample selection and the endogeneity issues which can cause biases in observational studies, such as this study. The results show that the government's financing intervention through the *Program Indonesia Pintar* in Indonesia has a positive impact on increasing the likelihood of school enrollment at both junior and senior secondary levels. Furthermore, the treatment effects are larger for children in rural areas than in urban areas, for boys than for girls and for children from poor than non-poor households. The findings suggest

that the provision of financial assistance for both junior and senior secondary education is still necessary to increase school enrollment.

To answer the third research question, this study calculates the cost-efficiency of the program based on the result of the impact analysis used in answering the second research question and the amount of money provided to recipients. The main idea is to find out which level of education takes less input to produce the same level of output. This study finds that the cost required to improve school enrollment at the same percentage point is much lower at senior secondary than junior secondary level. The fact that those out of school at junior secondary level mainly come from the poorest households while those out of school at senior secondary level also includes children from better income households might be one of the explanations of such a finding.

To answer the fourth research question, the methods used are the same as those utilized to answer the second research question of this study. This study finds that the provision of financial assistance through the *Program Indonesia Pintar* has a significant positive impact on increasing the likelihood of school continuation at both junior and senior secondary levels of education. Further examination also shows that the effects are larger for those in rural areas, for boys and for those from poor households. The findings suggest that the provision of financial assistance can help children who are enrolled in school to keep continuing their education.

To answer the fifth research question, the measurement is the same as used to answer the third research question. The results show that to improve schooling continuation at the same percentage point, the cost required is lower at senior secondary compared to junior secondary level. Moreover, the gap of efficiency between junior secondary and senior secondary level in increasing school continuation is much smaller than the gap in increasing school enrollment, which might be influenced by the smaller difference in the costs of continuing schooling compared to the costs of enrolling in school.

To answer the last research question, this study employs the ordinary least squares (OLS) regression as well as the propensity score matching (PSM) and the inverse probability weighted

regression adjustment (IPWRA) methods to address the potential bias due to endogeneity issues. This study finds that the financial assistance program has an impact in decreasing the likelihood of child labor participation of children aged 16-18, while the impact for children aged 13-15 is found to be limited to those only from poor households. The findings suggest that many children might not need to participate in child labor to generate income when financial assistance is provided to cover schooling costs.

The implication of the findings of this study suggests that financial issues remain a major constraint for many households in Indonesia to accessing education and that demand-side financing intervention in education plays a critical role in supporting those with financial barriers to access education. Providing financial assistance for both junior and senior secondary education is still necessary to accomplish the government target of achieving universal secondary education. However, the financial assistance programs should be better targeted so that they can effectively increase school enrollment and continuation as well as decrease child labor. There is room for improvement in the design and implementation of the program. All in all, the continuation and expansion of the program, targeting poor and vulnerable families, are suggested by the findings of this study in order to contribute to the formulation of human capital.

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LIST OF ABBREVIATIONS

ATE	Average Treatment Effect
ATT	Average Treatment Effect on the Treated
BOS	<i>Bantuan Operasional Sekolah</i> (School Operational Fund)
BPS	<i>Badan Pusat Statistik</i> (Central Bureau of Statistics)
BSM	<i>Bantuan Siswa Miskin</i> (Cash Transfer for Poor Students)
CCT	Conditional Cash Transfer
D1	Diploma I
D2	Diploma II
D3	Diploma III
D4	Diploma IV
DAK	<i>Dana Alokasi Khusus</i> (Special Allocation Fund)
DAU	<i>Dana Alokasi Umum</i> (General Allocation Fund)
DBH	<i>Dana Bagi Hasil</i> (Revenue Sharing Fund)
DD	Difference-in-Differences
DID	<i>Dana Insentif Daerah</i> (Regional Incentive Fund)
GDP	Gross Domestic Product
GER	Gross Enrollment Rate
IFLS	Indonesian Family Life Survey
IMR	Inverse Mill's Ratio
INPRES	<i>Instruksi Presiden</i> (Presidential Instruction)
IPW	Inverse Probability Weighting
IPWRA	Inverse Probability Weighted Regression Adjustment
IV	Instrument Variables
KIP	<i>Kartu Indonesia Pintar</i> (Smart Indonesia Card)
MA	<i>Madrasah Aliyah</i> (Islamic Senior Secondary School)

MI	<i>Madrasah Ibtidaiyah</i> (Islamic Primary School)
MTs	<i>Madrasah Tsanawiyah</i> (Islamic Junior Secondary School)
NER	Net Enrollment Rate
OLS	Ordinary Least Squares
OTSUS	<i>Otonomi Khusus</i> (Special Autonomy)
PIP	<i>Program Indonesia Pintar</i> (Smart Indonesia Program)
PKH	<i>Program Keluarga Harapan</i> (Hopeful Family Program)
PODES	<i>Potensi Desa</i> (Village Potential)
PSM	Propensity Score Matching
RA	<i>Raudatul Athfal</i> (Islamic Kindergarten)
RDD	Regression Discontinuity Design
S1	<i>Sarjana</i> (Undergraduate)
SAKERNAS	<i>Survei Angkatan Kerja Nasional</i> (National Labor Force Survey)
SD	<i>Sekolah Dasar</i> (Primary School)
SMA	<i>Sekolah Menengah Atas</i> (Senior Secondary School)
SMK	<i>Sekolah Menengah Kejuruan</i> (Vocational School)
SMP	<i>Sekolah Menengah Pertama</i> (Junior Secondary School)
SUSENAS	<i>Survei Sosial Ekonomi Nasional</i> (National Socioeconomic Survey)
TK	<i>Taman Kanak-kanak</i> (Kindergarten)
TNP2K	<i>Tim Nasional Percepatan Penanggulangan Kemiskinan</i> (National Team for the Acceleration of Poverty Reduction)
UCT	Unconditional Cash Transfer
UNESCO	United Nations Educational, Scientific and Cultural Organization

CHAPTER I

INTRODUCTION

1.1 Background

The role of human capital formation through education has been examined by economists along with other researchers in other fields. From an economic viewpoint, the importance of education in promoting economic growth has been widely observed (Barro, 1991; Becker, 1993; Petrakis & Stamatakis, 2002). For instance, by using cross-sectional data from 98 selected countries, Barro (1991) finds that the school enrollment rate, used as a proxy for human capital, is positively correlated with the growth rate of real per capita Gross Domestic Product (GDP). A further study by Petrakis and Stamatakis (2002) discovers that higher education is key to promoting growth in developed nations, while primary and secondary education plays an important role in promoting such growth in less developed nations. At the micro-level, the economic benefits of education have also been extensively observed. For example, education is commonly found to be positively correlated with individual earnings (Becker, 1993; Checchi, 2006; Mincer, 1974).

In addition, various external social benefits are potentially produced from educational participation. Such benefits may include a reduction in fertility, a more educated labor force and an increasingly democratic society (Lincove, 2015). These prospective outcomes of education should encourage nations to provide policies and sufficient public investments to promote the educational participation of school-age children and continuously reduce the number of out-of-school children who often come from families with socioeconomically disadvantaged backgrounds.

After the Second World War, a global rise in school enrollment across the globe was observed (Checchi, 2006). Barro and Lee (2013) have shown that the average years of schooling for the world population aged 15 and above have consistently increased from 3.12 percent in 1950, 5.34 percent in 1980 to 7.89 percent in 2010. Substantial increase in school enrollment in secondary and tertiary education is observed in advanced countries. Meanwhile, developing countries have shown a significant increase in school enrollment in primary and secondary

schooling. Yet, the average years of schooling gap between advanced and developing countries remain large and are only slowly narrowing. Thus, increasing school attainment is still a challenge for most developing countries.

Similar to the global school enrollment trend, Indonesia has demonstrated a remarkable upward trend in the school enrollment rate. Universal primary education has been nearly achieved in Indonesia as indicated by the attainment of gross enrollment rate at 106.44 percent and net enrollment rate at 93.78 percent in 2016. In the same period, the gross and net enrollment rate for junior secondary education was 101.05 percent and 76.29 percent respectively. Meanwhile, the gross and net enrollment rate for senior secondary education was 81.95 percent and 61.20 percent respectively (Ministry of Education and Culture, 2017). These achievements are most likely contributed to by the implementation of several educational policies and programs in Indonesia. For instance, to provide equal education opportunities to all Indonesian children, the government of Indonesia promoted the six years of compulsory education in 1984, which then extended to nine-years in 1994. Moreover, the national education law 20/2003 stipulates that the government must allocate at least 20 percent of the national budget to finance the education sector and must also provide financial support for children from families having difficulties paying schooling costs.

Becker (2003) notes that despite the existence of educational expansion policies in a nation along with growing public financing in the education sector, children from better-off family backgrounds are often more likely to attend schooling than those from socioeconomically disadvantaged backgrounds. The significant association between family background and the schooling of children has been widely acknowledged by researchers in the fields of economics and sociology (Becker, 1991; Blake, 1981). This phenomenon might explain the existence of a significant gap in the educational attainment between children from poor and rich households in Indonesia as well (World Bank, 2012).

To provide empirical evidence, many researchers have carried out studies on such particular issues. Some of the studies aim to examine potential factors associated with school enrollment

(Connelly & Zheng, 2003; Smits & Huisman, 2013; Tansel, 2002) while others focus on the relationship of specific family-related characteristics, such as parent's education (Gang & Zimmermann, 2000; Sen & Clemente, 2010), siblingship (Rammohan & Dancer, 2008; Zeng et al., 2012), birth order (Black et al., 2005; de Haan, 2010) or orphanacy (Evans & Miguel, 2007; Yamano et al., 2006) with children's schooling attainment.

A more comprehensive framework suggests that schooling of children is determined by choices made by the government, parents and children (Haveman & Wolfe, 1995). Other scholars also suggest that school enrollment is influenced by three main aspects namely demand, supply and government policy (Connelly & Zheng, 2003). Thus, several studies examining the determinants of school enrollment have also considered the influence of the government's educational policies (Gaddah et al., 2016).

The government policy intervention through financing mechanisms can be channeled in two ways namely demand-side and supply-side financing (Patrinos, 2007; Schultz, 2004). Supply-side financing provides educational inputs including human and material resources through government administrators which will affect the supply of schooling. Meanwhile, demand-side financing focuses on delivering the resources to those who demand it (parents or students) based on the characteristics of their needs, such as their income. Thus, building schools, increasing teacher salaries and reducing class size are examples of supply-side intervention, while school subsidies targeting poor households is an example of a demand-side approach to increasing enrollment in schooling (Schultz, 2004).

In the last few years, the governments of numerous countries have implemented various kinds of demand-side financing interventions in education, such as conditional cash transfer, scholarships, vouchers and student loans. Among those, the conditional cash transfer program is one of the most popular approaches implemented in many developing countries to alleviate long-run poverty by fostering the accumulation of human capital through education (Attanasio et al., 2010; Dammert, 2009).

Demand-side financing interventions primarily target those from poor families since

financial constraints remain a significant barrier for children from poor families to attend schooling due to the inability of their parents to afford direct and indirect costs of schooling, including travel costs, school fees and the opportunity cost of child labor. The justification for financing interventions targeting the poor and disadvantaged is that it addresses the equity and efficiency issues in education. In addition, supply-side intervention programs alone are often considered inadequate for low-income families to cover schooling costs. As a result, without such demand-side interventions, the gap in schooling between children from low-income and higher-income families may persist over time (Bedi & Garg, 2000).

Opponents of demand-side financing question the need for such intervention, especially when returns on investment in education are not certain and the government deals with scarce resources. They often argue that families should not receive financial support because it is their own responsibility to finance it. Moreover, financial resources allocated to demand-side intervention lessen the resources that could be used to improve the supply-side instead. Furthermore, there may be negative consequences when some poor families are excluded from such programs due to targeting errors.

Empirical evidence is necessary to address this kind of academic debate. Fortunately, the widespread implementation of such government interventions has made such evidence from a variety of settings accessible to researchers. Most studies have consistently found positive effects of demand-side financing interventions, especially with regards to school enrollment (Attanasio et al., 2010; Behrman et al., 2012; Ferro et al., 2010; Heinrich, 2007). Moreover, evidence suggests that demand-side intervention is a much more cost-effective use of resources than supply-side interventions to improve school enrollment (Coady & Parker, 2004).

There is discussion over whether these kinds of programs should include conditionality or not. Unconditional cash transfers often favorable due to the mostly unknown marginal contribution of the conditionality, as well as due to the increased administrative burden of implementing such conditional cash transfers (Baird et al., 2011). However, some studies suggest the use of conditionality to increase school enrollment more effectively (Janvry et al., 2006).

Since the demand-side financing intervention is mainly aimed at increasing the human capital accumulation of children in underprivileged households, as well as to reduce poverty in the long run, scholars have also studied the program's effect on child labor. The early participation of children in the labor market may negatively affect the accumulation of human capital and disturb the economic development in the long run, as there is a trade-off between child labor and schooling (Baland & Robinson, 2000; Janvry et al., 2006). However, it should be noted that child labor does not always substitute or be otherwise incompatible with schooling (Janvry et al., 2006). Demand-side financing interventions are often aimed at decreasing child labor amongst poor families by providing incentives to invest in human capital (Bourguignon et al., 2003).

A number of studies examining the relationship between cash transfers and child labor includes Brazil's Bolsa Escola program (Bourguignon et al., 2003; Ferro et al., 2010; Pais et al., 2017), Colombia's Familias en Accion program (Attanasio et al., 2010), Mexico's PROGRESA program (Janvry et al., 2006; Schultz, 2004; Skoufias et al., 2001), Nicaragua's Red de Proteccion Social program (Dammert, 2009) and Indonesia's Program Keluarga Harapan (Lee & Hwang, 2016) with mixed findings.

Considering that the design and implementation of these demand-side financing interventions varied greatly, whether in terms of beneficiary targeting, amount of money transferred, conditionality or other mechanisms, the existing findings cannot be generalized to different contexts. Thus, further empirical evidence is required in order to find out whether such kinds of demand-side financing interventions could also promote human capital formation in the context of Indonesia.

1.2 Problem Statement

In Indonesia, although progress in schooling enrollment has been shown since the independence of the country, challenges in the junior and senior secondary levels of education remain. The Ministry of Education and Culture (2015) highlights a number of issues that need to be addressed by the government in achieving the universal secondary education target, including (1) disparity of

schooling attainment between poor and rich households and (2) unavailability of senior secondary school buildings in many regions in Indonesia. Scholars also underscore the child labor issue in Indonesia (Janvry et al., 2006; Lee & Hwang, 2016). Such mentioned issues confirm the arguments that Indonesia is dealing with problems in both the household demand and the supply of school aspects (Jones & Hagul, 2001; World Bank, 2007).

From the supply of schooling perspective, World Bank (2007) has highlighted that, to increase access to education in the country, the supply of schools should be increased by constructing new school buildings or converting selected primary schools to secondary schools. In prior years, the government of Indonesia has continuously taken the necessary steps to address this school availability issue.

From the household demand perspective, financial issues are considered as the main reason for children not to attend secondary education in Indonesia (Suryahadi et al., 2005). High direct costs of schooling are the primary barrier for the poor to accessing junior secondary education. Moreover, the indirect costs of junior secondary education in rural areas are also high due to the longer travel distance to school (Sayed, 1996). More recently, the World Bank (2012) has also highlighted that high schooling costs and opportunity costs are the main barriers for children from poor households to accessing secondary education in Indonesia. For instance, the cost of schooling of one senior secondary education child can cover approximately 20 percent of the total household expenditure in poor households. Furthermore, the out of pocket costs of education, such as registration fees and tuition fees, remains costly for even non-poor households. Although basic education should be free, legal and illegal user fees that need to be paid by parents, such as registration fees, voluntary contributions and gifts to teachers at the end of the school year, are still often found in Indonesia (Lincove, 2012; Rosser & Joshi, 2013).

To address the household demand issues, the government of Indonesia has taken necessary actions by introducing educational policies primarily aimed at reducing out-of-school children, reducing child labor and promoting equal educational opportunities for all children by providing financial assistance for poor families which will encourage children to attend schooling (Lee

&Hwang, 2016). The current demand-side financing intervention in Indonesia is the *Program Indonesia Pintar* (Smart Indonesia Program/PIP), which was introduced by President Joko Widodo in 2014 as a continuation of the *Bantuan Siswa Miskin* (Cash Transfer for Poor Students/BSM) from the earlier regime. Those eligible to receive financial assistance from the *Program Indonesia Pintar* will receive the *Kartu Indonesia Pintar* (Smart Indonesia Card/KIP) as an identity card. The program provides financial assistance to those from poor and vulnerable families to cover their costs of schooling. The *Program Indonesia Pintar* aimed to ensure that all children can continue their education until finishing senior secondary school so that the universalization of secondary education targets can be achieved.

The compulsory and free education policy has also been implemented nationally for basic education (primary and junior secondary) in Indonesia. However, the school fee policy for senior secondary education is decentralized to provincial governments. Thus, some senior secondary schools require students to pay school fees while some others may not require the school fee payment.

Although relevant policies to address the issues mentioned above are available, there are some challenges to deal with. First, regarding the resource constraint issue, the government must allocate public resources to various sectors, such as health, education, agriculture and military. Improving the spending mix between those sectors is important. Second, even after the government spends a significant amount of resources in the education sector, making education expenditure more equitable is necessary. It is common in developing countries that the distribution of government funding on education does not fully reach the intended recipients or that there are targeting errors. Third, improving the efficiency of education expenditures is also crucial (Rosser & Joshi, 2013; World Bank, 2007).

All in all, the suboptimal schooling participation along with the disparity of schooling attainment in junior and senior secondary education in Indonesia requires further investigation of the potential factors associated with children's schooling and the impact of the existing demand-side financing intervention on the schooling, as well as child labor. Little is known about

how providing financial assistance for junior and senior secondary school-aged children in Indonesia contributes to the formulation of human capital and, as importantly, how it could be allocated more efficiently.

1.3 Research Questions

Motivated by the above background, this study intends to answer the following main research questions:

1. What is the association between key demand-side factors and schooling enrollment of junior and senior secondary school-aged children in Indonesia?
2. To what extent does the provision of the *Kartu Indonesia Pintar* (Smart Indonesia Card) affect schooling enrollment in junior and senior secondary education?
3. What is the cost-efficiency of the *Program Indonesia Pintar* (by the provision of Smart Indonesia Card) in increasing school enrollment between junior and senior secondary education?
4. To what extent does the provision of financial assistance through the *Program Indonesia Pintar* (Smart Indonesia Program) affect schooling continuation in junior and senior secondary education?
5. What is the cost-efficiency of the *Program Indonesia Pintar* (by the provision of financial assistance) in increasing school continuation between junior and senior secondary education?
6. To what extent does the provision of financial assistance through the *Program Indonesia Pintar* (Smart Indonesia Program) affect child labor participation of junior and senior secondary school-aged children?

1.4 Objectives of the Study

This study mainly aims to investigate demand-side factors influencing the schooling enrollment of junior and senior secondary school-aged children in Indonesia. Moreover, this study also intends to examine the effect of the *Program Indonesia Pintar* (Smart Indonesia Program) on the school

enrollment, school continuation and child labor participation of junior and senior secondary school-aged children in Indonesia. Furthermore, this study also explores the cost-efficiency issue and the heterogeneity of the impact of such kinds of demand-side financing intervention, whether by gender, location and across household wealth groups.

To answer the research questions of this study, a quantitative research design is used as the primary research method. Logistic regression, also known as a logit model, is employed to answer the first research question. Meanwhile, a quasi-experimental approach is used to answer the remaining research questions. The use of the quasi-experimental design in this study enables us to infer causality with respect to intervention effects. Due to the lack of random assignment in this observational study, selected statistical methods are employed to address both the observable and unobservable bias issues. In this study, both the selection into entering the study sample and entering treatment can be the sources of bias. The propensity score analysis can be used to correct endogeneity due to non-random selection into treatment. Meanwhile, Heckman's two-stage model can be used to control the sample selection issue. Therefore, Heckman's model (Heckman, 1979), propensity score matching (Rosenbaum & Rubin, 1983) and propensity score weighting (Hirano & Imbens, 2002) are mainly used in this study, along with other additional methods.

Data used in this study comes from a nationally representative survey carried out by the Central Bureau of Statistics of Indonesia, namely the Core Module and the Social Culture Education Module of the Indonesian National Socioeconomic Survey (Susenas) conducted in 2015. The scope of analysis in this study is limited to children aged 13-18. In Indonesia, children aged 13–15 and aged 16–18 will normally be enrolled in junior secondary and senior secondary school, respectively.

These groups of age, representing junior and senior secondary education, are chosen for several reasons. Firstly, secondary education plays a critical role in preparing children to either continue into tertiary education or to enter the labor market. Secondly, the number of children attending these levels of education in Indonesia is still below expectations, as many children are still out of school. Thirdly, different policy settings at these two levels of education enable us to

make comparisons among them.

1.5 Significance of the Study

This study is significant because it makes an academic contribution to the following aspects. First, factors associated with children's schooling have been extensively examined. Despite the growing interest in this issue, only limited studies have been undertaken in the particular context of secondary education in Indonesia. Previous studies in the area of research employing qualitative studies are available from scholars such as Jones et al. (1998) and Mollet (2007). Meanwhile, quantitative approaches are used by scholars such as Deolalikar (1993), Pradhan (1998), Suryadarma et al. (2006) and Takahashi (2011). In most cases, socioeconomic background is an important predictor of children's schooling. However, there is a gap of knowledge on whether socioeconomic status remains associated with children's schooling in Indonesia in a more recent context, where a compulsory and free basic education policy has been long implemented and an increased education budget is allocated in recent times. This study attempts to update and confirm the findings of previous studies by examining demand-side factors associated with the schooling of junior secondary and senior secondary school-aged children in Indonesia utilizing a quantitative approach.

Second, considerable research has been devoted to investigating the effect of demand-side financing interventions on schooling, especially in Latin America such as Argentina (Heinrich, 2007), Brazil (Ferro et al., 2010; Glewwe & Kassouf, 2012), Columbia (Attanasio et al., 2010) and Mexico (Behrman et al., 2012; Brauw & Hoddinott, 2011). However, the number of such studies in the context of Indonesia is still small and mostly uses a qualitative and case study approaches. It should also be noted that each intervention program is unique in size and design so that the empirical findings in other countries could not be generalized to the Indonesian context due to those possible differences. This study is expected to contribute to providing empirical evidence in the case of Indonesia, more specifically the effect of the *Program Indonesia Pintar* (Smart Indonesia Program) on the schooling of children at junior and senior secondary levels by using a

number of quantitative methods which is rarely found in earlier studies. Furthermore, to the best of the author's knowledge, this is by far is the first study utilizing the inverse probability weighted regression adjustment (IPWRA) approach to examine the effect of the *Program Indonesia Pintar* (Smart Indonesia Program) on children's schooling in Indonesia.

Third, this study extends the investigation by including child labor participation as an outcome of interest. Although such a topic is accessible, the number of empirical studies examining the effect of demand-side financing programs on child labor is much less available compared to studies investigating the effect of such programs on children's schooling. Moreover, previous studies in the international context show mixed results (Attanasio et al., 2010; Bourguignon et al., 2003; Dammert, 2009; Ferro et al., 2010; Janvry et al., 2006; Pais et al., 2017; Schultz, 2004; Skoufias et al., 2001) so that further examination is still necessary to obtain a more conclusive explanation on this subject. This study attempts to contribute to the body of knowledge by providing empirical evidence of the impact of the *Program Indonesia Pintar* (Smart Indonesia Program) on the likelihood of junior secondary (aged 13-15) and senior secondary (aged 16-18) school-aged children in Indonesia to participate in child labor.

Fourth, this study explores the difference in findings between junior secondary and senior secondary levels in the above-mentioned investigations. Such comparison is crucial, considering the difference in the nature and existing policies between those two levels of education. In addition, this study also explores an examination of the cost-efficiency issue of the provision of the demand-side financing intervention among junior secondary and senior secondary levels, which is difficult to find in earlier studies. Furthermore, this study explores the heterogeneity of the effects across location, gender and household consumption groups. Therefore, this study is expected to contribute by providing a more in-depth assessment to enrich the existing relevant literature and can be used as a basis for academic discussion and policy debates.

1.6 Organization of the Study

The remaining chapters are organized as follows. In order to contextualize the above discussion,

Chapter II presents an overview of the Indonesian educational policies and practices, highlighting some of the relevant policy initiatives and educational developments. To understand the main concepts and the current progress of the research topic, Chapter III provides a review of the existing theoretical and empirical literature, mainly focusing on the literature of human capital formation and the demand-side factors associated with children's schooling. Chapter IV presents the methods used to answer the research questions of this study, which covers the analytical framework, hypotheses, review of the methods, empirical methods, data description, description of variables and summary statistics. Furthermore, the analytical results are provided in Chapter V. To conclude, Chapter VI presents the discussions, limitations of the study and conclusions.

CHAPTER II

EDUCATION IN INDONESIA: POLICIES AND PRACTICES

This chapter presents an overview of education in Indonesia to provide the necessary contextual information of the country, which is organized into five sections. In the first section of this chapter, the geographical and socioeconomic backgrounds are briefly presented. The second section of this chapter describes the education system in Indonesia, which also covers key educational policies relevant to this study. The third section describes the nation's service provision in the education sector, emphasizing the number of students and the availability of schools and teachers. The fourth section describes the financing of education in the country, which discusses the public financing, private financing and the demand-side financing intervention in Indonesia. Lastly, since this study mainly focuses on children's schooling, the fifth section of this chapter provides an overview of educational attainment in Indonesia.

2.1 Geographical and Socioeconomic Context of Indonesia

Indonesia is an archipelagic nation located between the Asian Continent and Australian Continent in Southeast Asia, consisting of 13,466 islands (Central Bureau of Statistics, 2017). There are five main islands, namely Sumatera, Java, Kalimantan, Sulawesi and Papua, and four main archipelagos, namely Riau, Bangka Belitung, Nusa Tenggara and Maluku. Indonesia consists of 34 provinces (*provinsi*), 416 regencies (*kabupaten*), 98 cities (*kota*), 7,145 sub-districts (*kecamatan*) and 82,395 villages (*desa*) spread across the country (Central Bureau of Statistics, 2017).

In terms of population, Indonesia is the fourth largest country in the world, with a total population of approximately 258.7 million in 2016 (Central Bureau of Statistics, 2017). More than half of Indonesia's population live on the island of Java, where the capital city of Jakarta is located. The diversity of the population is reflected by the more than 300 ethnic groups and more than 250 languages spoken as well (Yeom et al., 2002). Despite the variety of local languages, Bahasa

Indonesia is the national and official language of the country. Although the majority of the population is Muslim, there are a considerable number of Christians, followed by Hindus and Buddhists.

The independence of the country after a long period of colonialism was gained in 1945. Sukarno, who played an important role in the independence of Indonesia, became the first President of post-independence Indonesia until 1966. Suharto then became the second President ruling the country for more than 30 years under the so-called New Order regime. In the aftermath of the 1997 Asian financial crisis and the fall of Suharto's regime, Indonesia began to decentralize to create a more democratic political system. It was officially started by the enactment of Law No. 22/1999 concerning Local Government and Law No. 25/1999 concerning Fiscal Balancing between Central and Local Governments (later revised to Laws No. 32 and Laws No. 33 of 2004).

Under the decentralization regime, as mandated in the Law No. 22/1999, the authority of the central government was reduced to cover only defense, religion, justice, foreign affairs, debt and financial management. Meanwhile, local governments in Indonesia have been given higher autonomy and responsibility for most of the public service delivery, including public work, health, education and culture, agriculture, communications, industry and trade, capital investment, environment, land, cooperatives and labor. Law No. 25/1999, on the other hand, mandates that the transfer of responsibilities from central to local governments should be accompanied by sufficient intergovernmental transfers. Therefore, larger fiscal resources and higher authority to use the resources have also been given from central to local governments (Lewis, 2005).

Indonesia has maintained stable economic growth, with the exception of the economic slowdown during the 1997 financial crisis. In 2016, the Gross Domestic Product (GDP) growth was around 5 percent and the per capita GDP was approximately 48 million Indonesian Rupiah. The labor force participation rate in 2016 was around 66.3 percent, while the unemployment rate has been continuously decreasing from 6.1 percent in 2012 to 5.6 percent in 2016 (Central Bureau of Statistics, 2017).

Despite the economic growth, an imbalance in economic development across regions

persists. The biggest contributors to the nation's economic development are provinces in Java, mainly DKI Jakarta, West Java, Central Java and East Java (Central Bureau of Statistics, 2017). It is believed that better economic development in western parts of Indonesia is mainly due to their close proximity to the capital city of Indonesia. These regions have benefited, compared to other parts of the country, from easier access to various resources which potentially boost economic development.

In general, a shift of employment from agriculture to manufacturing and service sectors has taken place in the country. At the same time, the number of educated workers entering the labor market has been increasing substantially, but the slow rate of job creation has created a high rate of youth unemployment and difficulties to access good quality occupations for educated youth (Ogawa & Akter, 2007; World Bank, 2010).

2.2 Education System and Policies in Indonesia

Education in Indonesia consists of formal, informal and non-formal education. Figure 2.1 shows the organizational structure of the education system that incorporates formal, informal and non-formal education. Formal schooling is represented by in-school education, while informal and non-formal schoolings are represented by out-of-school education.

The formal school system is separated into two streams, namely the secular/general stream regulated under the Ministry of Education and Culture and Ministry of Research, Technology and Higher Education while the Islamic stream is under the Ministry of Religious Affairs. In general, the curriculum for both type of schools is the same, but Islamic schools have additional Islamic religious lessons.

Formal education consists of basic, secondary and higher education. The 6-3-3-4 formal education system has been adopted in Indonesia, which is divided into 6 years of primary education (aged 7-12), 3 years of junior secondary education (aged 13-15), 3 years of senior secondary education (16-18), and 4 years of higher education (aged 19-22). Basic education includes primary and junior secondary schools. Primary school consists of Sekolah Dasar (SD),

Madrasah Ibtidaiyah (MI) and other schools of the same level. Meanwhile, junior secondary school consists of Sekolah Menengah Pertama (SMP), Madrasah Tsanawiyah (MTs) and other similar kinds of schools.

After completing basic education, children can continue to attend school at senior secondary level. In senior secondary education, a student might choose to attend general or vocational schools. General senior secondary schools include Sekolah Menengah Atas (SMA) and Madrasah Aliyah (MA). Meanwhile, vocational senior secondary school comes in the form of Sekolah Menengah Kejuruan (SMK).

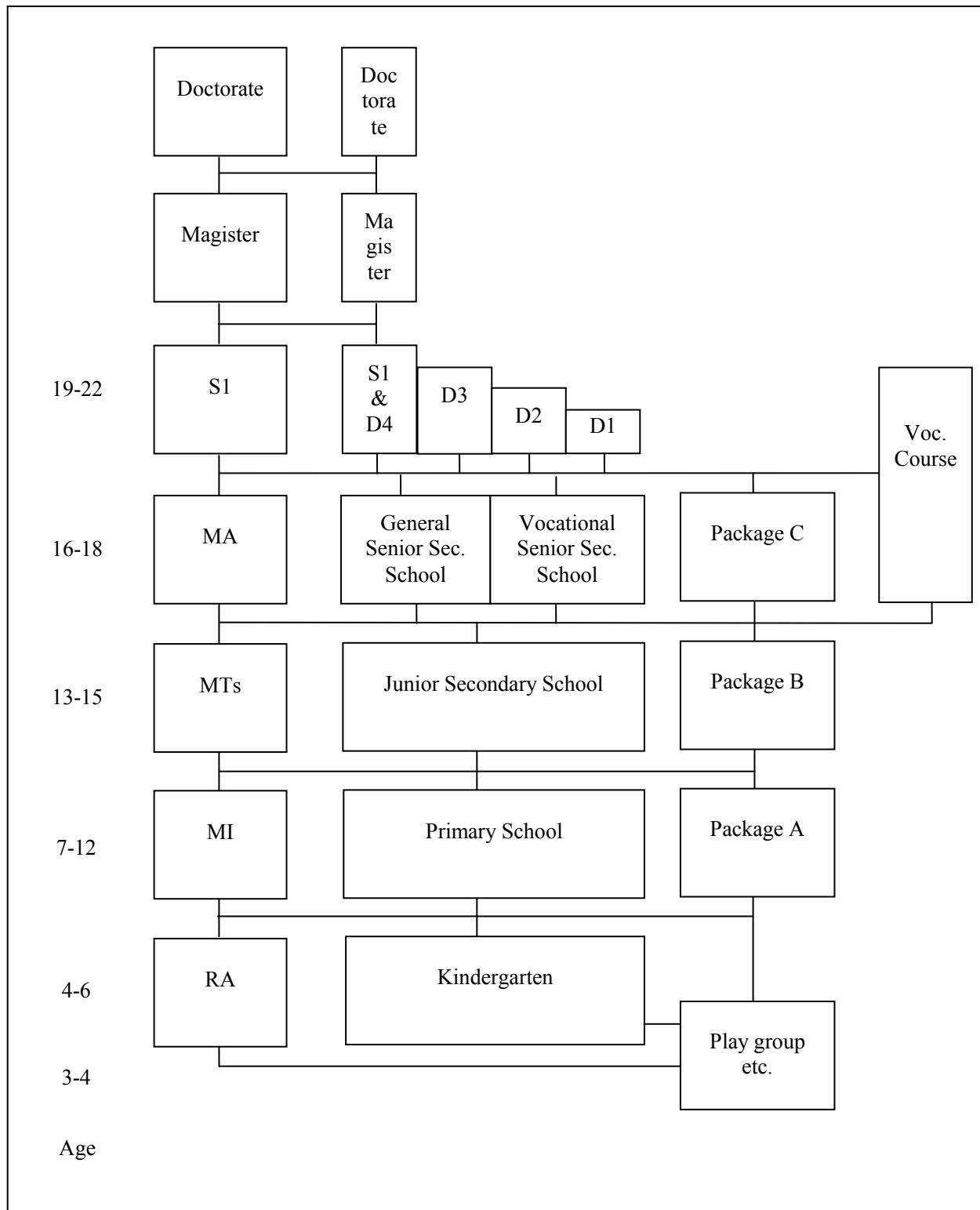
After finishing senior secondary education, graduates may continue to attend higher education, which consists of various types of diploma, bachelors, masters, specialized postgraduates and doctorate programs. There are various kinds of higher education institutions in the country, such as academies, polytechnics, institutes or universities.

Non-formal education is available, including early childhood education, equivalency programs, vocational training and internships, literacy education and other similar kinds of education. Meanwhile, self-learning provided by families and surroundings is categorized as a kind of informal education.

Prior to basic education, a child can attend early childhood education. It can be provided through formal, non-formal, and/or informal education. Early childhood education in the form of formal education is available through kindergarten, whether Taman Kanak-kanak (TK), Raudatul Athfal (RA) or other similar types of formal education. Early childhood education through non-formal education is available in the form of playgroups, childcare centers or other similar types of non-formal education. Meanwhile, family education, or education in a child's surroundings, is a kind of early childhood education that is done informally.

Package A, Package B and Package C are non-formal education pathways equivalent to primary, junior secondary and senior secondary schools respectively. These programs are mainly provided for disadvantaged individuals that need flexibility of time for learning around the time for working.

Figure 2.1: Education System in Indonesia



Source: Ministry of Education and Culture (2003, p.15).

Education has become a central concern for Indonesia. Various policies have been implemented by the Indonesian government over the last few decades to increase educational attainment and educational opportunity for all children, involving a considerable proportion of the national budget. Such key policies include the school construction program and the expansion of the compulsory education policy.

The school construction program in Indonesia, namely the Sekolah Dasar INPRES, was implemented between 1973 and 1978, which was considered to be one of the largest and fastest primary school construction programs ever (Duflo, 2001). During those periods, 61,807 primary schools were built at the cost of over 1.5 percent of the Indonesian GDP in 1973. The program was made possible by political stability and economic prosperity during that period and triggered by the need to provide school buildings to allow equity of access to schools across provinces in Indonesia. In addition to school construction, several actions to expand basic education were also provided, such as improving teacher's compensation, providing learning materials and subsidizing private schools. The main target of the program was those who had not previously been enrolled in school. Duflo (2001) showed that the school construction program has led to an increase in the years of schooling in Indonesia.

With the great success of the implementation of the Sekolah Dasar INPRES program, the six-year compulsory education policy for primary school-age children was introduced in 1984. The program mandated that children aged 7-12 years old had to attend primary schooling. The program has shown to have contributed to a large increase in primary school enrollment from 79.3 percent in 1983 to 92.16 percent in 1993 (Yeom et al., 2002).

Considering that many factors, including supply-side aspects, may prevent primary school graduates from continuing to junior secondary schools, the government continued to build many junior secondary schools during the 1980s. Furthermore, the government of Indonesia introduced Law No. 2/1989, concerning the National Education System, as the fundamental reference of the educational system and practices in the country.

Indonesia began promoting the nine-year compulsory education policy in 1994, aiming for

all children aged 7-15 years to be enrolled in school by 2004. Moreover, the Ministry of Education and Culture issued Ministerial Decree No. 0151/1994 to eliminate school fees in public junior secondary school. Also, the Ministerial Decree No. 0131/1994 was issued to provide out-of-school education programs (Package A and Package B) to support the accomplishment of the compulsory education policy. Those regulations were aimed to help disadvantaged families having difficulties in accessing education, mostly due to socioeconomic issues.

The nine-year universal basic education program was intended to provide sufficient education for children before entering the labor market and to prevent them from participating in child labor (Yeom et al., 2002). Moreover, in the longer term, direct and indirect benefits of this policy are expected, such as higher individual earnings or per capita national income as a direct benefit and better children's health or a lower fertility rate as the indirect benefits (McMahon & Boediono, 1992). The introduction of this policy has been followed by a substantial increase in the net enrollment rate (Ministry of Education and Culture, 2003), although there are still some issues after the implementation of this policy, such as regional and economic disparities (Ministry of Education and Culture, 2015b).

Unfortunately, shortly after the introduction of the nine-year compulsory policy, the Asian financial crisis hit Indonesia in 1997. The crisis threatened to have a severe impact on the education sector since financial issues remain a major obstacle for lower-income households to send their children to schools in Indonesia. As such, the upward trend in the schooling enrollment rates was interrupted. For that reason, the government of Indonesia introduced social safety net programs to prevent large-scale dropouts from school (Jones & Hagul, 2001).

The School Grant Program was an educational policy program, introduced in 1998, to lessen the impact of the financial crisis on education. The program covers the demand and supply aspects of schooling by delivering resources to students and schools through scholarships and grants directly to schools (Agustina et al., 2009). The scholarships were designed to prevent children from low-income families from dropping out of school, while grants to schools were intended to maintain educational services at a time of higher prices due to the financial crisis.

The scholarships were delivered to primary school students (Rp. 10,000 a month), junior secondary students (Rp. 20,000 a month) and senior secondary students (Rp. 25,000 a month). It was targeted to reach 1.54 million (6 percent) of primary students, 1.57 million (17 percent) of junior secondary students and 0.50 million (10 percent) of senior secondary students (Agustina et al., 2009; Cameron, 2009; Jones & Hagul, 2001). Based on the Indonesian National Socioeconomic Survey (Susenas), the primary, junior secondary and senior secondary students who reported receiving the scholarship was only around 1.2 million, 0.9 million and 0.25 million respectively which was considerably below the target. Meanwhile, the Ministry of Education and Culture reported a higher number: 1.6 million, 1.5 million and 0.46 million respectively (Jones & Hagul, 2001). Meanwhile, the block grants to school were targeted to reach 60 percent of primary schools, junior secondary schools and senior secondary schools. The total amount of money delivered to each school was Rp. 2,000,000 for primary schools, Rp. 4,000,000 for junior secondary schools and Rp. 10,000,000 for senior secondary schools respectively (Jones & Hagul, 2001).

The School Grant Program was considered successful in the sense that it helped to prevent a significant decline in the school enrollment rate during the crisis. After the implementation of the School Grant Program, the enrollment rate recovered its upward trend, exceeding the level before the crisis occurred. The contribution of the School Grant Program was that the scholarship helped the targeted recipients to remain at school, while the block grant helped schools to keep schooling costs low so that those who did not receive the scholarship also stayed at school (Agustina et al., 2009; Jones & Hagul, 2001). Subsequently, the implementation of the School Grant Program has become a reference for later educational intervention programs in Indonesia.

After the crisis passed and the Indonesian economic and political situation steadied, another scholarship scheme was introduced by the government, namely the *Bantuan Khusus Murid* (Scholarship Program for Poor Student), in 2001. The scholarship program was funded by an allocation of fuel subsidy savings (Agustina et al., 2009; World Bank, 2007).

In 2003, Law No. 20/2003 concerning National Education System was released to replace

the earlier regulation, Law No. 2/1989. Law No. 20/2003 asserts that all citizens have the right to quality education without discrimination. Furthermore, the regulation also emphasizes that all citizens aged 7 to 15 are under the free and compulsory basic education policy. The central and local governments are responsible for ensuring the implementation and financing of free compulsory basic education.

Law No. 20/2003 mandates that to provide sufficient financial resources in the education sector, the central and local governments must allocate at least 20 percent of the budget to education. Moreover, every student has the right to receive financing supports, mainly (1) scholarships, for those performing well academically that are from poor family backgrounds and (2) financing supports to cover the costs of schooling, for those who have parents unable to afford the schooling costs (Indonesia, 2003).

In 2005, the government of Indonesia initiated a mechanism of using government budgetary savings to finance education by transferring the funds directly to schools through the *Bantuan Operasional Sekolah* (School Operational Assistance) scheme (Agustina et al., 2009; World Bank, 2007, 2008, 2012). This funding mechanism allocates financial support to cover operational costs for all primary and junior secondary schools based on the per-pupil allocation formula, mainly aimed at eliminating school fees. Meanwhile, the *Bantuan Khusus Murid* (Scholarship Program for Poor Student) program partially continued as well. The *Bantuan Operasional Sekolah* program covered approximately 41 million students (62 percent were primary school students and 38 percent were junior secondary students). Primary schools received Rp. 235,000 per pupil per semester and junior secondary schools received Rp. 324,500 per pupil per semester.

The program evaluation of the *Bantuan Operasional Sekolah* by the World Bank (2008) highlighted positive aspects including (1) the program encourages children to stay at school due to the low school fees and (2) the mechanism produce less leakage of funds due to the direct transfer to schools. Meanwhile, several issues also needed to be addressed, such as (1) schools might potentially inflate the number of students enrolled to obtain greater funding, (2) the program irrelevant with the concept of decentralization since the mechanism bypassed provinces and

districts and (3) the difficulties to measure the program impact due to a grant mechanism that does not demand good performance or budget transparency of schools.

In 2006, to accelerate the accomplishment of the nine-year basic education policy target, the government has issued Presidential Instruction No. 5/2006. The Presidential Instruction demands that the net enrollment of children aged 7-12 (primary education) reach at least 95 percent by the end of 2008. Meanwhile, the gross enrollment of children aged 13-15 (junior secondary) to level at least 95 percent by the end of 2008 (Indonesia, 2006). The Asian financial crisis in 1997 was one of the main factors in hindering progress toward the universalization of basic education in Indonesia.

In 2008, the government released two important regulations related to compulsory education (Government Regulation No. 47/2008) and education financing (Government Regulation No. 48/2008) policies to follow up the release of the education law in 2003. Based on Government Regulation No. 47/2008, parents not sending their children aged 7-15 to school may receive administrative sanctions from the local government. Schools may also get administrative sanctions if they discriminate in accepting students. However, in practice, several issues need to be addressed to make sure that these mandates can be executed well. Another important point in the regulation is that, in addition to the national compulsory basic education policy, local governments may extend the compulsory education policy to cover the senior secondary education. However, in practice, many regions are still financially incapable of extending it. On the other hand, Government Regulation No. 48/2008 mainly covers the mechanism of education financing in Indonesia (Indonesia, 2008a, 2008b).

Also in 2008, the increasing budget availability at the Ministry of Education and Culture and the Ministry of Religious Affairs, due to the constitutional target of allocating 20 percent of the government's budget to education, allowed both institutions to expand the financial assistance given to the education sector. As a result, the coverage of financial assistance could be increased to provide support for those from a poor family background with little emphasis on academic performance as an eligibility criterion (Agustina et al., 2009).

The *Bantuan Siswa Miskin* (Cash Transfer for Poor Students) program was then introduced by the government in 2008 as an improvement on the earlier financial assistance program and as a complement to the *Bantuan Operasional Sekolah* (School Operational Assistance) program. The combinations of both supply-side and demand-side interventions were aimed to remove the financial barrier to access quality education and to provide opportunities for poor students to obtain a higher level of education. The *Bantuan Operasional Sekolah* was designed mainly to cover direct costs of schooling while the *Bantuan Siswa Miskin* aimed to cover the indirect costs of schooling. The nature of the *Bantuan Siswa Miskin* program that targeted poor students allowed it to reduce the schooling gap between those from poor and non-poor families.

The *Bantuan Siswa Miskin* provided cash transfers to all currently enrolled public school students from a poor background. It covered all educational levels, including both secular/general and religious public schools. Participating students attending secular/general public schools were managed by the Ministry of Education and Culture while participating students attending religious public schools were managed by the Ministry of Religious Affairs. The intention of the cash transfer was to be used to compensate for the costs of schooling, including textbooks, uniform and transportation for schooling attendance (World Bank, 2012).

The selection of program recipients was performed by school administrators. An annual lump-sum transfer was then delivered to the program recipients. The amount of benefits received by program recipients ranged based on the level of schooling. Due to the government's focus on achieving compulsory basic education targets, primary and junior secondary education became the main priority of financial assistance (World Bank, 2012).

The *Bantuan Siswa Miskin* spending has rapidly increased as the target beneficiaries enlarged. In 2008, the *Bantuan Siswa Miskin* program targeted approximately 3 million students and the coverage of the program in 2010 was nearly 6 million students. The level of spending in 2010 was equivalent to 4 percent of central government expenditures on education, which made it the third-largest cash transfer program for households in Indonesia (World Bank, 2012).

However, based on the evaluation of the program conducted by the National Team for the

Acceleration of Poverty Reduction (*Tim Nasional Percepatan Penanggulangan Kemiskinan* or TNP2K), there were several issues that needed to be addressed in the early implementation of the *Bantuan Siswa Miskin*. Those issues included (1) weak targeting accuracy, as many non-poor households received the financial assistance (inclusion error) and many children from poor households did not receive the financial assistance (exclusion error), (2) inadequacy of the benefit amount and (3) delays in disbursement of fund (Larasati & Howell, 2014). Another important issue is that the *Bantuan Siswa Miskin* did not become available in the transition periods, such as between junior secondary education and senior secondary education, which are often much costly and the chance to dropout is higher (World Bank, 2012). Those issues contributed to hampering the program's effectiveness.

The targeting error was partly contributed to by the selection process, which was performed by schools. In this mechanism, only students who were already enrolled and attending school could be included while children who were not enrolled (more likely from poorest households) were excluded. Subjectivity may have also taken place in the selection of potential financial assistance recipients among enrolled students. As a result, the coverage of the *Bantuan Siswa Miskin* for poor and vulnerable households was low, with only around 4 percent of primary and junior secondary school-age children and 2 percent of senior secondary school-age children benefiting from the *Bantuan Siswa Miskin* at the time of the evaluation (Larasati & Howell, 2014). Moreover, the funds from the *Bantuan Siswa Miskin* program benefited students from poor households and non-poor households equally (World Bank, 2012).

In 2014, the government of Indonesia introduced the *Program Indonesia Pintar* (Smart Indonesia Program/PIP) as an improvement of the previous program, the *Bantuan Siswa Miskin*. In this program, *Kartu Indonesia Pintar* (Smart Indonesia Card/KIP) was distributed to poor children of school age, including those who are out of school. According to Presidential Instruction No. 7/2014, the Ministry of Education and Culture was commanded to provide the *Kartu Indonesia Pintar* and payment for those in primary, junior secondary and senior secondary schools running under the Ministry of Education and Culture. Meanwhile, the Ministry of

Religious Affairs was mandated to provide the *Kartu Indonesia Pintar* and payment for those in primary, junior secondary and senior secondary schools running under the Ministry of Religious Affairs (Indonesia, 2014).

The *Program Indonesia Pintar* is a cash transfer from the government to those from poor and vulnerable families to finance their education. The program aimed to provide financial support to pay the costs of schooling of those eligible based on the existing government's data and the school's recommendation. Special priority is given to (1) orphans living in orphanages, (2) children with special needs attending regular schools, (3) children who have had a parent arrested, (4) children involved in criminal acts, (5) children in a natural disaster, (6) children in a conflict area and (7) children attending non-formal education in community-based non-formal institutions (Ministry of Education and Culture, 2018b).

The *Kartu Indonesia Pintar* is distributed to children aged 6-21 as an official identity document of the *Program Indonesia Pintar* recipients (Ministry of Education and Culture, 2016b). The financial assistance transferred to the *Program Indonesia Pintar* recipients can be used for several potential costs related to schooling, including textbooks, school supplies, school uniforms, transportation expenses and private tutoring. The financial assistance is transferred to program recipients on an annual lump-sum basis. The basis allocation for primary students is Rp. 225,000 per semester, junior secondary students is Rp. 375,000 per semester and senior secondary education is Rp. 500,000 per semester. The program expects to ensure that children can continue their education until graduating senior secondary education and to attract those dropping out of primary and secondary schooling to continue their education (Ministry of Education and Culture, 2018a).

Indonesia began the preparation toward universalization of secondary education in 2015 to provide equal access to education for children aged 16-18 years. Several strategic plans prepared by the government to support the accomplishment of the policy implementation includes: providing financial support for students from low-income families, providing financial support for schools, increasing the availability of senior secondary schools and increasing awareness of

society about the importance of education (Ministry of Education and Culture, 2015b). The *Program Indonesia Pintar* itself is considered to be one of the most important government initiatives to support the universalization of secondary education effort (Ministry of Education and Culture, 2016b).

2.3 Educational Service Provision in Indonesia

Besides the importance of demand-side intervention, the supply-side of education is also a crucial factor that needs to be developed, as the availability of sufficient resources is indispensable to providing educational services to society. Orazem and King (2008) stated that growing enrollment rates and completed years of schooling in developing countries are mostly influenced by the increased resources provided by governments to build schools, pay teachers and other supply-side aspects.

Table 2.1: Educational Resources, 1970/71-2001/02

	1970/71	1980/81	1990/91	2001/02
Student				
- Primary school	12,821,618	22,551,870	26,348,376	25,850,849
- Junior secondary	1,292,230	3,412,116	5,686,118	7,466,458
- Senior secondary	598,110	1,754,496	3,700,667	5,051,640
- Higher education	206,800	543,175	1,590,593	2,915,291
Institution/School				
- Primary school	64,040	105,485	147,066	148,516
- Junior secondary	6,527	10,956	20,605	20,842
- Senior secondary	2,668	4,901	11,490	12,307
- Higher education	231	403	963	1,944
Teacher				
- Primary school	397,500	665,264	1,136,907	1,164,408
- Junior secondary	94,615	202,062	409,739	476,827
- Senior secondary	54,040	127,114	327,383	363,508
- Higher education	31,500	53,777	128,652	292,949

Source: Ministry of Education and Culture (2003, p.18).

The rising number of students enrolled in schools in Indonesia, partly due to the educational expansion policy, must be in line with the availability of school resources. Table 2.1 shows the dynamics of students enrolled in schools and the availability of school resources (schools and teachers) in four different decades in Indonesia. It is shown that enrollment has been increasing remarkably from 1970/71 to 2001/02 at all levels of education. The number of students enrolled at primary school was increased by 2.02 times from 12,821,618 in 1970/1971 to 25,850,849 in 2001/2002. Meanwhile, the increase of students enrolled at junior secondary school (5.78 times), senior secondary school (8.45 times) and higher education (14.10 times) are even more considerable. The growing number of students enrolled in schools was possible as it was supported by the growing number of schools and teachers available during those periods, as shown in the table.

2.3.1 Student

More recent data regarding the number of students enrolled in public and private schools regulated under the Ministry of Education and Culture and the Ministry of Religious Affairs in 2016/2017 is presented in Table 2.2. As shown in the table, there are 59,373,949 students in total, of which 5,888,529 are attending kindergarten, 121,244 special schools, 29,292,078 primary schools, 13,343,727 junior secondary schools and 10,728,371 senior secondary schools in 2016/2017.

Overall, there is a larger proportion of students enrolled in public schools (63.16 percent) than private schools (36.84 percent). Of this, as shown in Table 2.2, a higher proportion of students at primary, junior secondary and senior secondary levels of education attend public schools than private schools. On the other hand, a higher proportion of students at kindergarten, special schools and Islamic schools (at all levels of education) attend private schools than public schools.

In Indonesia, the majority of parents will expect their offspring to attend public school as the first choice since it is less costly and often perceived as having better quality than most of the private schools (Bangay, 2005; Bedi & Garg, 2000). Private school is often considered as an alternative when children have failed to enter public schools or when a public school is not near to

the family home (Bangay, 2005). Thus, there is a competition among children to enter public schools. However, there are three key factors constraining access to public schools in Indonesia, namely geography, academic selection and financial issues (Bangay, 2005). First, the public school provision by the government in rural and remote areas in Indonesia is not as extensive as in urban areas so that the competition to enter public school is larger in those areas. Second, the academic selection determines who can enroll in the public schools based on the child's ability, so that lower ability children will have difficulties to access schools if they fail to compete in academic selection processes. Finally, the school practices to collect levies for school entrance often constrain children from poorer households to compete with children from better-off households.

Table 2.2: Number of Students in Public and Private Schools, 2016/2017

Level and Type of School	Public	Private	Total	Public (%)	Private (%)
Kindergarten Level	316,848	5,571,681	5,888,529	5.38	94.62
Kindergarten	316,848	4,288,961	4,605,809	6.88	93.12
Islamic Kindergarten	-	1,282,720	1,282,720	0	100.00
Special School	47,399	73,845	121,244	39.09	60.91
Primary School Level	22,922,182	6,369,896	29,292,078	78.25	21.75
Primary School	22,428,159	3,189,919	25,618,078	87.55	12.45
Islamic Primary School	494,023	3,179,977	3,674,000	13.45	86.55
Junior Secondary School Level	8,351,101	4,992,626	13,343,727	62.58	37.42
General Junior Secondary School	7,585,324	2,560,092	10,145,416	74.77	25.23
Islamic Junior Secondary School	765,777	2,432,534	3,198,311	23.94	76.06
Senior Secondary School Level	5,862,314	4,866,057	10,728,371	54.64	45.36
Senior Secondary School	5,420,810	3,921,645	9,342,455	58.02	41.98
General Senior Secondary School	3,416,755	1,242,787	4,659,542	73.33	26.67
Vocational Senior Secondary School	2,004,055	2,678,858	4,682,913	42.80	57.20
Islamic Senior Secondary School	441,504	944,412	1,385,916	31.86	68.14
Total	37,499,844	21,874,105	59,373,949	63.16	36.84
Ministry of Education and Culture	35,798,540	14,034,462	49,833,002	71.84	28.16
Ministry of Religious Affair	1,701,304	7,839,643	9,540,947	17.83	82.17

Source: Ministry of Education and Culture (2017b, p. 109).

Table 2.3 presents the number of students by grade from early childhood education until senior secondary education in 2016/2017 (including Package A, B and C programs). The table also provides the gross and net enrollment rate at each grade and level of education. As shown in the table, for all children aged 0-18 years old, the gross enrollment rate is 92.12 percent and net enrollment rate is 60.15 percent. There is a large room for improvement to increase the enrollment rate at junior secondary (net enrollment rate is 76.29 percent) and senior secondary (net enrollment rate is 61.20 percent) education.

Table 2.3: Number of Students by Grade, 2016/2017

Level of Education	Students	Age	Net Age Students	Population	Students as % of Population	
					Gross	Net
Early Childhood	13,913,680	3-6	...	19,229,800	72.35	...
Primary School	29,351,817	7-12	25,845,245	27,574,800	106.44	93.73
Grade I	4,986,955	7	4,391,179	4,681,719	106.52	93.79
Grade II	4,945,173	8	4,354,388	4,667,822	105.94	93.29
Grade III	4,997,217	9	4,400,215	4,626,734	108.01	95.10
Grade IV	4,863,507	10	4,282,479	4,571,547	106.39	93.68
Grade V	4,803,586	11	4,229,716	4,521,999	106.23	93.54
Grade VI	4,755,379	12	4,187,268	4,504,979	105.56	92.95
Junior Secondary School	13,566,271	13-15	10,241,986	13,425,000	101.05	76.29
Grade I	4,816,895	13	3,636,561	4,502,480	106.98	80.77
Grade II	4,438,277	14	3,350,719	4,481,920	99.03	74.76
Grade III	4,311,099	15	3,254,706	4,440,600	97.08	73.29
Senior Secondary School	10,879,950	16-18	8,124,666	13,276,000	81.95	61.20
Grade I	3,863,687	16	2,885,231	4,426,133	87.29	65.19
Grade II	3,742,436	17	2,794,686	4,428,932	84.50	63.10
Grade III	3,273,827	18	2,444,749	4,420,935	74.05	55.30
Total	67,711,718	0-18	44,211,897	73,505,600	92.12	60.15

Source: Ministry of Education and Culture (2017b, p. 91).

2.3.2 School

When the demand for schooling increases, new school buildings and additional teachers are desired (Jones & Hagul, 2001). This section provides an overview of school buildings in Indonesia while the teacher's issue is presented in the next section.

As an alternative to public school, there are many private schools in Indonesia. Most of the private schools in Indonesia are religious schools and those established by non-profit foundations (Bangay, 2005). In some cases, those private schools are subsidized by the government to support them because they are essential in increasing school availability to cover the lack of public schools needed to meet the increasing demand for schooling in the nation due to the educational expansion policy (James et al., 1996). The growing number of private schools is desired due to the scarcity of public funds and efficiency issues in managing public schools (Bedi & Garg, 2000).

Despite the growing number of private schools, many parents are aware that many of these new private schools are merely emerging to meet the boom in demand for schooling and many have low quality. In the past, the increase in school demand at junior secondary education in the 1980s and 1990s caused many poor-quality private schools with low school fees to emerge (Jones & Hagul, 2001). These schools thus may become an alternative for children from a disadvantaged background who are unable to enter the desired public schools.

For many parents, a school's perceived quality and relevance are important factors affecting children's schooling decisions, besides physical and economical access to school (Mehrotra & Delamonica, 1998). As a result, even with the lower costs of schooling, poorer parents often prefer not to send their children to such schools because they do not see the benefit of sending their children to low-quality secondary schools. Moreover, there is no assurance that their children will obtain white-collar occupations after graduating from school, whether junior or even senior secondary education (Jones & Hagul, 2001).

Table 2.4 shows the composition of schools by type and level of education in 2016/2017. It covers the general schools under the administration of the Ministry of Education and Culture and the Islamic schools under the Ministry of Religious Affairs. As shown in the table, the number of public schools is found to be largest at primary education which has been mainly attributed to the massive school construction program called the Sekolah Dasar INPRES program, where between 1973 and 1978 more than 61,000 primary schools were built in Indonesia (Duflo, 2004). The table also shows that the higher the tier of education, the lower the number of schools there are.

Moreover, Islamic schooling in Indonesia is mostly provided by private schools at all levels of education.

Table 2.4: Number of Education Institutions, 2016/2017

Level and Type of School	Ministry of Education and Culture			Ministry of Religious Affair		
	Public	Private	Total	Public	Private	Total
Kindergarten/ Islamic Kindergarten	3,207	85,174	88,381	0	27,865	27,865
Special School	545	1,525	2,070	-	-	-
Primary School/ Islamic Primary School	132,022	15,481	147,503	1,688	23,077	24,765
Junior Secondary School/ Islamic Junior Secondary School	22,803	14,960	37,763	1,442	15,759	17,201
General Senior Secondary School/ Islamic Senior Secondary School	6,567	6,577	13,144	768	7,270	8,038
Vocational Senior Secondary School	3,434	9,802	13,236	-	-	-

Source: Ministry of Education and Culture (2017b, p. 16).

Pupil to school ratio is closely associated with the costs and quality of schooling. When the number of pupils in a school is larger, the total cost per pupil is lower due to the economies of scale, but it might harm the quality of schooling. The pupil to school ratio in 2016/2017 is presented in Table 2.5. It is shown that the pupil to school ratio in general schools is higher than that in Islamic schools for all levels of education. It might be attributable to the tendency that general schools attract more students than Islamic schools.

Table 2.5: Pupil to School Ratio, 2016/2017

Level of Education	Pupil to School Ratio			
	General	Islamic	Vocational	All
Kindergarten	52	46	-	51
Primary School	174	148	-	170
Junior Secondary School	269	186	-	243
Senior Secondary School	354	172	354	312

Source: Created by the author based on Ministry of Education and Culture (2017b, p. 104-105).

The quality of the classroom is another necessary element to producing high-quality education. Table 2.6 presents the number and percentage of classrooms in primary, junior secondary and senior secondary schools (general and vocational) in Indonesia in 2016/2017 by their condition. As presented, the percentage of classrooms in good condition is relatively small, whether in primary school (25.74 percent), junior secondary school (28.73 percent), general senior secondary school (45.66 percent) or vocational senior secondary school (45.66 percent). Unfortunately, a total of 108,144 primary schools (more than 10 percent) are in a condition of having major or severe damage. In Indonesia, deteriorating classroom quality has been a serious issue for a long time.

Table 2.6: Number of Classrooms by Condition, 2016/2017

Level of Education	Good		Minor Damage		Some Damage		Major Damage		Severe Damage	
	N	%	N	%	N	%	N	%	N	%
Primary School	270,028	25.74	601,393	57.32	69,551	6.63	58,269	5.55	49,875	4.75
Junior Secondary School	99,853	28.73	195,791	56.33	21,683	6.24	17,057	4.91	13,208	3.80
Senior Secondary School (General)	69,147	45.66	70,773	46.73	4,943	3.26	3,224	2.13	3,354	2.21
Senior Secondary School (Vocational)	65,375	45.66	69,571	48.59	3,115	2.18	2,502	1.75	2,612	1.82

Source: Ministry of Education and Culture (2017a, p. 38).

2.3.3 Teacher

Besides providing school buildings, the government needs to employ a sufficient number of teachers to meet the schooling demand. In the context of decentralized governance in Indonesia, the authority to employ teachers is delegated to the district governments, but schools can also employ their own teachers (UNESCO, 2012).

The composition of teachers by gender and level of education, from kindergarten until senior secondary school, in the 2016/2017 academic year is presented in Table 2.7. In public schools,

there are 1,414,560 (62.87 percent) female teachers compared to 835,428 (37.13 percent) male teachers. Meanwhile, in private schools, there are 633,164 (71.65 percent) female teachers compared to 250,486 (28.35 percent) male teachers. Overall, the proportion of female teachers in public and private schools in Indonesia is higher than male teachers for almost all levels of education, with the exception of private vocational senior secondary schools.

Table 2.7: Number of Teachers, 2016/2017

Level and Type of School	Public			Private		
	Male	Female	Total	Male	Female	Total
Kindergarten	1,752	16,844	18,596	9,118	301,388	310,506
Special School	3,065	6,338	9,403	4,237	11,017	15,254
Primary School	490,015	917,676	1,407,691	55,214	123,222	178,436
Junior Secondary School	187,454	278,735	466,189	71,600	84,992	156,592
General Senior Secondary School	88,979	124,798	213,777	37,411	43,684	81,095
Vocational Senior Secondary School	64,163	70,169	134,332	72,906	68,861	141,767
Total	835,428	1,414,560	2,249,988	250,486	633,164	883,650

Source: Created by the author based on Ministry of Education and Culture (2017b, p. 122).

Pupil to teacher ratio might measure the sufficiency of teacher resources, while it may also influence the cost of schooling, through teacher salaries, as well as the quality of schooling, through teacher-student interaction. The implication of a lower pupil to teacher ratio is that students could obtain adequate attention from their teachers during the learning process. The general consensus for the optimal pupil-teacher ratio is 30:1 (World Bank, 2007). Table 2.8 shows the pupil to teacher ratio in Indonesia in 2016/2017. The average pupil to teacher ratio for vocational secondary schools (17) is the largest compared to the average pupil to teacher ratio for kindergarten (14), primary school (16), junior secondary school (15) and senior secondary school (16). This situation shows that, in general, teacher availability might not be the main issue in Indonesia. Instead, the distribution of teachers is often considered as an issue.

Table 2.8: Pupil to Teacher Ratio, 2016/2017

Level and Type of School	Pupil to Teacher Ratio			
	General	Islamic	Vocational	All
Kindergarten	14	16	-	14
Primary School	16	16	-	16
Junior Secondary School	16	13	-	15
Senior Secondary School	16	12	17	16

Source: Created by the author based on Ministry of Education and Culture (2017b, p. 106-107).

Besides teacher availability, the quality of a teacher is another important aspect of producing high-quality education. A teacher must satisfy the standard for academic and competency qualifications to perform their tasks well. Table 2.9 shows the academic qualification of teachers from kindergarten until senior secondary school level in 2016/2017 in Indonesia.

Table 2.9: Number of Teachers by Qualification, 2016/2017

Level and Type of School	<S1		>=S1		Total
	N	%	N	%	
Kindergarten	157,026	47.71	172,076	52.29	329,102
Special School	3,207	13.01	21,450	86.99	24,657
Primary School	250,453	15.79	1,335,674	84.21	1,586,127
Junior Secondary School	49,147	7.89	573,634	92.11	622,781
General Senior Secondary School	9,202	3.12	285,670	96.88	294,872
Vocational Senior Secondary School	16,686	6.04	259,413	93.96	276,099

Source: Created by the author based on Ministry of Education and Culture (2017a, p. 27-32).

As shown in the table, there are numerous teachers that do not have an undergraduate degree (S1) who teach in kindergarten (47.71 percent), special schools (13.01 percent), primary schools (15.79 percent), junior secondary schools (7.89 percent), general senior secondary schools (3.12 percent) and vocational senior secondary schools (6.04 percent). There is a need to develop

under-qualified teachers so that they can satisfy the required standards. Otherwise, the quality of education will remain an issue in education in the country.

2.4 Financing of Education in Indonesia

Besides physical educational resources, such as school buildings and teachers, the financing of education has an indispensable role in providing better access to quality education. The education system is mainly financed by government financing, tuition and other fees and voluntary contributions. However, the main source of education financing in many countries is mostly from the government budget (Bray, 1998). This section provides an overview of the government's financing of education and is then followed by the costs of schooling paid by households in Indonesia.

Table 2.10 shows the trend of the public spending on education as a percentage of Gross Domestic Product (GDP) and as a percentage of total government spending in Indonesia and other Southeast Asian countries, such as Malaysia, Philippines, Singapore, Thailand and Vietnam, in the years 2000, 2003, 2006, 2009, 2012 and 2015. Although there is no theoretically appropriate proportion of GDP or government spending that should be devoted to education, comparisons with other countries may provide a benchmark on how much Indonesia should spend on education.

As shown in the table, for most of the years indicated, Indonesia has spent relatively fewer public funds on education than countries such as Malaysia, Singapore, Thailand and Vietnam. Only the Philippines shows lower public financing of education than Indonesia. However, Indonesia has shown an upward trend in public investment in education across time. For instance, the percentage of public spending on education as a percentage of GDP has risen from approximately 3.22 percent in 2003 to 3.59 percent in 2015. Moreover, by the percentage of total government spending, public spending on education reached 20 percent in 2015. This trend indicates that the government of Indonesia has continuously invested more in education.

Table 2.10: Public Spending on Education in Selected Southeast Asian Countries, 2000-2015

Country	Public Spending on Education as a Percentage of GDP						Public Spending on Education as a Percentage of Total Government Spending					
	2000	2003	2006	2009	2012	2015	2000	2003	2006	2009	2012	2015
Indonesia	n/a	3.22	n/a	3.52	3.40	3.59	n/a	16.28	n/a	19.30	18.09	20.5
Malaysia	5.98	7.50	4.48	5.97	5.74	4.97	21.39	24.54	16.75	18.47	19.93	19.7
Philippine	3.26	3.04	2.53	2.65	n/a	n/a	15.21	14.38	13.27	13.21	n/a	n/a
Singapore	3.33	4.00	2.87	3.03	3.12	n/a	18.29	21.81	19.75	17.20	21.16	n/a
Thailand	5.25	3.72	4.05	3.87	4.56	n/a	28.39	20.87	22.00	18.18	21.40	n/a
Vietnam	n/a	n/a	n/a	4.81	5.53	n/a	n/a	n/a	n/a	15.24	18.82	n/a
World	3.95	4.17	4.19	4.75	4.57	n/a	13.39	14.67	13.98	14.31	14.45	n/a

Source: Created by the author, based on data retrieved from World Bank, <https://data.worldbank.org/indicator>.

The allocation of public spending at each level of education may indicate which level of education is prioritized by the government. The common pattern of educational financing is that the government provides financial support mainly for the lower level of education so that the proportion of private financing for education is increasing from lower to higher educational levels (Jones & Hagul, 2001). Indonesia, by and large, follows these general patterns (Bray, 1998; Jones & Hagul, 2001).

Regarding the allocation for each level of education, Table 2.11 presents the public spending on education per pupil as a percentage of GDP per capita by levels of education in Indonesia from 2007 to 2015. The table shows that pupils in secondary education in Indonesia receive the least subsidy from the government in comparison to pupils in primary and tertiary education for the periods from 2007 to 2015. That the proportion of public spending per pupil for tertiary education is the largest is most likely due to the number of students enrolled in this level of education being the lowest when compared to other levels of education.

Table 2.11: Public Spending on Education per Pupil as a Percentage of GDP per Capita by Levels of Education, 2007-2015

Level of Education	2007	2008	2009	2010	2011	2012	2013	2014	2015
Primary Education	11.48	11.36	13.48	9.95	n/a	11.47	11.90	12.25	13.22
Secondary Education	9.49	9.42	10.98	8.27	n/a	10.26	9.84	9.93	10.48
Tertiary Education	23.70	16.97	21.05	21.81	n/a	23.29	21.56	19.49	28.52

Source: Created by the author, based on data retrieved from World Bank, <https://data.worldbank.org/indicator>.

The strong commitment of the government of Indonesia to increasing public spending on education is indicated by the adoption of a constitutional mandate which stipulates that central and local governments must allocate at least 20 percent of the total budget to education each year to cover investments, operations and personnel costs of education. Moreover, funding for education is the mutual responsibility of the central and local governments as well as communities.

To comply with the reform in Indonesia toward the implementation of decentralization, the central government transfers additional funds to sub-national governments along with the transferring of responsibility. It is expected that the transfer of funds can address the vertical fiscal imbalance between central and sub-national governments and horizontal fiscal imbalance between sub-national governments. In practice, sub-national governments' revenue mainly comes from the intergovernmental fiscal transfers, so that adequate transfer of financial resources from central to sub-national governments for education is essential to producing a quality education across the country.

Table 2.12 shows the education budget, whether allocated for central governmental institutions or transferred to sub-national governments. The central government's education budget is principally allocated to the Ministry of Education and Culture, the Ministry of Religious Affairs, the Ministry of Research, Technology and Higher Education and some other institutions. The education budget transfer to regions is allocated to regions through several mechanisms: the Revenue Sharing Fund (*Dana Bagi Hasil*), General Allocation Fund (*Dana Alokasi Umum*), Special Allocation Fund (*Dana Alokasi Khusus*), Regional Incentive Fund (*Dana Insentif Daerah*)

and Special Autonomy Fund (*Dana Otonomi Khusus*). Meanwhile, the Education Development Fund is managed by the Ministry of Finance.

Table 2.12: National Education Budget, 2010-2016 (in trillion Rupiah)

Description	2010	2012	2014	2016
Total Central Government Education Budget	96.5	117.2	128.2	145.0
Total Education Budget Transfers to Regions	127.7	186.6	238.8	266.6
a. Revenue Sharing Fund (DBH)	0.7	1.0	1.2	-
b. General Allocation Fund (DAU)	95.9	113.9	135.6	142.1
c. Special Allocation Fund (DAK)	28.8	68.5	97.9	119.9
1. Physical Special Allocation Fund	9.3	10.0	10.0	2.7
2. Non-physical Special Allocation Fund	18.0	57.1	86.5	117.3
- Teachers' Professional Allowance	11.0	30.6	60.5	69.8
- School Operational Fund (BOS)	-	23.6	24.1	43.9
d. Regional Incentive Fund (DID)	1.4	1.4	1.4	-
e. Special Autonomy Fund (Otsus)	2.3	3.3	4.1	4.6
Educational Development Fund	1.0	7.0	8.4	5.0
Total Education Budget	225.2	310.8	375.4	416.6
Total State Budget	1,126.1	1,548.3	1,876.9	2,082.9
Education Budget Ratio	20.0	20.1	20.0	20.0

Source: Created by the author, based on data retrieved from Ministry of Finance, www.anggaran.depkeu.go.id.

The General Allocation Fund (*Dana Alokasi Umum*) is the component of the intergovernmental fiscal transfers which provides the largest contribution to the source of funds for local governments. As shown in Table 2.12, the composition of the General Allocation Fund for education accounts for almost half of the intergovernmental transfers in education. The General Allocation Fund itself aimed to equalize fiscal capacities of local governments to deliver public services, which is based mainly on the fiscal gap (the difference between the fiscal needs and capacities) of local governments.

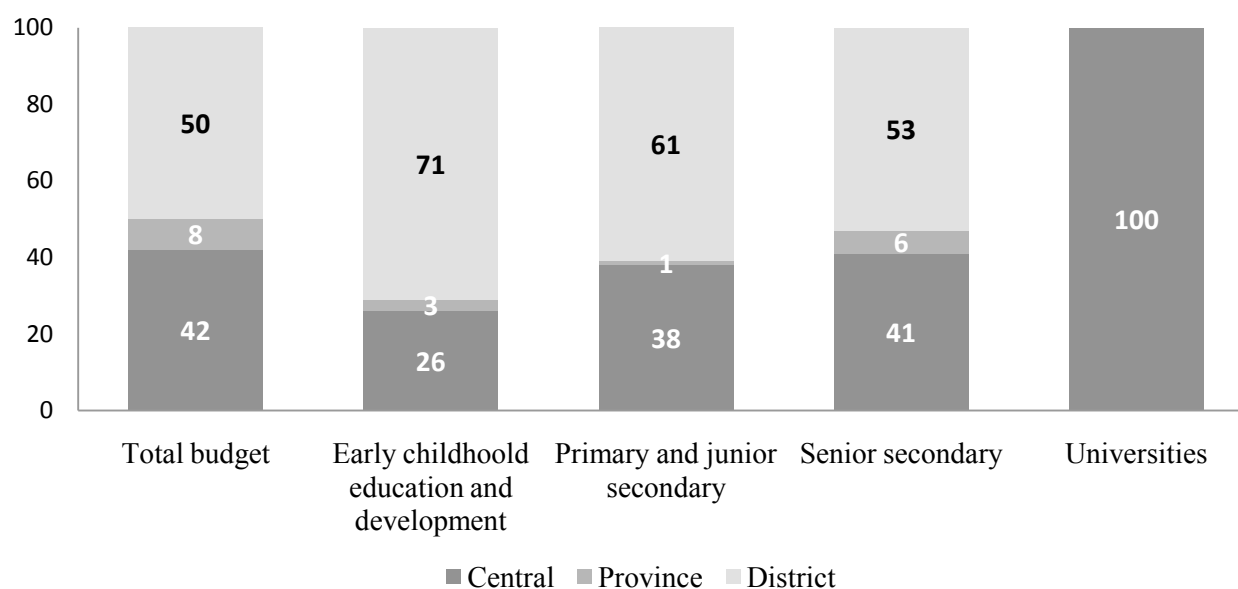
The use of the General Allocation Fund depends on the priorities of the local government whereby the central government does not have the authority to stipulate the allocation of the funds for a specific purpose, including education. Meanwhile, the central government has control regarding the allocation of the Special Allocation Fund (*Dana Alokasi Khusus*). Through the Special Allocation Fund, the government can specifically finance activities that are decided to be national priorities, such as education.

As shown in the table, the total education budget has been increasing over time alongside the increasing national budget, from Rp. 225.2 trillion in 2010 to Rp. 310.8 trillion in 2012, Rp. 375.4 trillion in 2014 and Rp. 416.6 trillion in 2016 respectively. Moreover, the national education budget also shows that the government has maintained the educational budget ratio at 20 percent in order to meet the constitutional mandate.

Although the decentralization in Indonesia has resulted in greater authority for local governments regarding the allocation of educational funding, the financing of education at most educational levels remains the responsibility of both the central and local governments. Figure 2.2 shows the proportion of government spending at each level of education for central, provincial and district-level governments in Indonesia in 2009 to show the role of central and local governments in Indonesia.

As shown in the figure, the financing of education for early childhood, primary, junior secondary and senior secondary education was mainly fulfilled by the central and district governments, while provincial governments only provide a small portion of the financing. In total, around 42 percent of the education sector was financed by the central government, 8 percent was financed by the provincial government and 50 percent was financed by the district government's budget.

Figure 2.2: Proportion of Spending on Education by Central, Province and District-level Governments, 2009



Source: World Bank (2013, p. ix).

Table 2.13: District Expenditures on Education by Poverty Quintile

District Quintile	Per Capita Total District Expenditure (Rp)		Education Expenditure per Public School Student (Rp)		Education as % of Overall Expenditures		Non-personnel Education as % of Total Expenditure	
	2001	2004	2001	2004	2001	2004	2001	2004
Poorest	558,116	725,459	165,486	215,523	35.7	34.4	5.5	5.3
2	364,804	724,234	148,595	228,492	40.1	36.3	4.4	4.7
3	393,305	690,836	144,850	209,021	43.0	35.0	4.3	4.6
4	493,893	899,841	184,214	245,510	40.0	32.0	4.9	5.6
Richest	619,163	950,714	182,893	272,704	32.9	31.1	5.2	3.9
All	484,758	798,819	165,168	234,718	38.2	33.7	4.8	4.8

Source: World Bank (2008, p. 41).

Furthermore, based on the World Bank (2008), the educational spending pattern at the district level is presented in Table 2.13. The table demonstrates that, overall, around 38.2 percent of district expenditure in 2001 was spent on education, although it then declined to 33.7 percent in 2004. Moreover, the table also indicates there is no assurance that the proportion of education expenditure in richer districts is larger than in poorer districts as it may depend on the district's developmental priorities.

Overall, based on the more recent government budget of 2017, the funding for education is provided mainly to meet several key objectives, including (1) to obtain quality teachers through certification programs, (2) to obtain equitable distribution of teachers through transfer across schools and regions, (3) to increase access to education through government programs: School Operational Assistance (*Bantuan Operasional Sekolah*), Operational Assistance for State Universities (*Bantuan Operasional Perguruan Tinggi Negeri*), Smart Indonesia Card (*Kartu Indonesia Pintar*) and Bidikmisi scholarship, and (4) to improve the quality of school facilities through school rehabilitation programs (Ministry of Finance, 2017).

In addition to public financing of education, the understanding of the private costs of schooling is necessary as it might influence the demand for schooling as well. The information regarding the costs of schooling that should be paid by households in Indonesia is presented in Table 2.14. The table shows the costs of schooling for each level of education based on location (urban or rural) and type of school (public or private) in 2015. These costs of schooling cover the total costs, including school registration, uniform, textbooks, school supplies and transportation expenses (Central Bureau of Statistics, 2016b).

The table indicates a significant increase in the costs of schooling across educational levels, from primary education (804 thousand) to junior secondary education (1,363 thousand), senior secondary education (2,035 thousand) and tertiary education (4,981 thousand) respectively. Thus, the costs of schooling tend to be larger as the level of education increases. Furthermore, the data also shows that the cost of schooling is higher in urban areas than in rural areas and similarly also higher in private schools than in public schools.

Table 2.14: Costs of Schooling, 2015 (in thousands of Rupiah)

Levels of Education	Location		Type of School		Average Cost of Schooling
	Urban	Rural	Public	Private	
Primary Education	1,074	558	691	1,363	804
Junior Secondary Education	1,692	1,073	1,287	1,563	1,363
Senior Secondary Education	2,404	1,605	1,842	2,443	2,035
Tertiary Education	5,268	3,962	4,479	5,321	4,981

Source: Central Bureau of Statistics (2016b, p. 28).

The more detailed components of the costs of schooling are shown in Table 2.15. It provides information on which aspects of educational expenses are considered more costly for households in each level of education. The table shows that besides pocket money, the proportion of the transportation expenses is relatively high and increases from primary education (8.4 percent) to junior secondary education (17.44 percent) and into senior secondary education (21.83 percent). Meanwhile, the proportion of transportation expenses in higher education (16.37 percent) is relatively lower, possibly because the tuition fee is much higher (36.75 percent) in higher education.

On the other hand, much lower school fees are observed in the lower levels of education, especially primary and junior secondary education, which might be explained by the better availability of government intervention programs, such as *Bantuan Operasional Sekolah* (School Operational Assistance) or the *Program Indonesia Pintar* (Smart Indonesia Program). The relatively high costs of uniform, as well as transportation, in the primary, junior secondary and senior secondary education might also suggest the need to expand demand-side intervention programs to support those with financial constraints.

Table 2.15: Costs of Schooling by Types of Expenditure, 2015 (in percentage)

Types of Expenditure	Levels of Education			
	Primary	Junior Secondary	Senior Secondary	Higher Education
Registration	1.42	2.87	4.90	4.60
School Fees	6.19	6.82	10.94	36.75
School Committee	1.29	1.79	2.48	0.30
Extracurricular	0.39	0.59	0.81	0.23
Uniform	14.97	12.09	8.63	1.25
Hat and socks	6.88	4.77	3.17	0.86
Textbooks	4.27	4.15	4.97	4.09
Student worksheet	3.36	3.53	2.66	0.27
School supplies	7.72	5.83	4.47	1.88
Practicum	0.32	0.59	2.05	1.25
Private tutoring	0.26	0.26	0.23	0.11
Test/evaluation	0.07	0.13	0.25	0.88
Study tour	0.08	0.32	0.33	0.59
Pocket money	43.84	38.18	31.65	29.02
Transportation	8.40	17.44	21.83	16.37
Others	0.55	0.64	0.63	1.56
Total	100	100	100	100

Source: Central Bureau of Statistics (2016b, p. 29).

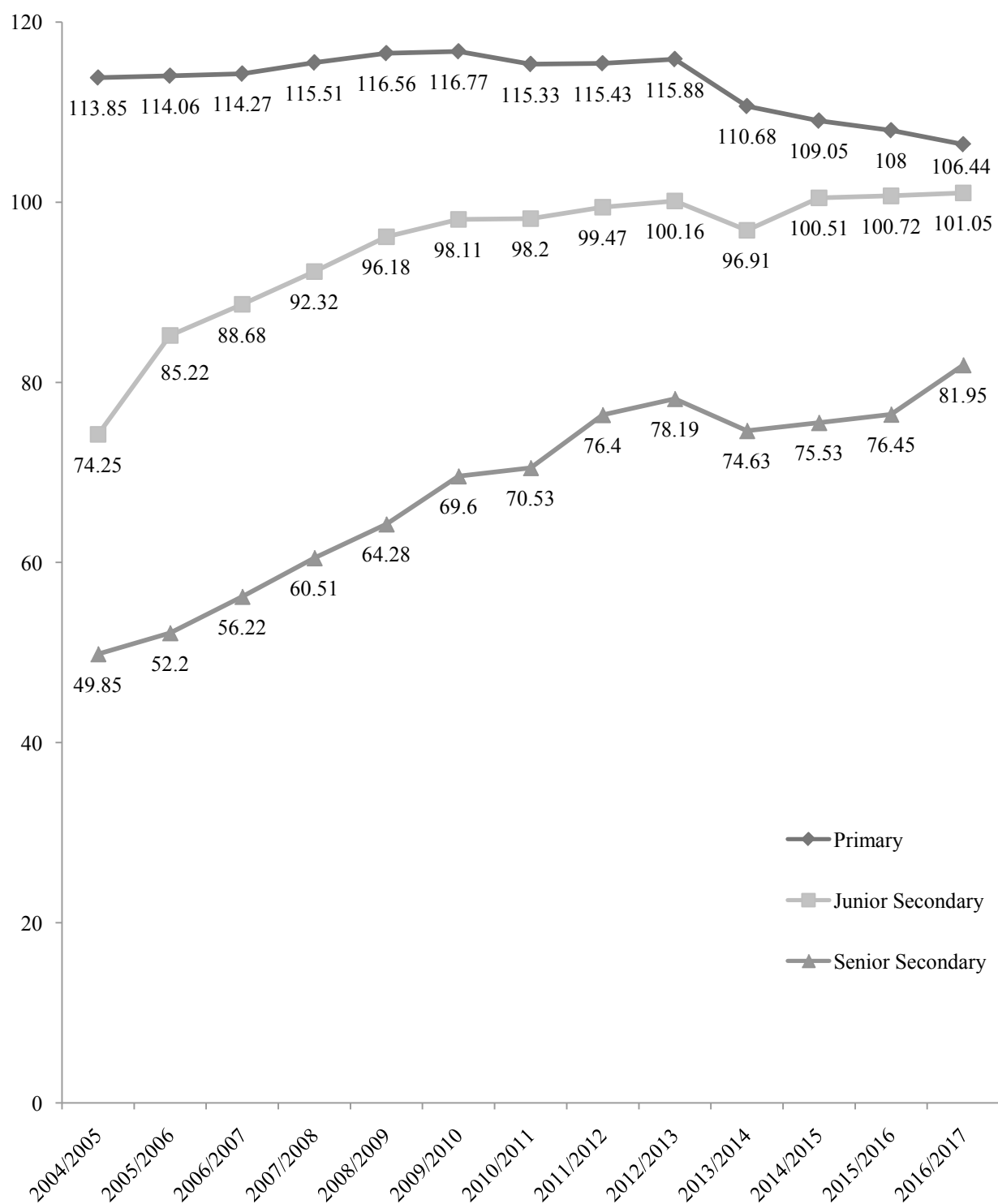
2.5 Educational Attainment in Indonesia

The prior sections have shown a steady increase in educational resources, including schools, teachers and financial resources, over time in Indonesia. Improvement in educational outcomes is thus expected from such an increase in public investments in education. The following paragraphs present the school enrollment in Indonesia as one of the outcomes affected by the educational investment.

The gross and net enrollment ratio for each level of education from the academic year of 2004/2005 to 2016/2017 is shown in Figure 2.3 and 2.4. The figures show that Indonesia has achieved near-universal primary education and the school enrollment for other levels of education has tended to increase over time. For primary education, the gross and net enrollment rate in 2016/2017 was 106.44 percent and 93.73 percent respectively. For junior secondary education, the gross enrollment rate has increased from 74.25 percent in 2004/2005 to 101.05 percent in 2016/2017, while the net enrollment rate increased from 60.15 percent in 2004/2005 to 76.29 percent in 2016/2017. For senior secondary education, the gross enrollment rate increased from 49.85 in 2004/2005 to 81.95 in 2016/2017, while the net enrollment rate increased from 40.35 percent in 2004/2005 to 60.20 in 2016/2017. Despite the continuous progress in school enrollment, the challenges to meet the universal secondary education target set by the government remain.

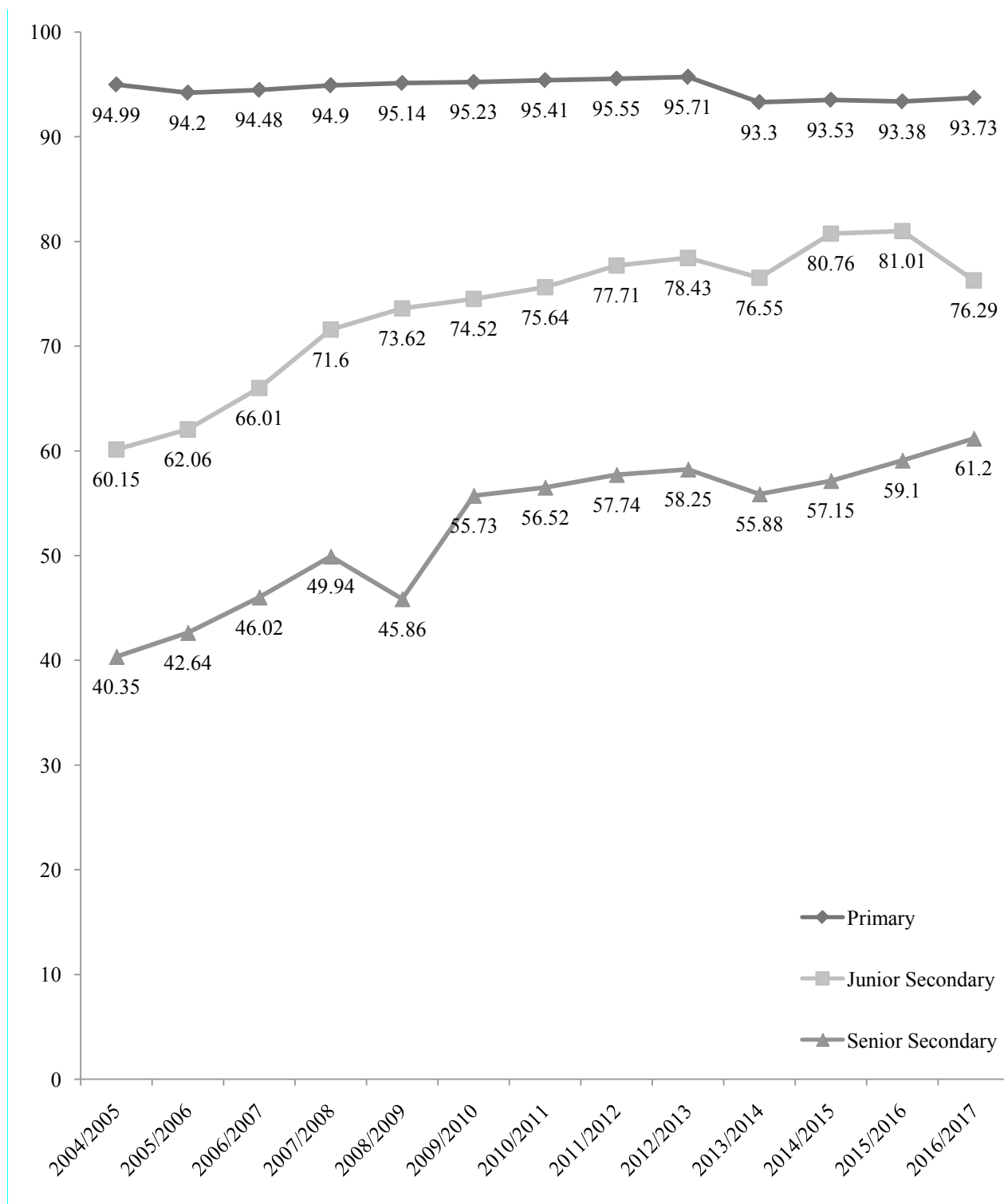
The gross and net enrollment rate in all 34 provinces in Indonesia in 2016/2017 is presented in Figure 2.5 (primary school), Figure 2.6 (junior secondary school) and Figure 2.7 (senior secondary school). For primary education, there are three provinces with the lowest gross enrollment rate, all below 100 percent, namely Yogyakarta (98.42 percent), Kepulauan Riau (97.94 percent) and Papua (88.75 percent). For junior secondary education, there is a huge gap in the gross enrollment rate between Papua (64.93 percent) and other provinces, even with Kalimantan Utara (93.35 percent) as the second-lowest one. For senior secondary education, the gross enrollment rate in Papua (49.31 percent) is again the lowest and the difference with the second-lowest one, Bangka Belitung (73.13 percent), is also huge.

Figure 2.3: Gross Enrollment Rate, 2004/2005-2016/2017



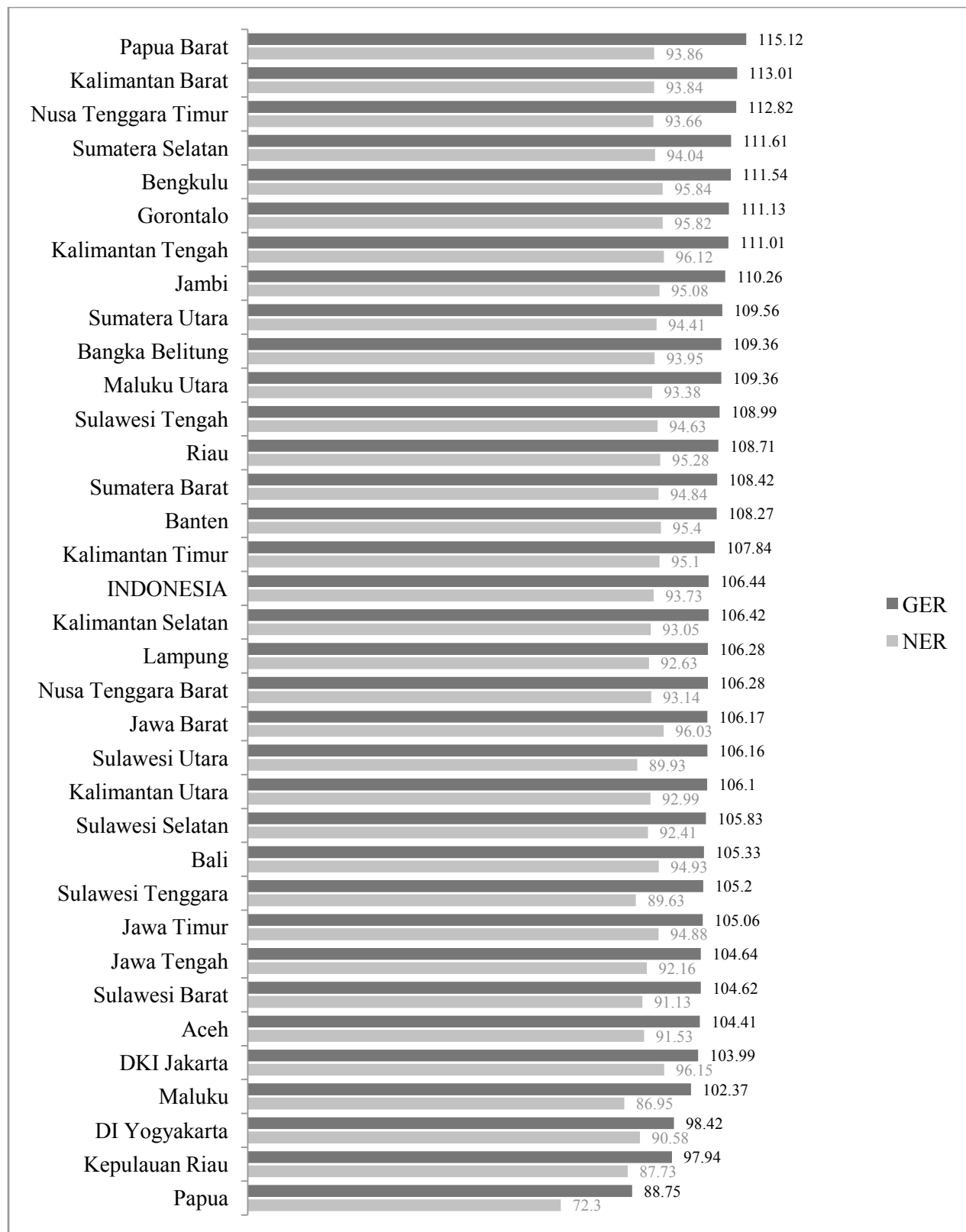
Source: Created by the author based on Ministry of Education and Culture (2009, 2012, 2013, 2014, 2015a, 2016a, 2017a).

Figure 2.4: Net Enrollment Rate, 2004/2005-2016/2017



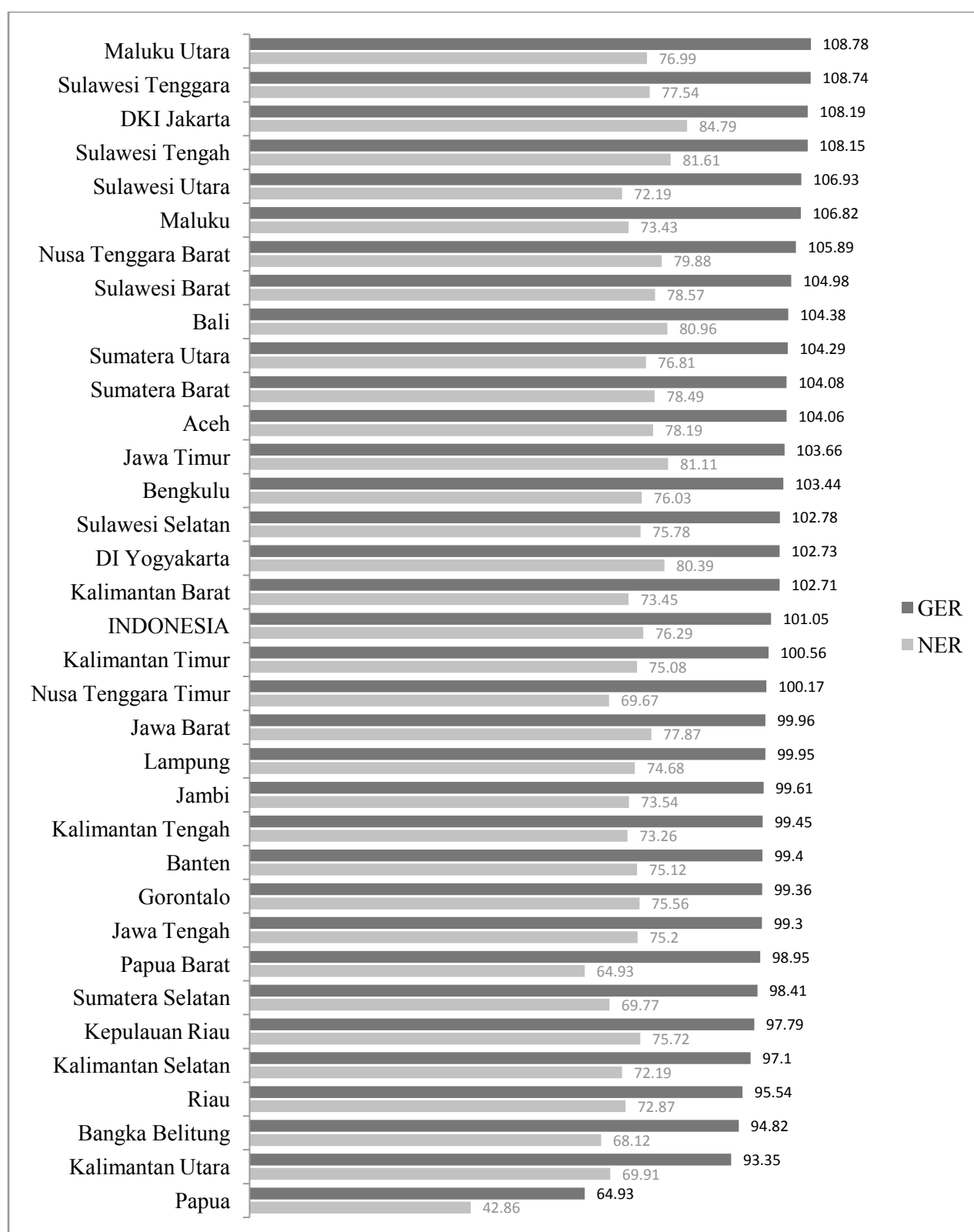
Source: Created by the author based on Ministry of Education and Culture (2009, 2012, 2013, 2014, 2015a, 2016a, 2017a).

Figure 2.5: Primary School Enrollment Rate by Provinces in 2016/2017



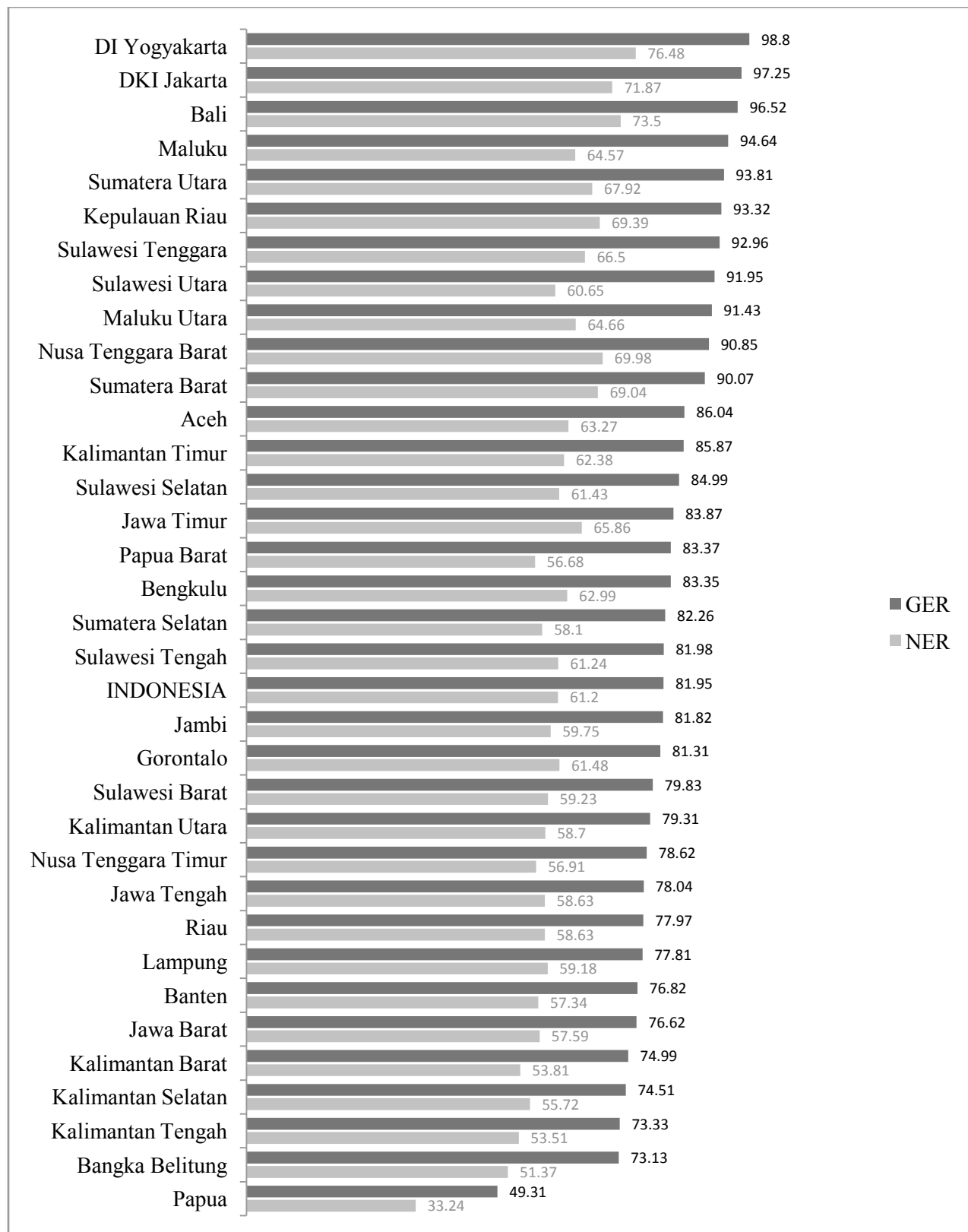
Source: Created by the author based on Ministry of Education and Culture (2017b, p. 133).

Figure 2.6: Junior Secondary School Enrollment Rate by Provinces in 2016/2017



Source: Created by the author based on Ministry of Education and Culture (2017b, p. 134).

Figure 2.7: Senior Secondary School Enrollment Rate by Provinces in 2016/2017



Source: Created by the author based on Ministry of Education and Culture (2017b, p. 134).

Educational delivery in Indonesia is partly constrained by the geographic features of the country, which may cause for low enrollment in some underserved areas in Indonesia. The difficulties that emerged from geographic characteristics are commonly related to access, logistics, and unit cost (Bangay, 2005). Under the previous centralized regime, the government of Indonesia pays little attention to the development of regions in the eastern part of Indonesia, such as Papua, and the effect may still exist today. The isolated geographic location of Papua from the central administration is one reason for the low educational sector development in the region. For instance, approximately 36 percent of the population of Papua aged five years and above had never attended schooling or were unable to finish primary school as of 2004, which was a rate that was far lower than the national average (Mollet, 2007).

Nusa Tenggara Timur is another example of a region located in the eastern part of the country and which is one of the poorest provinces in Indonesia. Jones et al. (1998) found that there were dilemmas in the region regarding the implementation of the educational expansion policy because there was a mismatch between schooling and the labor market situation. The growing enrollment rate in the region did not correspond with the job opportunities and the type of work available in the region, which were mostly unskilled and semiskilled jobs.

Contrasting this, the overall enrollment rate in the capital region of Jakarta in 2016/2017 was relatively higher than in other regions. For instance, in primary education, although the gross enrollment rate (103.99 percent) was lower than the national average (106.44 percent), the net enrollment rate (96.15 percent) was the highest in the country. In junior secondary education, the gross enrollment rate (108.19 percent) was the third-highest while the net enrollment rate (84.79 percent) was the highest in the country. In senior secondary education, the gross enrollment rate (97.25 percent) was the second-highest and the net enrollment rate (71.87 percent) was the third-highest in the country.

In the Annexes, additional information regarding the school participation of children aged 13-15 and 16-18 is provided visually (Figure A-19 – Figure A-22). In addition, the Annexes also shows the availability of junior and senior secondary schools (Figure A-23 – Figure A-28) as well

as the socioeconomic feature of the country (Figure A-29). Overall, the visual information shows the diversity of the educational and socioeconomic conditions in Indonesia.

To observe the schooling differences between those from poor and non-poor households, Table 2.16 presents the gross enrollment rate for primary, junior secondary and senior secondary schools by household economic status in 2016. In general, the table indicates that children from a household with better economic conditions are more likely to be enrolled in schools than those from a disadvantaged economic background. For primary education, the enrollment rate between both groups was only slightly different. For junior secondary education, those from the poorest background (Q1) were underprivileged compared to the others. For senior secondary education, the disparity between children from a household with low economic status (Q1 and Q2), middle (Q3) and high (Q4 and Q5) was obvious. These might suggest that attention should be given mainly to the poorest in junior secondary and those from poor and medium households in senior secondary education.

Table 2.16: Gross Enrollment Rate by Household Economic Status, 2016

Level of Education	Household Economic Status				
	Q1	Q2	Q3	Q4	Q5
Primary School	107.05	108.08	109.42	109.78	111.20
Junior Secondary School	85.96	90.60	91.96	91.28	91.50
Senior Secondary School	62.44	75.46	81.41	91.68	94.44

Source: Created by the author based on Central Bureau of Statistics (2016a, p. 40).

The cost of schooling is often considered to be the main obstacle for children from lower-level income households to access education (Buchmann, 2000). When the per-pupil cost of schooling is high, the enrollment rate will tend to be low and vice versa (Mehrotra & Delamonica, 1998). User fees, such as tuition, uniform, textbooks and exam fees can potentially become a burden for low-income households. In Indonesia, such kinds of user fees are often observed in schools even though basic education is free (Rosser & Joshi, 2013). Moreover, many parents from low-income family often do not see the value of keeping their children at school when the cost of

schooling is high (Jones & Hagul, 2001). However, as household income increases, the willingness of parents to spend on education also increases (Glewwe & Patrinos, 1999).

Table 2.17 shows the gross enrollment rate for primary, junior secondary and senior secondary school by location and gender in 2016. The gross enrollment rate for junior and senior secondary education was higher in urban areas than in rural areas, but the opposite was true for the case of primary education. By gender, the gross enrollment rate for junior and senior secondary education was higher for females, but the opposite for primary education. Overall, the gaps between urban and rural areas and also between males and females were not significant, with the exception of the gap for gross enrollment rate between urban (88.14) and rural (73.24) students in senior secondary education. Such a considerable gap may need to be highlighted by policymakers to encourage the design of a necessary government intervention to increase school enrollment for those disadvantaged.

Table 2.17: Gross Enrollment Rate by Location and Sex, 2016

Levels of Education	Location		Sex	
	Urban	Rural	Male	Female
Primary Education	107.85	110.72	109.93	108.66
Junior Secondary Education	90.71	89.55	88.91	91.38
Senior Secondary Education	88.14	73.24	80.51	81.29

Source: Created by the author based on Central Bureau of Statistics (2016a, p. 33).

Table 2.18 presents the school participation of those aged 7 to 24 years by school age group and sex in 2013 and 2016. The table indicates that the schooling attendance for all age groups has increased between those years and there is no gender gap in schooling in Indonesia. In total, of children aged 7-24 years who have never attended school in 2013, the number of females in this group (0.93 percent) is lower than males (1 percent). In 2016, the proportion of children never attending school for females (0.73 percent) is, again, lower than males (0.76 percent).

Table 2.18: School Participation of Population Aged 7-24 Years by School Age Group and Sex, 2013 and 2016

Age Group	Never Attending School				Attending School				Not Attending School Anymore			
	2013		2016		2013		2016		2013		2016	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
7-12	1.15	0.95	0.77	0.73	98.16	98.58	99.05	99.12	0.69	0.47	0.18	0.14
13-15	0.78	0.78	0.77	0.56	89.69	91.72	93.82	95.98	9.54	7.50	5.41	3.47
16-18	0.88	0.85	0.79	0.77	63.16	63.82	69.62	72.11	35.96	35.34	29.59	27.12
19-24	1.02	1.05	0.73	0.81	20.05	19.89	23.64	24.23	78.94	79.06	75.63	74.95
7-24	1.00	0.93	0.76	0.73	68.54	68.36	70.71	71.55	30.46	30.71	28.53	27.72

Source: Created by the author based on Central Bureau of Statistics (2014, 2017).

All in all, there are many possible factors constraining children's enrollment in school. In the context of Indonesia, Suryahadi et al. (2005) identify that financial issues, helping parents at work, low academic ability and long distances to travel to school are some of the main reasons for children not to attend schooling. Attention should be given for both the demand and supply-side aspects since both have an important role in the schooling of children (Bedi & Garg, 2000; Behrman, 2010).

CHAPTER III

LITERATURE REVIEW

This chapter reviews relevant literature to provide the context and foundation for this study. Since this study focuses on examining the demand-side factors associated with the schooling of children and the effect of demand-side financing interventions on schooling and child labor, the review includes relevant earlier studies that are organized into five sections. The first section provides a review of human capital theory, which focuses on education as a form of human capital investment. The second section of this review discusses various factors relating to household background contributing to the schooling of children, which are mostly used as the variables considered in this study. The third section discusses various other non-household factors associated with the schooling of children, with particular focus on the impact of various government financing intervention programs on children's schooling in the international context. The fourth section provides relevant literature on child labor issues. The last section of this review provides previous empirical studies on the factors associated with secondary school enrollment in the Indonesian context.

3.1 Education and Human Capital Formation

From the human capital theory perspective, investments can be made in humans in the same way that it can be made in physical capital (G. S. Becker, 1993b; T. W. Schultz, 1961). Human capital investment is accumulated from principal activities that improve human capabilities, such as health, formal education and on the job training (G. S. Becker, 1993b; T. W. Schultz, 1961). A distinct characteristic of human capital formation is that it cannot be sold after the human capabilities, such as knowledge and skill, are produced as it becomes an integral part of the individual (T. W. Schultz, 1961).

The driving principle of human capital investment for children is that parents will seek to maximize the welfare of their children (G. S. Becker, 1993b). Various kinds of future benefits are

the main incentive to invest in human capital. Alongside higher future earnings, the other expected benefits of education include better health and better opportunity for labor market participation. Thus, the demand for schooling is likely to increase if the perceived benefits of schooling are greater.

However, additional time spent in schooling means that individuals have to pay the direct costs of schooling, delay the time of receiving earnings and thus shorten their working life, assuming that the age of retirement is fixed to gain future benefits (Mincer, 1974). Principally, the costs of schooling can be categorized into direct monetary costs, indirect monetary costs (opportunity costs) and non-monetary costs (G. S. Becker, 1993b; Checchi, 2006). The direct costs include tuition fees, books, school supplies, uniforms and transportation expenses. The foregone earnings, the income that could have been earned if working rather than in education, is considered as the indirect cost of schooling. Meanwhile, the non-monetary costs of schooling are the efforts taken by individuals to attend schooling.

Behrman (1999) suggests that investment in human capital requires resources, which consists of human resources, financial resources, physical resources, genetic endowments and learning environment. Economists typically believe that decision making always deals with the allocation of scarce resources to achieve the desired objectives. The scarcity of family and government resources may turn out to be a constraint for investment so that it may lessen the educational participation of children. Opportunity costs for alternative uses of these resources may negatively affect schooling as well (Behrman & Wolfe, 1987).

Many scholars have looked into the potential factors influencing household decisions to explain the underinvestment in human capital investment through education. For instance, Buchmann (2000) notes that the decision on children's schooling is based on three main perspectives. First, the economic stance which focuses on wealth maximization by looking at the future returns of schooling. Second, the resource constraint standpoint which focuses on the scarcity of family resources, categorized into family-economy and resource-dilution models. The family-economy model deals with the immediate and future needs of the family, in which

immediate needs are the priority so that children are often involved at home or in labor market activity to meet the needs of the family. In addition to this, the resource-dilution model deals with the allocation of finite family resources, where family size will affect the allocation of family resources. Third, cultural viewpoints which explain educational decisions based on non-economic factors, including traditional norms and values. From this viewpoint, for example, culture or religious beliefs may restrain girls' schooling.

Belfield (2000) highlights that household's demand for education is influenced by the direct costs of education, the relative costs of education and the impact of education on earning. Furthermore, uncertainties and risks of an investment in education may impede the demand for schooling. The uncertainties are related to whether individuals will be able to understand and absorb knowledge obtained from schooling and whether the knowledge and skills obtained in schooling are relevant to the job market. Meanwhile, the risks of investment are related to the characteristic of education as a long term and indivisible investment.

Checchi (2006) explains that household demand for schooling will be higher in the case of high family resources, low borrowing rates, cheap access to education and high expected returns. On the other hand, financial constraints and the parent's lack of knowledge of the benefits of education may lessen schooling demand.

Behrman and Wolfe (1987) highlight that investment in human capital through education is determined by two key categorizations, namely (1) individual or family background characteristics and (2) school-supply factors. Individual characteristics refer to the inherent characteristics, such as age and gender, which individuals bring to the educational process. Meanwhile, family backgrounds refer to sociodemographic characteristics, such as parental education, income, and family size. On the other hand, school-supply factors often refer to the availability of schools. The individual or family backgrounds are varied across individuals, while the school-supply factors are varied across geographical areas.

Likewise, Checchi (2006) argues that school enrollment is affected not only by a household's demand for schooling but also by the supply of such public services by the

government. From the household demand perspective, parents are willing to invest in the education of their offspring because they need to prepare their children for their entrance to the labor market with a target to succeed in order to secure their class status (R. Becker, 2003). Without proper education, children would not gain adequate skills and knowledge demanded by the labor market so that they might be marginalized (McIntosh, 2001). From the supply-side perspective, the provision of schools will affect whether there is a constraint to access education or not.

Connelly and Zheng (2003) argue that enrollment is the function of demand, supply and government policies. Demand for education is the individual decision on their education, which is mainly based on the calculation of the costs and benefits of schooling, by considering the choice between schooling and working. The supply of education is the availability of quantity and quality of education. Government policy represents both the general and specific policies for the education sector, such as compulsory education, curriculum and education financing policies.

All in all, there are various factors influencing the demand for schooling. The next parts of this chapter will provide a more detailed literature review regarding those factors based on the relevant existing studies.

3.2 Family Background and Schooling

The decision making in a family regarding the generation and consumption of household resources is mainly made by parents. Parents also make other choices that will affect their children, such as fertility (number of siblings), location (a neighborhood in which they will grow up) and family stability (Haveman & Wolfe, 1995).

Regarding the human capital investment of their children, parents make choices and are willing to sacrifice time and money for their children. Parental choices will influence how children develop and the success of their children in the future. In principle, parents are motivated to maximize the welfare of their children driven by the altruism of parents toward children (G. S. Becker, 1993b). However, in some cases, parents can be indifferent towards their children's

schooling, especially for older children. In such cases, the decision to continue or drop out of schooling is decided by children themselves (Sabates et al., 2013).

Furthermore, Becker (1993a) notes that choices made by parents, along with the child's environment and genetic inheritance, affect the transmission of culture, abilities, education, earnings and assets from parents to their children. Thus, many scholars have investigated the influence of family background on children's schooling (Buchmann, 2000). The following parts discuss several key measures related to family background, namely family structure, family size, birth order, parent's education and household income which are often considered as factors influencing children's schooling.

3.2.1 Family Structure and Child's Schooling

Researchers have looked for the relationship between family structure and child development, such as examining the importance of the presence of father and mother on the schooling outcomes of children (Astone & McLanahan, 1991; Burke & Beegle, 2004; Sandefur & Wells, 1999). Many other scholars specifically focus on investigating the education of orphan children, which is mostly observed in African studies where the mortality rate is high (Evans & Miguel, 2007; Senne, 2014; Yamano et al., 2006).

School-aged children might suffer the loss of parents for various reasons, such as in childbirth, through accidents or through sickness. The loss of parents often results in reduced financial resources for the families in question so that the ability to finance the education of children will be lessened. When family income is mostly earned by the father, the effect of losing a father is frequently larger than losing a mother. However, Gertler et al. (2004) note that the schooling of children is not affected by the loss of a parent when households can freely borrow money to finance the education of children. It is also unaffected when households cannot borrow money but still have sufficient savings. When families deal with liquidity constraints however, the investment in the quality of children may be affected. Nevertheless, it can be offset if parents are insured for the schooling of children or when there is support from extended family to cover the

costs of children's schooling.

From the non-monetary perspective, Gertler et al. (2004) suggest that parental involvement, such as transporting children to school or helping children to do their homework, will be much less available if the parent is not present. In the case of children attending a lower level of education, a single parent can still send children to school so that the parent does not have to remain at home for childcare. In this situation, children from families that have suffered the loss of a parent might still stay in school. Nevertheless, when the psychological aspect is considered, the traumatic experience of losing a parent might affect the emotional state of the children involved so that they may prefer to withdraw from school, whether temporarily or permanently. From this perspective, considering that mothers are more likely to be more involved in the development and education of children than fathers, the loss of a mother might then negatively influence the schooling of children much more strongly than the loss of a father.

Some findings suggest that although the family structure is not the most important factor associated with educational attainment, children who grew up in a family without two biological parents have a higher risk of withdrawing from schooling at an earlier level in the United States (Astone & McLanahan, 1991; Sandefur & Wells, 1999). Less encouragement and help with school work for children who live with single parents or stepparents are believed to be the explanation for such lower educational attainment (Astone & McLanahan, 1991). Furthermore, Mulkey et al. (1992) find that children from single-parent families not only have lower school attendance but also lower test scores. The dominant effect of having only a single parent is often of an increase in negative behavior of children effected in school, such as lateness, absenteeism or not doing homework, which then impacts on educational attainment. The negative influence on schooling outcomes is found regardless of whether parents are not present because of death or divorce (Amato & Anthony, 2014).

Fitzsimons and Mesnard (2013) note that the liquidity constraints in poor families caused by a loss of father is the reason for the lower enrollment of children without a father. By observing the data in rural Colombia, the study finds that the father's absence not only decreases child

enrollment but also increases child labor. The reduced family income forces children to be involved in economic activities to earn money, which is commonly found in developing countries.

Senne (2014) finds that the impact of a parent's death on children's schooling in Madagascar is not only in the short term but also in the long term. The immediate effects upon orphans is a tendency to withdraw from schooling earlier than those non-orphaned. In the long term, it is observed that those orphaned in childhood attain a lower level of education than those who are not orphaned.

However, a negative association between the loss of parents and educational outcomes has not always been observed in previous studies. For instance, Yamano et al. (2006) find that there is no significant difference between orphans and non-orphans regarding school enrollment in Uganda. The study suggests that the implementation of Universal Primary Education in the country or support from extended families to the orphaned children might explain such a finding.

3.2.2 Family Size and Child's Schooling

Children from larger families are generally associated with lower chances of attending schooling because of competition among siblings in the family. The effect of the number of siblings on childhood outcomes has been explained by several theories in economics, sociology and psychology (Jæger, 2008). In economics, the Quantity-Quality Model hypothesizes the trade-off between quantity and quality of children. In sociology, the Resource Dilution Hypothesis explains that parental resources allocated to each child will decrease as the family size increases. In psychology, the Confluence Model hypothesizes the adverse effect of siblings on children's intellectual ability and schooling outcomes.

In the field of economics, a theory explaining the interaction between quantity and quality of children was developed in Becker (1960) which was further expanded in Becker and Lewis (1973). This theory was intended to confirm the observed negative correlation between quantity and quality of children as found in many previous studies. In this concept, higher-quality children do not mean morally better children, but more expensive children in terms of the amount of money

spent per child, which will produce an additional utility for parents in the future. In principle, there is a tradeoff between the quantity and quality of children within the budget constraint, which explains the negative association between increased family size and the schooling of children.

In addition, the negative influence of family size is also hypothesized in the Confluence Model and Resource Dilution Hypothesis. While the Confluence Model argues that the effect is through the inferior intellectual environment in bigger families, the Resource Dilution Hypothesis argues that the negative effect occurs because parental resources (economic, social, emotional, interpersonal, etc) are more diluted when the number of siblings is larger (Blake, 1981; Downey, 1995; Jæger, 2009).

Relative to other aspects of family background, the number of children in a family is more controllable (Blake, 1981). If the negative association between family size and the quality of children is true, parents can decide whether to have fewer children with better quality or to have more children with lower quality, particularly if parents face resource constraints.

The spending on children's quality is competing with other family consumptions, such as housing expenditures, buying goods or vacations. The spending for each child depends on the number of children in the family. When the number of children increases, the total cost for the investment of children is higher. Given a budget constraint, parents will then lower the per-child spending. Downey (1995) observed that even when parents have similar levels of education, income and other characteristics, the allocation of family resources for each child is lower in bigger families than in smaller ones.

Concerning child schooling, the human capital theory suggests that spending on children's schooling depends on parental income and preferences, the number of children, and the cost of education (G. S. Becker, 1993a). Thus, parents face a trade-off to make a decision concerning the schooling of their children while taking into account the size of the family (G. S. Becker & Lewis, 1973). The competition over household resources among siblings in poor families is much greater than in rich families. Rich families have a better ability to self-finance the human capital investment of their children than poorer families (Behrman & Knowles, 1999). Moreover, rich

families usually do not face access constraints to the credit market while, on the other hand, many poor families often find difficulties to access the credit market. The scarcity of household resources might push lower-income families to sacrifice the education of children, especially when the number of children is large.

In poor families, the amount of money allocated to the human capital investment of children depends on the number and ability of siblings, where children with better abilities are more likely to obtain better human capital investment from parents than those with lower abilities (G. S. Becker, 1993a). The reason for this behavior is that poor parents are taking into account the efficiency of their investments. In contrast, in rich families, the human capital investment in children does not directly depend on the number of siblings or the ability-levels of other siblings (G. S. Becker, 1993a).

Empirical studies have found various effects of family size. There are numerous pieces of evidence which support the hypothesis that increasing family size is negatively associated with child schooling, with various magnitudes ranging from modest to rather large (Downey, 1995; Haan, 2010; Kuo & Hauser, 1997; Peraita & Sanchez, 1998; Sen & Clemente, 2010). On the other hand, Black et al. (2005) find that family size and the education of children are negatively correlated, but the effects become insignificant when birth order is included. De Haan (2010) finds that when birth order is included as a control variable, the magnitude of the correlation declines. Meanwhile, Sen and Clemente (2010) find consistent results on the negative effect of family size even after birth order effects are included in the estimation. All in all, the evidence shows that the effects of family size are mixed among earlier studies (Buchmann, 2000).

3.2.3 Birth Order and Child's Schooling

Not only family size, but birth order within a family is also considered to influence the education of children. To observe the influence of birth order on the quality of children, an economist typically focuses on the concept of scarcity of parental time and resources in families. Regarding the allocation of family time, later-born children are disadvantaged over the older siblings (Haan,

2010; Patrinos & Psacharopoulos, 1997). A first-born child does not have to share parental attention until a younger sibling is born. The allocation of parental time for each child is further declining as the family has more children. Thus, according to this view, a first-born child is more likely to receive the most parental support relative to younger siblings.

However, other studies view that the allocation of household financial resources for the human capital investment of children may or may not be negatively associated with birth order. Parents can make a decision whether to allocate the resources for each child equally or they can take preference over a specific child, such as the oldest child (Haan, 2010). When each child receives the same resources allocation, the negative effect of birth order is not expected. The negative association between birth order and schooling of children can be expected if family resources have been allocated upon earlier-born children, and later-born children, therefore, receive a smaller proportion of the remaining resources to finance their schooling.

In contrast, other scholars contend that later-born children may have educational advantages over earlier-born children in the family with regards to financing human capital investment (Buchmann, 2000). When later-born children enter schooling, older siblings may have already finished their education and entered the labor market. Therefore, the allocation of family resources for younger children is likely to be higher and may even be greater if the older siblings contribute part of their earnings to finance the younger siblings' education.

Furthermore, the birth order effect might also be influenced by the siblings' gender composition, as there is often different treatment between boys and girls. As noted by Rammohan and Dancer (2008), gender also often influences the intra-household allocation of resources. In many traditional societies, girls are often disadvantaged compared to boys. The preference for sons over daughters is also often found in poor societies (G. S. Becker, 1993a).

Some researchers have found empirical evidence for a negative association between birth order and educational attainment of children (Alvi & Dendir, 2011; Black et al., 2005; Haan, 2010) while others have found the opposite results (Huisman & Smits, 2009; Rammohan & Dancer, 2008). For instance, Alvi and Dendir (2011) examine the sibling differences in school attendance

of children aged 7-14 in Ethiopia by using data from 1999. The study uses cross-sectional data and employs fixed-effect models. The negative association between birth order and schooling of children is consistently found in rural areas, where later-born children are less likely to attend school. However, the findings are not consistent with cases of children in urban areas.

Black et al. (2005) examine the effect of birth order on education by looking at sample data of the Norwegian population aged sixteen or over. A considerable negative effect of birth order is found in this study. However, it is argued that financial constraint issues may not be the appropriate explanation for why such results occurred because a large effect of birth order is also found even for families with highly educated mothers, which is typically associated with wealthier households.

Haan (2010) investigates the potential mechanisms behind the effect of birth order and schooling outcomes. By using the Wisconsin Longitudinal Study, the study finds that earlier-born children tend to receive a higher amount of money from parents than later-born children. The different allocation of family resources for older and younger children may thus be explained by the notion of scarcity of parental resources, which further clarifies the negative association between birth order and schooling of children found in the study.

Rammohan and Dancer (2008) investigate the impact of birth order on schooling outcomes by focusing on the differences between boys and girls of children aged 7-17 in Egypt by using cross-sectional data in 1997. The results suggest that later-born daughters are more likely to have better schooling outcomes than older siblings. Moreover, an adverse effect of the oldest son on schooling outcomes is also found. As mentioned in the study, the possible explanation of these results is that earlier-born sons have to withdraw from school to earn money to support family financing resulting in a reduction in their educational outcomes. In low-income families, it is quite common to find children who leave school at an early age to help their families obtain earnings.

A cross country study observing the determinants of primary school enrollment in 30 developing countries by Huisman and Smits (2009) find similar results to Rammohan and Dancer (2008) regarding daughters' schooling. By observing children aged 8-11, the study finds that

later-born daughters are more likely to attend schooling than older ones. The study argues that this result is consistent with the notion that older daughters are the most underprivileged in bigger families. In summary, empirical findings from the above mentioned studies demonstrate that the effect of birth order on the schooling outcomes of children is not yet conclusive.

3.2.4 Parent's Education and Child's Schooling

The correlation between parent and child behavior has been observed by scholars. Such correlation is strongly visible in some characteristics of parents and children, such as religion, political beliefs, education and wealth (Calvó-Armengol & Jackson, 2009). Regarding education, when a person is well educated, he or she has a higher probability not only of getting a better job and subsequently, usually, improved earnings, but also to have well-educated children as well. Many studies support the claim that children raised by well-educated parents are more likely to obtain greater levels of schooling than those raised by less-educated parents (Lillard & Willis, 1994; Plug & Vijverberg, 2003). Thus, the influence of parent's education on human capital investment has been well recognized.

Parental education influences the education of children directly and indirectly (Lillard & Willis, 1994). In other words, it can be obtained passively through the environment established by the parents or from the genetic endowment of the parents. Checchi (2006) also mentions that such intergenerational persistence in education can be obtained through various channels, namely (1) genetic transmission, (2) cultural influence, (3) liquidity constraints and (4) family wealth. The mechanism of the transmission through those channels can be explained as follows. First, the transmission of unobservable ability through genetics may affect the educational outcomes of children. Second, educated parents understand the importance of education so that pressure put upon their children to perform well in their education. Third, better-educated parents tend to have better income so that they do not face constraints to access the credit market or self-finance the education of their children. Fourth, richer families often live in better environments and gain better access to good quality schools which create advantages for their children. The stronger the

association between parental education and the education of children, the greater the intergenerational education persistence will be and the lower the intergenerational education mobility will likewise be.

Studies on intergenerational education persistence or the relationship between parental education and children's education are widely available with various findings. Plug and Vijverberg (2003) investigate whether intergenerational education persistence is caused by the transmission of parental ability genetically. By using the data from the Wisconsin Longitudinal Survey, the study finds that the portion of genetic transmission of parental ability to children is about 55-60 percent and extends to between 70-75 percent when family income is included. This study further suggests that ability plays an important role in the educational outcomes of children and that ability is mostly inherited from parents.

Nimubona and Vencatachellum (2007) find that intergenerational education mobility for black students is lower than that for white students in South Africa. Moreover, the poorest black children have the lowest intergenerational mobility. It is noted that there are various barriers faced by those households to send their children to school, including barriers to access to the credit market, high costs of schooling and the low quality of schools.

Many studies have also found a positive relationship between child enrollment and the education of parents (Buchmann, 2000; Connelly & Zheng, 2003; Ilon & Moock, 1991; Smits & Huisman, 2013; Tansel, 2002). For instance, in China, Connelly and Zheng (2003) find that children aged 10-18 are more likely to attend schooling when parents have graduated from secondary school compared to when parents have graduated only from primary school or never attended schooling. In Turkey, Tansel (2002) finds that when parents have themselves received longer years of schooling, the probability of boys and girls aged 14-20 to be enrolled in school is higher. Thus, parental education, whether measured in terms of the level of education obtained or the years of schooling, is found to be positively associated with the education of their offspring.

3.2.5 Household Income and Child's Schooling

Household income represents the family resources available to be used by parents for the education of their children. The positive association between household income and educational attainment of children is commonly observed in a wide array of literature (Haveman & Wolfe, 1995; Janvry et al., 2006). In general, improvement in wealth will be followed by higher demand for education and, thus, higher educational attainment (Glewwe & Jacoby, 2004).

Children from wealthier families have a better chance to be in school because their parent's willingness and ability to pay the direct costs of schooling are higher (Bedi & Garg, 2000; Glewwe & Patrinos, 1999). On the other hand, financial constraints, such as poverty and inability to pay the costs of schooling, are important factors causing children to drop out from schools (Sabates et al., 2013). In addition, constraint to access to the credit market faced by poor families may also cause an adverse effect on children's schooling (Huisman & Smits, 2009). The imperfection of the credit market hinders the poor in finding an alternative source to finance their children's education (Deininger, 2003). Yet, a credit program does not always positively affect children's schooling. For instance, Shimamura and Lastarria-Cornhiel (2010) find that the agricultural credit program in rural Malawi adversely affects girls schooling because girls from credit recipient families may further need to help their parents in agricultural activities.

Household income can also be contributed to by mothers in a family if she participates in the labor market. There are several reasons why a mother works, such as because of the absence of a spouse (Mulkey et al., 1992) or to generate additional family income (Francavilla et al., 2013). Researchers have found a positive influence of mother's employment on children schooling through income effect (Francavilla et al., 2013), although there is also a possible negative influence through the loss of childcare time from the mother (Haveman & Wolfe, 1995).

When a mother participates in the labor market, the income earned by the mother will increase family resources so that the likelihood of children being involved in child labor, especially in poor families, should be reduced (Francavilla et al., 2013). For that reason, children are expected to stay in school. However, when the female wage rate is lower in comparison to the

male wage rate, the family income may not be substantially increased and, thus, is inadequate to cover family expenses. In this case, children may still have to withdraw from school to get involved in working due to financial necessity. For instance, by using the Indian National Family Health Survey 1998-1999 data, Francavilla et al. (2013) find that mothers in poorer families in India are more likely to work to get additional family income. However, the income obtained by mothers is inadequate to cover the costs of children's schooling, meaning that their children are still less likely to attend schooling.

Children may have to take over domestic work to cover their mother's responsibility at home when a mother is working (Alvi & Dendir, 2011). For instance, girls might have to take care of their younger siblings and do household chores when the mother is absent for work, especially in poor families or single-parent families. Such household chores include cooking, cleaning, washing and other domestic activities. This situation may cause a negative consequence on the schooling of children.

Children may also have to participate in the labor market, whether in agricultural and livestock-related activities or in non-agricultural (such as commercial and manufacturing) economic activities, which often creates a trade-off between schooling and participating in the labor market, especially for boys. There is a strong association between poverty and child labor. As an example, in Indonesia, child labor occurs more in rural (6.34%) than urban (1.84%) environments (Suryahadi, Priyambada, & Sumarto, 2005). Children in rural areas usually work in the agriculture sector, while children in urban areas work in streets, selling newspapers, begging or other similar types of work. Suryahadi et al. (2005) observed that children who work are 30 percent less likely to attend school in Indonesia.

In some cases, children might manage to stay enrolled in school and work at the same time, but it is likely that the energy spent working reduces their school performance. However, the combination of schooling and taking part-time work is more desirable than not going to school at all. For wealthier families, the opportunity costs of children not earning money through child labor is not really important (Huisman & Smits, 2009) so that the occurrence of child labor in wealthier

families should be negligible.

Many studies have looked at the effect of household income and schooling with various findings. For instance, Checchi (2006) finds no statistically significant association between household income and school enrollment in primary education, but a strong association is found in secondary education. It is suggested that financial constraints to accessing secondary education are more visible than in primary education because of the higher costs of schooling at that level of schooling. Glick and Sahn (2000) find that girls are more likely to be enrolled in school when the household income is higher in Guinea, while no effect from household income is found for boys. The finding supports that girls from poor families are often disadvantaged, where they often do not attend schooling frequently because they need to stay at home to take on domestic work.

3.3 The Role of School Supply and Government Policy on Schooling

The previous section discusses the important role of family backgrounds on the schooling of children. To obtain a more comprehensive understanding of the factors associated with children's schooling, the role of school supply and government policy on children's schooling needs to be addressed.

Haveman and Wolfe (1995) argue that the various government policy instruments, such as regulation, taxation and spending, provide a basic environment that will directly or indirectly influence how children and families make choices regarding human capital investment. Considering the importance of its role, in recent decades governments in many countries have established policies to promote education, especially to close schooling gaps.

The following discusses non-familial issues affecting school enrollment, with a particular focus on government financing policies. First, distance to school, that can reflect the availability of schools in a location. Second, education in rural areas, which indicate the facility and quality of schooling issues. Third, the role of government financing policies, which becomes the center of this study.

3.3.1 Distance to School and Child's Schooling

Distance to schools, which reflects the location and the availability of schools, will influence the direct costs of schooling (Behrman & Wolfe, 1987). Thus, distance to school might affect school participation, since the private cost of schooling paid by parents will be higher as the distance between a home and school increases (Coady & Parker, 2004).

Dickerson and McIntosh (2012) argue that the increase in the costs of schooling due to long distances to school does not only reflect the financial cost as measured by traveling expenses. Instead, it also reflects the non-financial costs as measured by the time spent traveling and the possible inconvenience of the daily routine of traveling to school. In urban areas, where better public transportation is more likely to be available, traveling to school might not be as problematic as in rural areas, so that the effect of distance to school might be different between urban and rural areas.

Distance to school also reflects the local availability of schools, in which reducing the distance travelled can be achieved by the construction of new schools (Coady & Parker, 2004). The role of the government in providing better access to schools by the construction of school buildings is vital. For instance, in Indonesia, a massive school construction program was introduced by the government, namely the Sekolah Dasar INPRES, in order to increase access to primary education. More than 61,000 primary schools were built during that period. Evidence supports that the school construction was followed by a significant increase in the enrollment rate and years of schooling in Indonesia (Duflo, 2001).

Distance to school, along with pupil-teacher ratio, is one of the most common indicators used to measure the supply-side of schooling which affects enrollment (Coady & Parker, 2004; Handa, 2002). The importance of distance to school is reflected in the fact that although household financial constraints may not exist, children will likely still be unable to attend schooling if there is no school nearby (Huisman & Smits, 2009).

A number of studies have investigated the effect of the distance to school or the school availability on educational outcomes, such as Dickerson and McIntosh (2012) and Filmer (2007)

and Lavy (1996). Dickerson and McIntosh (2012) examine how the distance from home to post-compulsory education institutions may influence school participation in England. While family backgrounds remain dominant in predicting educational participation in England, distance to the nearest educational institution is found to have a slight effect on the decision to continue post-compulsory schooling, especially for children who are marginalized. Moving to and living in an area closer to a post-compulsory education institution may increase the chance of attending the education for such children.

Filmer (2007) also finds a small degree of a negative association between distance to school and school participation. By observing the impact of distance to the nearest primary school and distance to secondary school in 21 low-income countries in Sub-Saharan Africa, the results suggest that increasing the school availability will not have a large impact on enrollment. Therefore, school construction, which will reduce the distance to school, should be combined with other alternative policies, such as school quality improvement and subsidies to increase the demand for schooling by households. The importance of school quality has been highlighted by Huisman and Smits (2009), arguing that if the quality of a school is low, parents will be less willing to send their children to school because of a perception that their children will gain less. Therefore, reducing the distance to school, by providing additional schools, should be followed by improving the quality of schools to have an effect on enrollment.

Other studies find that the negative effect of the distance to school and school attendance is found only for girls in Malaysia (Anderson et al., 2003), while in Mexico this effect is found in both genders but the effect is more profound for girls than for boys (Coady & Parker, 2004). One of the possible reasons for the lower probability of girls attending schooling when the distance to school is too far is because many parents may not allow their daughters to travel long distances due to safety issues, perceived or otherwise. For instance, Jones and Hagul (2001) find that parents in Indonesia are more reluctant to send girls to school over boys when the distance to school is far. In a similar line of examination, in Mozambique, poorer households are those who receive a larger effect from school construction (Handa, 2002). Overall, these findings show that disadvantaged

children are more likely to benefit from the reduction of distance to school by school construction initiatives.

3.3.2 Schooling in Rural Areas

The effect of rural residence on schooling has been examined by researchers (Dancer & Rammohan, 2007). School participation in rural areas is usually lower than that in urban areas. Ilon and Moock (1991) argue that there are many factors affecting such lower schooling attainment. First, the costs of schooling in rural areas tend to be higher than in urban areas. The reduced availability of schools in rural areas requires children to travel further so that the transportation cost is higher. Moreover, the opportunity costs are also higher because of the possibilities of children's involvement in rural farming. Second, the quality of schools in rural areas is usually lower because the best teachers often prefer to teach in urban areas than in rural areas. Third, parents in rural areas tend to be less educated so that household demand for children's schooling in rural areas is likely to be lower than the demand for schooling in urban areas. Meanwhile, urban households are likely to have better levels of income so that they can better afford to pay for the education of their children (Ogawa & Imura, 2010). Furthermore, rural areas are often disadvantaged over urban areas in terms of the facilities available, such as school facilities or other nearby educational facilities, and in terms of job opportunities. These factors might increase the likelihood of children in rural areas of obtaining lower educational attainment than those in urban areas (Huisman & Smits, 2009; Tansel, 2002).

Studies focusing on the examination of educational outcome issues in a rural setting in developing and lesser developed countries are widely available, such as in Brazil (Singh, 1992), Ghana (Lavy, 1996), India (Drèze & Kingdon, 2001), Indonesia (Takahashi, 2011), Kenya (Mugisha, 2006), Malawi (Shimamura & Lastarria-Cornhiel, 2010), Pakistan (Sawada & Lokshin, 2009) and Peru (Ilon & Moock, 1991). The common emphasis of such studies is to observe the obstacles faced by children in rural areas to attend schooling.

For instance, by conducting a field survey in rural Pakistan in 1997, Sawada and Lokshin

(2009) find that household wealth and intra-household resource allocation greatly influence the educational decision making in rural households. The lack of credit market is the main obstacle for children's schooling progression and thus affects the demand for schooling. Moreover, the low household demand for schooling is believed to influence the supply of schools. Therefore, demand-side and supply-side intervention by the government are desired by providing scholarships and increasing the supply of schools by the construction of school buildings. Difficulties in accessing schools in rural areas are also found in Africa (Lavy, 1996). The significant distances to schools affect the costs of schooling as students have to pay either greater traveling costs or fees to board at the school.

Regarding schooling enrollment in rural areas, girls tend to be disadvantaged (Dancer & Rammohan, 2007). In many cases in rural areas, when mothers participate in market work to generate income to alleviate poverty, female children are often pushed to take over the domestic chores of the working mother which might negatively affect children's schooling (Alvi & Dendir, 2011). However, Shimamura and Lastarria-Cornhiel (2010) show that girls might also both attend school and do household chores simultaneously.

Mugisha (2006) shows that the urban advantage does not always generate better school enrollment. In Kenya, secondary school enrollment for urban areas was relatively lower in comparison to those in rural areas in the period of 1993 to 2003. The sprouting of slums in the urban areas of Kenya is argued to be the main factor contributing to the lower urban enrollment. The reason is that there are many issues in urban slum areas, such as difficulties to access secondary schools and child labor problems.

3.3.3 Government Financing and Child's Schooling

Education is held by many to be a basic human right so that it should be provided free by the government, at least at the lower levels. In fact, many countries have made basic education both compulsory and free, although the strictness of enforcement of compulsory school attendance varies greatly (Eicher, 2000).

The main reason for providing such a free compulsory education is aimed at closing the gap on access to education, where children in poor families are usually less privileged than those from wealthier families. Unless such government intervention is put into practice, inequality of access to education between children from wealthy and poor families may persist from generation to generation (Bedi & Garg, 2000).

The argument for subsidizing education is stronger for primary education because the various positive externalities of a high enrollment rate at primary education caused by such policy interventions will be beneficial for the whole society. Such externalities consist of, for instance, higher literacy rate, higher numeracy rate, better child health rate and lower fertility rate (Bray, 1998; Checchi, 2006).

The nature of post-compulsory education is rather different so that there is an argument between those in favor and for those opposed to public subsidizing in post-compulsory education. The argument supporting more public financing allocated for post-compulsory education is weakened because individuals will take the most benefits from their additional schooling (Checchi, 2006). For higher education, it is also believed that greater public financing will create inequity in spite of equity for society because those attending higher education are most likely from higher-income households (Bray, 1998; Checchi, 2006). Therefore, a variety of approaches regarding public financing of education for different levels of education should be applied.

The free education policy, particularly in basic education, has been widely implemented aiming to support children from disadvantaged backgrounds to attend schooling. The effectiveness of such a policy has been extensively studied. However, the expected positive impact of the policy does not always hold. Likewise, the impact of student financial aid on attendance and persistence has been disagreed with by some researchers (Somers, 1995).

In Uganda, the Universal Primary Education program decreases the school fees paid by households and significantly increases school enrollment (Deininger, 2003). In Malawi, the fee abolition program increases primary school enrollment, but disadvantaged children remain less likely to be in school (Kadzamira & Rose, 2003). The main reason for such a finding is that

children in Malawi still have to pay school fees despite the implementation of the fee abolition program. In Ghana, the increasing cost of schooling reduces a larger scale of demand for schooling among the poor because the price elasticity of the demand for schooling is larger to the poor than to the rich families. Therefore, it is suggested that the charge fees should not be beyond what the poor can reasonably pay (Gaddah et al., 2016). Meanwhile, in Nigeria, a positive effect of the government policy on school enrollment is confirmed and the costs of schooling remaining to be paid by households have not become a barrier to sending children to school, presumably because the costs are relatively low (Lincove, 2009).

Eicher (2000) reveals that despite basic education being free, in fact, there are costs that often still need to be paid by households for several situations. First, households have to pay additional costs when children choose to enter private schools instead of public schools. Second, in many cases, some schooling costs are charged by schools to parents, such as for textbooks and uniforms. Third, the transportation costs to school have to be paid by households.

Moreover, Rosser and Joshi (2013) identify legal and illegal user fees which often have to be paid by households despite the free basic education policy in a country. The legal user fees can be classified into formal (e.g. registration fee and voluntary contribution) and informal (e.g. gifts to the teacher at the end of the school year) fees or costs. Meanwhile, the illegal user fees can be classified into formal (e.g. overcharging on legal fees) and informal (e.g. bribes and extortion to ensure a child is promoted or to obtain good grades). In some cases, formal and informal school fees remain one of the major constraints to achieving the universal basic education goal (Lincove, 2012; Rosser & Joshi, 2013).

In general, reducing the private costs of schooling by providing more public funding in education is often selected because school enrollment tends to be lower when private costs are high (Mehrotra & Delamonica, 1998). The rationale is that more public spending allocated for education should lower the barriers for poor households to send their children to school. For instance, Gupta et al. (2002) find that increased public spending on education is associated with higher enrollment rates. However, a rather weak association between public spending on

education and the school enrollment rate is also observed in other studies, including Checchi (2006).

Gaddah et al. (2015) attempt to find out who benefited most from public spending on education. The findings confirm that, in Ghana, the primary education financing mostly benefited children from poorer families. Meanwhile, secondary education financing is more likely to benefit children from wealthier families. This finding suggests that, in the case of Ghana, the allocation of public spending on secondary education appears to be off-target and less beneficial to those who need it most.

There are discussions regarding the various types of financial support mechanisms and which ones are the most preferable. Bray (1998) highlighted the differences between grants and loans. From a state budget perspective, a loan scheme is less costly than a grant scheme. A loan scheme is also suggested by loan supporters based on the argument that the constraint of poor households to send their children to school is not due to the inability to pay but more likely due to lack of ability to pay at the time of educational delivery (Eicher, 2000). Therefore, a loan can be provided at the start of schooling and then be repaid once the recipients earn a higher income in the future caused by the degree they obtained. However, a loan scheme is considered as less attractive than a grant scheme due to the administrative complexities required to deliver such a scheme (Bray, 1998).

There are also discussions over supply-side and demand-side financing interventions in education. Both demand-side and supply-side interventions lower the costs of schooling which must be paid by families (Orazem & King, 2008). Supply-side financing is a kind of funding provided to suppliers of education. Meanwhile, demand-side financing is a kind of transfer to the consumer of education (parents or students) for a specific education-related purpose (Patrinos, 2007). In the past, supply-side interventions have become the main strategy employed to improve schooling outcomes in developing countries. In more recent periods, the focus has shifted to demand-side interventions (Heinrich, 2007; Lincove, 2015).

Various kinds of demand-side financing interventions have been implemented in developing

countries and gained considerable attention from scholars. Patrinos (2007) notes that there are various types of demand-side financing, with different characteristics, including stipends (such as conditional cash transfer and scholarships), targeted vouchers, and student loans. Stipends are financial support packages given to families to cover schooling costs. Targeted vouchers are forms of financial support given to families or schools to enable children to attend private or public schools. Student loans are financial support packages provided for students, usually in higher education, to attend schooling and which should be repaid later. Meanwhile, supply-side interventions intend to improve school access and quality, including incentives to reduce teacher absences, increase the number of teachers, and pay for school expansion (Behrman, 2010; Coady & Parker, 2004; Heinrich, 2007).

Such kinds of demand-side financing interventions generate income effects and substitution effects (Ferro et al., 2010). The former implies that cash transfers increase household resources which leads to increase consumption, including in education. The latter implies that cash transfers decrease the demand for schooling substitutes, such as child labor if schooling and working are considered substitutes. However, when schooling and working are complementary, rather than substitutes, the effect of cash transfers on child labor will be ambiguous.

Similarly, Schultz (2004) argues that educational cash transfer is intended to reduce the price of schooling as well as to increase the household's income. Thus, the cash transfer will increase the household's demand for schooling as poor households are allowed to invest more in the child's schooling. It might have a consequence of reducing child labor as well because the needs for child labor are offset by the cash transfer.

Most demand-side policy interventions are aimed at removing constraints to human capital investment by providing cash incentives to offset some portion of the direct and indirect costs of schooling (Heinrich, 2007; Patrinos, 2007). The distribution of financial support to families through demand-side interventions is mainly targeted at children at risk of not attending school (Patrinos, 2007) by reducing the amount of payment which should be covered directly by targeted families on children's schooling costs, such as tuition, uniforms, and textbooks (Lincove, 2015). In

some cases, the amount of subsidy may differ by grade to address the opportunity costs for older children or by other characteristics (Patrinos, 2007).

Scholars have highlighted that demand-side financing interventions are more cost-effective at improving schooling outcomes than supply-side interventions (Patrinos, 2007). For instance, Coady and Parker (2004) show that demand-side interventions are more cost-effective in increasing secondary school enrollments in rural Mexico than supply-side interventions. Behrman (1999) suggests that demand-side interventions provided to target recipients, such as the poor, should be preferred when efficiency is the main objective.

To achieve its objectives, demand-side interventions still require adequate availability of good quality schools (Heinrich, 2007; Patrinos, 2007). Demand-side interventions alone are not sufficient to break the poverty cycle if available schools are of low quality. Thus, in general, government interventions through demand-side and supply-side aspects are both necessary to increase schooling outcomes (Heinrich, 2007). However, in some cases, demand-side incentives by themselves can increase school enrollment in the situation of low school quality (Ferro et al., 2010).

Patrinos (2007) notes that demand-side financing interventions, such as cash transfers, are most appropriate when supply-side interventions to increase schooling outcomes have not succeeded and the level of poverty in a society is high. Meanwhile, Handa (2002) notes that when supply-side interventions only produce a limited impact on enrollment, then further supply-side interventions will continue to produce only a very limited impact. Thus, demand-side interventions are suggested in such situations.

There are two kinds of cash transfer, namely the Unconditional Cash Transfer (UCT) and the Conditional Cash Transfer (CCT). However, it should be noted that the rules of both kinds of programs vary greatly so that categorization in one or the other is not always clear. Although both types of cash transfer can target certain groups, the major difference between unconditional and conditional cash transfer is that behavioral conditionality is not present to receive the unconditional cash transfer. The cash transfer is thus provided to all of the target population (Baird

et al., 2014). However, despite the nonexistence of conditionality, the unconditional cash transfer also often changes the behaviors of the recipients, such as by presenting increased schooling levels and a reduction in child labor participation (Baird, McIntosh, & Ozler, 2011). Another difference is that the unconditional cash transfer programs generally target a broader disadvantaged population (Baird et al., 2014).

There are several rationales to preference of an unconditional cash transfer mechanism, including (1) poor households are simply lacking money, not awareness (2) attaching conditionality to the cash transfer is more costly owing to increased administration costs, and (3) imposing conditionality may exclude poor households who do not comply with the program rules (Baird et al., 2014). However, some studies suggest that the effect of the unconditional cash transfer on increasing school enrollment as well as in reducing child labor is relatively smaller (Skoufias et al., 2001).

Due to the growing concern toward increasing human capital investment, the conditional cash transfer has recently become popular and more utilized in developing countries (Baird et al., 2010; Ravallion & Wodon, 2000). The conditional cash transfer program is a type of demand-side financing to reduce the out-of-pocket expenditures and opportunity costs of households that may affect schooling demand and reduce the occurrence of child labor (Heinrich, 2007; World Bank, 2006). Conditional cash transfers play an important role, functioning as a social safety net for households in a time of uncertainty, such as in natural disasters, financial crises and income loss in poor households that may restrain children's schooling (Fitzsimons & Mesnard, 2013). Therefore, the program is a kind of government intervention program mainly for poor and disadvantaged families, with certain conditionality, to promote human capital investment of their children and hopefully improve their lives.

Conditional cash transfers were initially implemented in Brazil and Mexico and then replicated in other developing countries, mainly in Latin America. Such kinds of program became an alternative to universal (such as school fee elimination in basic education) and unconditional social programs. Unlike government subsidy programs that distribute the benefit for those buying

a certain product or service, the conditional cash transfers are distributed only to selected recipients based on certain criteria. While many social programs are often based on an unconditional direct transfer to meet the basic needs of society in the short run, conditional cash transfers are proposed to deal with immediate and long term poverty issues by providing requirements, or conditionality, which need to be fulfilled by the recipients.

There are several reasons for imposing conditionality for the conditional cash transfer. From the government's perspective, the reasons include (1) to change the behavior of recipients toward doing things that government perceives as being beneficial for the recipients, which the recipients are unaware of and unlikely to carry out independently, and (2) to provide information to be analyzed by policymakers about the usefulness and other impacts of such programs. From the beneficiary household's perspective, imposing conditionality may (1) help to reduce disagreement within the household regarding the allocation of household resources, (2) limit a household's ability to use the money for consumptions other than for those stipulated in the conditions of the cash transfer (Baird et al., 2014; Brauw & Hoddinott, 2011). Moreover, in some cases, poor families may not be attracted towards free education (Patrinos, 2007) so that conditionality may force their behavioral changes. The imposed conditionality may, thus, provide incentives for behavioral changes toward better investment in human capital (Baird et al., 2011).

However, there are several drawbacks of such conditionality including (1) increases in administrative costs, (2) increases in the number of administrative procedures which may create unhelpful complexities, (3) push individuals that are unable to meet the conditions to withdraw from the program, and (4) create corruption opportunities for individuals who have the authority to monitor the conditionality imposition by demanding payments (Brauw & Hoddinott, 2011).

In general, conditional cash transfers might be designed to reduce poverty, minimize inequality, improve education and improve health outcomes. With respect to education, many studies have examined the impact of conditional cash transfers on school enrollment or attendance. Other scholars have also investigated the effect of the conditional cash transfer on various other schooling outcomes, including drop out, repetition, academic performance and graduation levels.

The conditional cash transfer programs have been widely implemented in developing countries, such as Colombia, Nicaragua, Honduras, Brazil, Argentina, Ecuador, and Turkey, with the main aim of promoting households to send their children to school. In general, conditional cash transfer programs have been shown to have a positive effect on enrollment and attendance in the implemented countries (Attanasio et al., 2010). Yet, the program effects vary across studies.

The effect of the conditional cash transfer program in Argentina, Programa Nacional de Becas Estudiantiles, on schooling outcomes is examined by Heinrich (2007). The propensity score matching method is used to compare between children receiving the program with children excluded due to the quotas applied. In addition, the multilevel modeling method is employed in explaining variation between schools in the student outcomes. The findings show that the conditional cash transfer program is favorable in increasing schooling attendance and improving student performance in school, although it may partly be affected by the conditionality requiring good attendance and academic progress of children to obtain continual funding.

Ferro et al. (2010) also find that the Bolsa Escola, a conditional cash transfer program in Brazil, affects schooling outcomes of children aged 6-15. The results from the probit regressions and the propensity score matching method show that, despite the percentage of children enrolled in school already being high, the conditional cash transfer program still increases school enrollment. Moreover, the program also reduces the probability of child labor. The effect of the Bolsa Escola program on school enrollment is consistent with Glewwe and Kassouf (2012) which find a similar result on the program's effect by employing panel data from 1998 to 2005. In addition, Glewwe and Kassouf (2012) also find that the Bolsa Escola program lowers the dropout rate and increases the grade promotion rate.

Attanasio et al. (2010) examine the effect of Familias en Accion, a conditional cash transfer program in Colombia, on the schooling outcomes and work participation of 14–17 year-old children using a difference-in-difference propensity score matching approach. Regarding the effect on schooling outcomes, the program increases school participation rates substantially. Meanwhile, related to its effect on children's work participation, the conditional cash transfer

program causes children's participation in domestic work to decrease, but children's participation in income-generating work remained unaffected.

Filmer and Schady (2011) examine the role of the conditional cash transfer program in Cambodia, namely the CESPP Scholarship Program, on increasing school enrollment. Children in grade six of primary schools are ranked based on an index of the likelihood of dropping out. In each of the program schools, a larger amount of scholarship (US \$60 per year) is offered for those with the highest probability of dropping out compared to a smaller amount of scholarship (US \$45 per year) for those with a medium probability of dropping out. Meanwhile, children with a low probability of dropping out are not offered a scholarship. The regression discontinuity design methodology is used by comparing the school attendance of children just above and just below the two cut-offs of scholarship amount. The results show that the positive impact on school enrollment is found to be larger when the modest amount (US \$45 per year) of cash transfer is delivered than the larger (US \$60 per year) cash transfer, which is believed to be consistent with the law of diminishing marginal returns.

The effect of the imposition of conditions in the conditional cash transfer program on improving the effectiveness of the program is often unclear (Brauw & Hoddinott, 2011). Brauw and Hoddinott (2011) observe that some of the recipients of the conditional cash transfer in Mexico, namely PROGRESA, never received the monitoring forms of their children's attendance at school. By using this fact, the nearest neighbor matching and household fixed effects regressions are used in the study to assess households receiving the form and those not receiving the forms. The study finds that, among children aged 8-16 years, the absence of monitoring forms reduced the likelihood that they attended school, especially when children are transitioning from primary to lower secondary school. Therefore, in this case, the conditionality is necessary to support the effectiveness of the program.

Behrman et al. (2012) also examine the impact of the Oportunidades conditional cash transfer, previously called PROGRESA, in Mexico on schooling outcomes of children age 6-20 years by using a difference-in-difference propensity score matching method. The study finds that

the program is positively affecting school attainment, school enrollment and the time children spent doing homework as well as decreasing the child labor rate of boys. It is suggested that when the enrollment rate for primary education is already high, using financial resources to increase subsidies for higher levels of education would be more effective in increasing overall school enrollment.

Besides an investigation on national policies, researchers also interested in examining local educational aid policies. For instance, Bai et al. (2017) examine the impact of a tuition relief program, which was introduced in 2009 in a poor county in China, namely Ningshan, on several schooling outcomes. The tuition relief program is aimed at increasing the high school enrollment rate by providing affordable schooling for most families in the county. The OLS regression and the propensity score matching results show that the program increases the likelihood of children deciding to attend high school and reduces the likelihood of children entering the labor market. However, the study shows that children from low-income families did not benefit more from the tuition relief program than those from high-income families. Furthermore, the effects of the program for middle-income students are larger than for other income groups. This finding suggests that the financial support provided by the tuition relief program might be sufficient for children from middle-income families to release their financial burden to afford schooling, but insufficient for those from low-income families.

Carruthers and Fox (2016) examine the impact of the Knox Achieves program in Knox County, Tennessee on college attendance and persistence. The program provides college coaching and financial aid which is made available to every graduating high school senior in Knox County to promote enrollment in higher education. The difference-in-difference analysis is used to compare the college-going rates between Knox County and the other areas, while the propensity score matching method is used to find whether program participants are more likely to enroll in college than those without access to the program. The results show that there is a positive impact of the Knox Achieves program on enrollment to college.

3.4 Government Financing and Child Labor

Child labor is commonly associated with a household's income constraints rather than a child's preferences (Janvry et al., 2006). The participation of children in generating income may be crucial for the household's survival. In many cases, parents from lower socioeconomic status may allow their children to be involved in child labor while parents with higher socioeconomic status often keep their children in schooling rather than involved in child labor.

Unemployment of parents and income shocks are some situations driving children to work (Lee & Hwang, 2016). Children will enter the labor market at an earlier age to complement the household's income for survival (Janvry et al., 2006). The early participation in the labor market may reduce the human capital development of children when child labor and schooling are substitutes. However, the intention to reduce child labor might have several consequences for the households, such as (1) lowering the household's income, (2) increasing the current cost of children, and (3) increasing the future value of children (Baland & Robinson, 2000).

Since schooling and working are not perfect substitutes, requiring school attendance does not prevent children from becoming involved in child labor (Pais et al., 2017). Instead, the conditional cash transfer program is often necessary to reduce child labor by increasing household income to offset the costs of schooling. Conditional cash transfer programs, with school attendance as a conditionality, have been argued to be effective in reducing child labor along with increased schooling.

The conditional cash transfer might increase school enrollment and reduce child labor as an indirect benefit. Generally, as children attend schooling, the time for working is replaced by the time spent in school so that it will reduce the possibility of child labor. However, the cases might not consistently hold for children from the poorest households as they may still prefer to work instead of continuing their education (Lee & Hwang, 2016).

While the evidence of the positive impact of the demand-side financial assistance on school enrollment is widely available, several studies have examined the impact on child labor with mixed results. For instance, Lee and Hwang (2016) find that the Program Keluarga Harapan

(PKH) program in Indonesia was not sufficiently effective in both increasing school enrollment and reducing child labor. Meanwhile, Ravallion and Wodon (2000) find a negative effect of the stipend program in Bangladesh on children's labor force participation along with a positive effect on schooling. However, the effect on children's labor force participation is very much lower compared to the effect on increased school enrollment. Gallani and McEwan (2013) also find that the conditional cash transfer in Honduras decreased the probability of child labor at a smaller magnitude than the effect on increasing school enrollment. Moreover, Skoufias et al. (2001) also find that subgroup analysis for boys and girls separately shows a smaller effect of the PROGRESA in Mexico in reducing the probability of children's labor market participation compared to schooling for both sample groups.

Ferro et al. (2010) find that the Bolsa Escola program in Brazil reduces the probability of work for children aged 6–15 along with increases in school enrollment. The effect of the program to reduce the probability of work is also relatively small. The results are consistent using probit and propensity score matching methods with various approaches (nearest neighbour, k-nearest neighbour and Mahalanobis). Furthermore, the negative impact on children's labor force work is larger for children in rural areas than urban.

Dammert (2009) also discovers the heterogeneity of impacts of the intervention program in Nicaragua on child labor and schooling. For instance, a more considerable positive impact of the program on schooling along with a negative impact on labor activities are observed for boys. Moreover, children in poor environments experienced a larger positive impact on schooling and a smaller negative impact on working hours.

3.5 Empirical Studies on Factors Associated with Secondary School Enrollment in Indonesia

There are a number of empirical studies examining the factors associated with secondary school enrollment in Indonesia, such as Deolalikar (1993), Pradhan (1998), Suryadarma et al. (2006) and Takahashi (2011). Using the National Socioeconomic Survey (Susenas) 1987 data and the village facility data from the survey of Village Potential (Potensi Desa) 1986, Deolalikar (1993) examines

the enrollment of children in four categories of age, which are 6-11 for primary education, 12-14 for junior secondary education, 15-17 for senior secondary education and 18-23 for tertiary education. Logistic regression is used to observe individual, household and community characteristics influencing school enrollment. A community characteristics indicator in the study is represented by the costs of traveling to school which is a cost of schooling paid by households. The results show that the correlation of the education of the head of household on the probability of secondary schooling enrollment is the strongest, but only when the head of the household is male. Moreover, the influence of community characteristics on enrollment is relatively weaker than individual and household characteristics, where the urban residence is the only strong predictor. Unexpectedly, the availability of secondary school does not significantly influence secondary school enrollment. Deolalikar (1993) argues that the insignificant effect might be due to the slight variability in the school availability data owing to aggregation or the high collinearity of school availability with other variables, such as an urban residence. This study also finds that the probability of attending school for boys is higher than girls in secondary education while the probability for girls is higher in primary education.

Pradhan (1998) examines factors associated with enrollment of children aged 13-18 years by using the National Socioeconomic Survey (Susenas) 1992. Individual and household characteristics are used to predict enrollment, as to whether a child is not enrolled, enrolled at the appropriate level or delayed in enrollment. A multinomial logit fixed effect model is used, where the fixed effect is employed to account for the variations on the supply of education in provinces. This study finds that earlier-born children have a better probability of attending the appropriate level of education. The education of parents is associated with a higher probability of their children's enrollment. When parents are working in the agricultural sector, the chance of children being enrolled is lower. In addition, the positive effect of income, where consumption is used as a proxy, on enrollment is higher for boys than girls. Also, different factors associated with enrollment between provinces are found. In conclusion, this study suggests that policies targeting households are more appropriate for provinces where enrollment is more influenced by individual

and household characteristics. However, policies toward increasing the availability of school are more appropriate for provinces where the fixed effect influence enrollment more.

Suryadarma et al. (2006) use the Indonesian Family Life Survey (IFLS) 1993, National Labor Force Survey (Sakernas) 1993 and Village Potential (Podes) 1993 data to examine individual characteristics, household characteristics, community characteristics and educational facilities affecting a student's continuation to junior secondary education. The probit model is used in this study. The results show that girls have a lower chance of continuing to junior secondary schooling. Household characteristics that significantly increase the probability of children continuing their education include the father's level of education and per capita expenditures. Higher unemployment rate significantly increases the probability of children to continue their education. The availability of junior secondary education also increases the probability of continuation although the coefficient is small.

Takahashi (2011) examines child, household, school and regional characteristics influencing enrollment of children aged 13-15 and 16-18 in rural areas by using the linear probability model. The data used for this study are the Indonesian Family Life Survey (IFLS) 1993, 2000, 2007; National Socioeconomic Survey (Susenas) 1993, 2000, 2007; and Village Potential (Podes) 1993, 2000, 2008. This study attempts to observe the changing of factors influencing enrollment in 1993, 2000 and 2007. Data shows that the enrollment gap between urban and rural areas remains large, but the disparity has been decreasing. The results suggest that the advantage of boys over girls has been reducing. The impact of the level of education of the household head remains strong, though it tends to weaken over time. The effect of household wealth remains significant. Meanwhile, the number of secondary schools and other school characteristics have little effect on enrollment. Finally, it is suggested that rather than improving in the aspect of the school characteristics, it is more crucial for the country to address the enrollment inequality issues.

In addition, some case studies examining enrollment in certain provinces in Indonesia are available. In Papua, a province in Indonesia, Mollet (2007) shows that low educational participation is partly caused by the shortage of teachers and poor educational facilities in the

region. The scarcity of teachers is caused by the reluctance to teach in remote areas due to low incentives and the lack of facilities and transportation. The uneven distribution of schools caused the unavailability of schools in some remote areas. In addition, helping parents in agriculture work is another reason affecting school attendance.

Jones et al. (1998) highlight that poverty is the major barrier for primary school graduates to pursuing secondary education in East Nusa Tenggara. The costs associated with schoolings, such as uniforms, transportation and other fees, are not affordable for children from lower-income families. Moreover, providing new schools might even have no considerable impact on enrollment. On the contrary, Bangay (2005) suggests that to address educational participation and equity issues in Indonesia, providing a sufficient number of schools across the nation is necessary. When the government deals with the scarcity of resources, private schools can play a vital role in covering school shortages, especially in disadvantaged regions. Jones and Hagul (2001) state that the availability of private schools, particularly madrasahs, in Indonesia is important because some parents often prefer to send their daughter to such a school if the distance to the public school is too far from home.

Overall, previous findings suggest that individual and household characteristics are significantly influencing enrollment of children in secondary schools in Indonesia, while school and community characteristics have relatively few significant correlations (Deolalikar, 1993; Pradhan, 1998; Suryadarma et al., 2006; Takahashi, 2011). Meanwhile, there is a lack of empirical studies examining the impact of the government's financial assistance to increase demand for education as well as to reduce child labor in Indonesia, which is to be addressed by this study.

CHAPTER IV

METHODS

This chapter describes the research design and procedures that are adopted in the process of responding to the research questions and achieving the research objectives. Specifically, this chapter is organized into six sections. It begins with the analytical framework of this study explaining the literature upon which the study is based and the framework demonstrating the linkage between outcomes and independent variables used in this study. The second section of this chapter provides the lists and brief descriptions of the hypotheses. The third section discusses the relevant analytical techniques to be adopted in this study. The following section provides an explanation of the methodological approaches used to answer the hypotheses of this study. The fifth section presents a detailed description of the dataset and the sample used in this study. The sixth section provides the description and measures of the outcomes and the independent variables. Finally, the descriptive statistics are presented in the last section of this chapter.

4.1 Analytical Framework

As mentioned in the first chapter, this study intends to investigate demand-side factors influencing the schooling enrollment of junior and senior secondary school-aged children in Indonesia. Earlier relevant empirical studies addressing similar issue are widely available, which are mostly based on human capital theory and often suggest that school enrollment is influenced by various factors that can be categorized into individual, household and community characteristics (Connelly & Zheng, 2003; Dancer & Rammohan, 2007; Glewwe & Patrinos, 1999; Huisman & Smits, 2009; Lincove, 2009; Ogawa & Iimura, 2010; Smits & Huisman, 2013; Takahashi, 2011; Tansel, 2002).

This study also aims to examine the effect of the *Program Indonesia Pintar* (Smart Indonesia Program) on school enrollment, school continuation and child labor of junior and senior secondary school-aged children in Indonesia. In addition, this study explores cost-efficiency issues as well as the heterogeneity of the impact of such kinds of demand-side financing interventions,

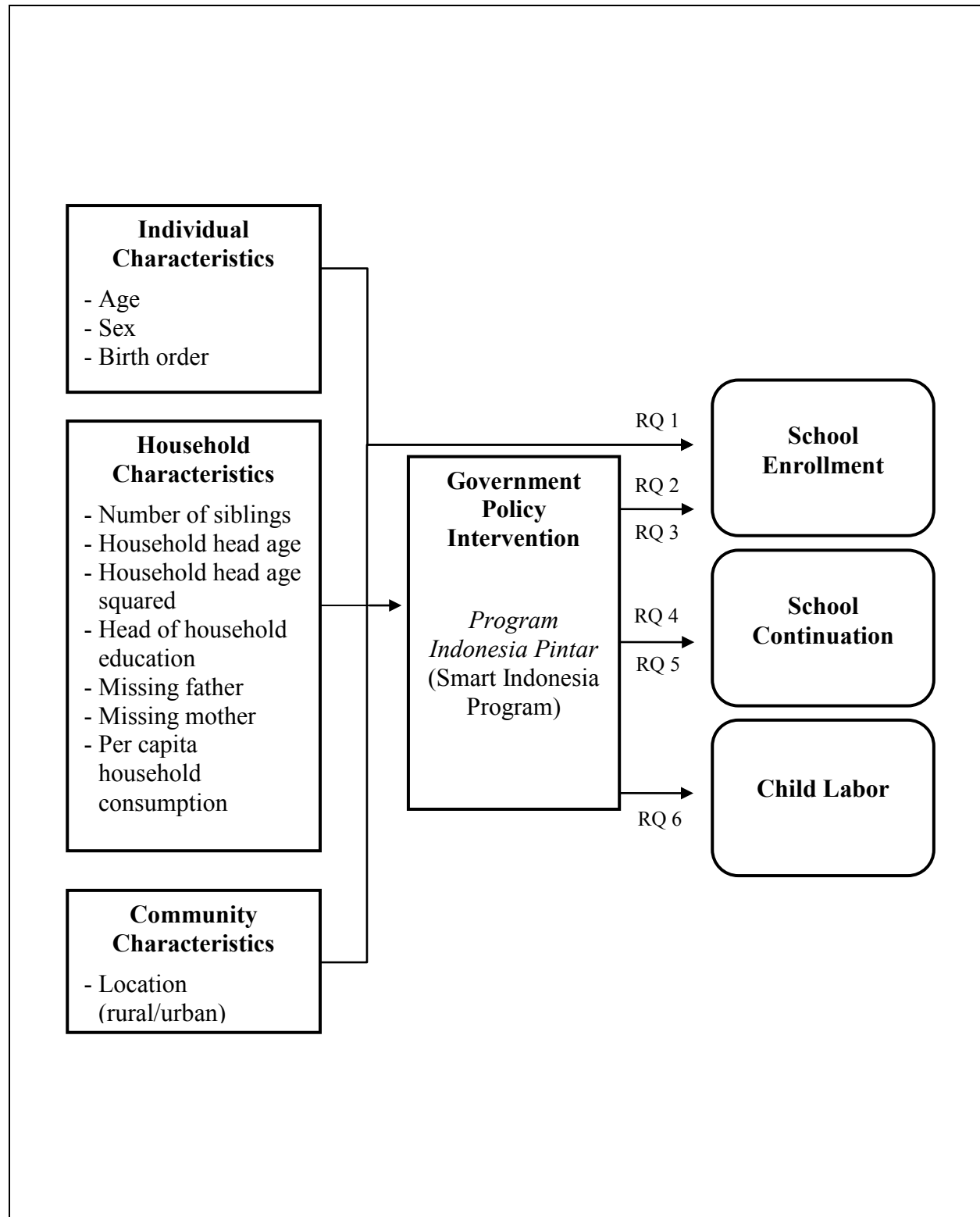
whether by gender, location and across household wealth group. Previous empirical studies examining the effect of financial assistance to children's schooling are accessible with various findings (Attanasio et al., 2010; Bai et al., 2017; Behrman et al., 2012; Brauw & Hoddinott, 2011; Carruthers & Fox, 2016; Ferro et al., 2010; Filmer & Schady, 2011; Glewwe & Kassouf, 2012; Heinrich, 2007). Meanwhile, earlier studies investigating the impact of demand-side educational financing interventions in reducing child labor are also available in various countries with mixed results (Dammert, 2009; Ferro et al., 2010; Galiani & McEwan, 2013; Lee & Hwang, 2016; Ravallion & Wodon, 2000; Skoufias et al., 2001).

Based on those earlier studies as well as theories that are discussed in Chapter III, the analytical framework of this study is designed and provided in Figure 4.1. Regarding the examination of factors influencing the schooling enrollment of junior and senior secondary school-aged children, the dependent variable used in this study is the schooling status of children aged 13-15 and aged 16-18 at the time of the survey, specifically whether they are currently enrolled in school or not.

The demand-side factors are grouped into three categories, as follows: (1) individual child characteristics, (2) household characteristics and (3) community characteristics. The categorization into these three groups is mainly based on earlier established literature. For the individual child characteristics, three measures are used in this study, namely the sex, the age and the birth order of children.

Meanwhile, within the set of household characteristics, the explanatory variable used includes the number of siblings in the family. According to earlier studies (G. S. Becker & Lewis, 1973; Haan, 2010), this factor influences how the family resources are allocated to each child in the household, including for the education of the children.

Figure 4.1: Analytical Framework



Source: Created by the author based on Attanasio, et al. (2010), Dancer and Rammohan (2007), Ferro, et al. (2010), Glewwe and Patrinos (1999), Takahashi (2011) and others.

Moreover, considering the important role of the head of household on children's schooling, some of the head of household attributes are used in this study. Firstly, the age of the head of the household and also the head of the household's age-squared, assuming that the relationship between the head of household's age and children's schooling is not linear. Furthermore, the education of the head of the household is also included as it is often suggested to have a strong influence on the education of children, whether through genetic transmission, awareness of the importance of education, environmental or income effects (Checchi, 2006).

Variables that describe the structure of family are also included in this study, namely the presence of a father and the presence of a mother in the household. The rationale to include these variables is that the loss of a parent may decrease family financial resources or reduce the parental involvement and encouragement of a child's education (Astone & McLanahan, 1991; Burke & Beegle, 2004). These monetary and non-monetary perspectives might potentially force children who have lost a parent to withdraw from schooling.

In addition, the log of per capita household consumption is also used as a variable in this study, as a proxy for household income, which represents the availability of financial resources in households (Behrman & Knowles, 1999). Higher per capita household consumption may imply a better ability of a household to finance family expenditures, including for the education of children.

For community characteristics, a widely used variable that might affect demand for schooling is included, which is whether the household is located in an urban or rural area. Previous literature often suggested that the likelihood of children to attend schooling is associated with an urban advantage (Mugisha, 2006).

In addition to individual, household and community characteristics, scholars argue that government policy interventions are important in influencing household demand for schooling mainly by removing barriers to investing in human capital, especially for children from poor families (Bedi & Garg, 2000; Heinrich, 2007; Patrinos, 2007). Thus, the effect of the *Program Indonesia Pintar* (Smart Indonesia Program) on school enrollment as well as school continuation

in junior and senior secondary education in Indonesia are also examined in this study.

Finally, child labor participation is also included as an outcome variable of interest in this study. Earlier studies suggest that demand-side government financing interventions in education might also reduce child labor, even though the impact is often not as pronounced as in increasing school enrollment or attendance (Galiani & McEwan, 2013; Lee & Hwang, 2016; Skoufias et al., 2001).

4.2 Hypotheses

This study identifies six hypotheses based on the research questions stated in the first chapter. The first hypothesis is related to the association of household's demand-side factors with school enrollment. The next four hypotheses are related to the effect of educational financial assistance on children's schooling. Meanwhile, the last hypothesis is related to the effect of educational financial assistance on child labor. These hypotheses are constructed based on earlier studies that may have links with the topic addressed in this study.

Hypothesis 1: Socioeconomic background influences school enrollment, especially for senior secondary school-aged children in Indonesia.

As reviewed in Chapter III, an extensive number of studies have been conducted to examine the association between individual, household and community characteristics with children's schooling (Burke & Beegle, 2004; Connelly & Zheng, 2003; Lloyd & Blanc, 1996; Post, 1993; Smits & Huisman, 2013; Tansel, 2002). Several studies have confirmed that parents with better socioeconomic status are more likely to be aware of the importance of education due to a better understanding of the future returns to education (Buchmann, 2000; Checchi, 2006). Thus, with the standpoint of the wealth maximization of their children, the education of children becomes the main priority in regards to the allocation of household resources. Moreover, parents with better socioeconomic status also have higher family resources so that they are better able to deal with financial constraints to sending their children to secondary education. In contrast, parents with

lower socioeconomic status are often unaware of the future benefits of education and are constrained by the scarcity of household resources in order to meet the immediate and future needs of the family (Buchmann, 2000; Checchi, 2006).

The constraints in accessing education should be more considerable for senior secondary education compared to junior secondary education. In Indonesia, junior secondary education is under the coverage of the national compulsory and free basic education policy. Thus, the financial issue faced by parents to send their children to junior secondary schools should be minimized. Meanwhile, the government support for senior secondary education, by far, is more limited since it is mainly under local government authority. As a result, the free education policy only applies in some areas where the local government has sufficient financial capability. Moreover, from the cost perspective, the Susenas survey shows that the average cost of schooling for senior secondary education students (Rp. 2,035 thousand) is much higher than junior secondary education students (Rp. 1,363 thousand) (Central Bureau of Statistics, 2016b). Against this background, the influence of socioeconomic background on schooling enrollment is expected to be more noticeable for senior secondary schooling-age children.

Hypothesis 2: Children having received *Kartu Indonesia Pintar* (Smart Indonesia Card) are more likely to be enrolled in school than their counterparts.

As reviewed in Chapter III, several studies have assessed the effects of financial assistance on the schooling of children (Attanasio et al., 2010; Bai et al., 2017; Behrman et al., 2012; Brauw & Hoddinott, 2011; Carruthers & Fox, 2016; Ferro et al., 2010; Filmer & Schady, 2011; Glewwe & Kassouf, 2012; Heinrich, 2007). Most studies have confirmed the critical role of financial assistance on the schooling of children, such as in Argentina (Heinrich, 2007), Brazil (Ferro et al., 2010; Glewwe & Kassouf, 2012), Cambodia (Filmer & Schady, 2011), Columbia (Attanasio et al., 2010) and Mexico (Behrman et al., 2012; Brauw & Hoddinott, 2011).

In Indonesia, financial issues have become the main reason for children not to attend secondary schooling (Suryahadi et al., 2005). The *Program Indonesia Pintar* is principally

intended to address this kind of issue. The *Kartu Indonesia Pintar* is distributed as an identity card to those eligible to receive financial assistance through the *Program Indonesia Pintar*. By having the *Kartu Indonesia Pintar*, children will be guaranteed to receive financial assistance once they are enrolled in school. Thus, the financial assistance provided can be used by program recipients to cover the costs of schooling that occurs when they enter the schools. With this being taken into account, the provision of the *Kartu Indonesia Pintar* under the *Program Indonesia Pintar* is expected to promote schooling enrollment of the recipients.

Hypothesis 3: *Program Indonesia Pintar* (by the provision of Smart Indonesia Card) is more cost-efficient in increasing the likelihood of school enrollment at senior secondary than junior secondary education.

Due to resource constraint issues, improving the efficiency of the government's educational expenditure is essential (World Bank, 2007). Principally, the demand-side intervention should be provided to those who really need it. Thus, children from lower socioeconomic backgrounds are usually prioritized.

The data from the Ministry of Education and Culture shows that the gross enrollment of junior secondary education (101.05 percent in 2016/2017) in Indonesia is higher compared to senior secondary education (81.95 percent in 2016/2017). Similarly, the net enrollment rate of junior secondary education (76.29 percent in 2016/2017) is higher compared to senior secondary education (61.20 percent in 2016/2017). Furthermore, mainly only those from the poorest households are out of school in junior secondary education level while those from low and middle-income households are out of schooling at senior secondary level in Indonesia (Central Bureau of Statistics, 2016a). Therefore, the room for improvement in increasing school enrollment is larger at the senior secondary level. Considering this background, it is expected that the *Program Indonesia Pintar* is more cost-efficient in increasing school enrollment into senior secondary compared to junior secondary education.

Hypothesis 4: Children receiving financial assistance through the *Program Indonesia Pintar* (Smart Indonesia Program) are more likely to continue schooling than their counterparts.

As mentioned previously, most studies that have investigated the impact of demand-side financing intervention find positive effects of such financial assistance on the schooling of children (Attanasio et al., 2010; Bai et al., 2017; Behrman et al., 2012; Brauw & Hoddinott, 2011; Carruthers & Fox, 2016; Ferro et al., 2010; Filmer & Schady, 2011; Glewwe & Kassouf, 2012; Heinrich, 2007). Such evidence is found in various kinds of demand-side financing programs in different countries across the world.

Primarily, the demand-side financing intervention is intended to offset the direct and indirect costs of schooling by providing cash to those most in need of it (Heinrich, 2007; Patrinos, 2007). In Indonesia, the *Program Indonesia Pintar* recipients receive financial assistance if they are enrolled in school. The basis allocation of the *Program Indonesia Pintar* is different for each level of education. For instance, junior secondary students receive Rp. 375,000 per semester while senior secondary students receive Rp. 500,000 per semester. As such, the provision of financial assistance through the *Program Indonesia Pintar* is expected to reduce the financial constraint issues faced by the recipients and increase their likelihood to continue attending school.

Hypothesis 5: Providing financial assistance through the *Program Indonesia Pintar* is more cost-efficient for senior secondary students than for junior secondary students in increasing the likelihood of school continuation.

The argument to postulate this hypothesis is similar to that given in Hypothesis 3. The larger room for improvement in increasing school continuation of senior secondary school students is the main rationale. Thus, it is expected that the provision of financial assistance from the *Program Indonesia Pintar* is more cost-efficient for senior secondary compared to junior secondary students in this situation.

Hypothesis 6: Children receiving financial assistance through the *Program Indonesia Pintar* (Smart Indonesia Program) are less likely to participate in child labor than their counterparts, especially for senior secondary school-aged children.

As reviewed in Chapter III, several studies have investigated the effect of financial assistance on children's participation in the labor market (Dammert, 2009; Ferro et al., 2010; Galiani & McEwan, 2013; Lee & Hwang, 2016; Ravallion & Wodon, 2000; Skoufias et al., 2001). Several studies have found an indirect effect of financial assistance towards reducing child labor, although the results are mixed. For instance, Ravallion and Wodon (2000) find that the effect of financial assistance on children's labor force participation was very much lower compared to the effect on increased school enrollment. Dammert (2009) reveals that the negative impact of financial assistance on children's labor market participation is much larger for boys than girls. Ferro et al. (2010) find that the negative impact on child labor activities is larger for children in rural areas than urban areas. In addition, children from poor households are more likely to be involved in child labor than those from households with greater income.

The scarcity of household resources may force children to be out of school because they might need to be involved in labor market activities to meet the household's basic needs (Behrman & Wolfe, 1987; Buchmann, 2000). Financial assistance in education is often necessary to decrease the demand for schooling substitutes, such as child work when schooling and working are substitutes (Ferro et al., 2010).

In Indonesia, child labor is still considered to be an enduring issue (Janvry et al., 2006; Lee & Hwang, 2016). As mentioned beforehand, junior secondary education in Indonesia is under the national compulsory and free education policy which might contribute to preventing children from participating in child labor as well as lowering the private costs of schooling compared to senior secondary education. The likelihood of child labor, especially for senior secondary schooling-age children, is therefore expected to diminish in line with the provision of financial assistance.

4.3 Review of Methods

To achieve the first objective of the study, investigating demand-side factors influencing the schooling enrollment of junior and senior secondary school-aged children in Indonesia, previous studies have employed various kinds of analytical tools such as probit regression (Suryadarma et al., 2006), logistic regression (Buchmann, 2000; Connelly & Zheng, 2003; Drèze & Kingdon, 2001; Ilon & Moock, 1991), multi-level logistic regression (Smits & Huisman, 2013) and linear probability model (Takahashi, 2011). In the binary discrete choices, as well as this study, the probit, logit (logistic) and linear probability model are commonly used models, in which a dichotomous dependent variable is regressed on the covariates.

While the linear probability model is fitted by ordinary least squares, the probit and logit model are fitted by maximum likelihood method. The linear probability model is being used less frequently, except with the intention of comparison with other models. The reason is that the least square concept in the linear probability model does not seem sensible to be applied in dummy dependent variables because this model could not constrain the predicted value within the interval of zero and one and also because of the violation of linear regression model assumptions (Greene, 2003; Long, 1997; Schmidt, 2005).

The probit and logit models guarantee that the estimated probabilities lie between values of zero and one. In the probit model, the error term in the equation is assumed to be normally distributed, while it is assumed in the form of logistic cumulative distribution function for the logit model (Greene, 2003; Long, 1997). It is difficult to justify which model should be preferred (Greene, 2003; Schmidt, 2005). Basically, the probit or logit model will provide similar results so that the conclusion obtained from the analysis will not be different. Long (1997) notes that the general rule is that the logit coefficient is approximately 1.7 times larger than the coefficient obtained from the probit model.

The logit model is used in this study to achieve the first objective of the study. According to Menard (2001), the probability of $P(Y = 0) = 1 - P(Y = 1)$. The odds that $Y = 1$ is the ratio of the probability that $Y = 1$ to the probability that $Y \neq 1$, which is equal to $P(Y = 1) / [1 - P(Y = 1)]$. Here,

the odds has a minimum value of 0 and no fixed maximum value. Furthermore, the logit of Y, or the natural logarithm of odds, can be calculated by $\ln\{P(Y = 1)/[1 - P(Y = 1)]\}$. The equation to estimate the relationship between the dependent and explanatory variables can then be written as follows:

$$\text{logit}(Y) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k$$

The logit(Y) can be converted back to the form of odds and probability, into the equations as follows:

$$\begin{aligned} \text{odds}(Y = 1) &= e^{\ln\{\text{odds}(Y=1)\}} \\ &= e^{(\alpha + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k)} \\ P(Y = 1) &= \frac{e^{(\alpha + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k)}}{1 + e^{(\alpha + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k)}} \end{aligned}$$

The interpretation of the probability, odds, and logit are different, but actually they are expressing the same thing. Among those, the odds is the one that can be interpreted more easily compared to others (Menard, 2001). However, it should be noted that caution should be considered in terms of claiming a causal inference.

To achieve the other objectives of the study, which is to examine the effect of demand-side financing intervention on school enrollment, school continuation and child labor participation, there are a number of alternative methods used in earlier empirical studies. For instance, the propensity score matching method is used to evaluate the impact of a tuition fee program in China on four student outcomes, namely matriculation into academic high school, matriculation into vocational high school, retaking high school entrance exams and entering the labor market (Bai et al., 2017). Likewise, the propensity score matching method is used to find whether scholarship program participants are more likely to enroll in college than those without access to the program,

while the difference-in-difference approach is used to compare the college-going rates between Knox County and the rest of the states (Carruthers & Fox, 2016). Another approach is used by Filmer and Schady (2011), which is the regression discontinuity design, to compare the effect of a conditional cash transfer program, with two different amounts of cash being transferred, on school attendance in Cambodia.

In determining causality, a random assignment or controlled experiment is the most ideal way. Randomized experiments have the advantage of producing convincing results (Klaauw, 2014). In this methodological setting, random assignment of children to treatment and control groups should be performed before the program implementation so that the program impact can be then confidently measured. When the randomization is missing, causal inferences cannot be made since it is not possible to conclude whether the outcome differences between the treated and the control groups are as a result of the treatment or due to differences between them on other characteristics. There is a possibility that subjects with certain characteristics are more likely to receive treatment than others. However, in practice, it is exceptionally challenging to perform it in social science due to the cost and ethical issues which arise (Murnane & Willett, 2011; Rosenbaum, 1991). The endogeneity or self-selection bias issues in the evaluation of any social program caused by the missing of randomization of treatment to study participants thus need to be properly addressed (Haskell, 2016).

Fortunately, social scientists have developed various research designs and strategies to address such issues and produce causal analysis on educational policies by using observational data. In observational studies, the analysis is based on data where the values of all variables are observed rather than assigned by an external agent. The main limitation of such kinds of study is the absence of random allocation of treatment to the subject, although a random selection of subjects may exist (Murnane & Willett, 2011).

In drawing a conclusion regarding the causal effect of the program treatment and the changes in outcomes, social scientists often need to compare the treatment outcomes with the counterfactual, which is what the outcomes would be without the program treatment. Due to the

practical impossibility issue, the alternative way that can be employed is by comparing the outcomes of treated with untreated individuals who have similar characteristics in all aspects, except for their treatment status.

When observational data is used, several possible methods to deal with observed and/or omitted variables when making comparisons across groups are available, such as fixed effects models, instrumental variables, propensity score matching, difference-in-difference and regression discontinuity designs (Murnane & Willett, 2011; Schneider et al., 2007). Instrumental variables (IV) and regression discontinuity design (RDD) produce estimates of the counterfactual and can be used when the program assignment rules are clear. Meanwhile, matching methods and the difference-in-differences (DD) method can be used when the program assignment rules are less clear or when instrumental variables and regression discontinuity designs are not feasible to use (Gertler et al., 2016).

In the regression discontinuity design, a clearly defined eligibility threshold is required to select the samples which fall just above or below the threshold point. The estimates produced by the regression discontinuity design compares between the average outcomes for those on the treated and those on the untreated side of the eligibility threshold to find the treatment effect (Gertler et al., 2016; Schneider et al., 2007). Meanwhile, the difference-in-differences method is used when the research's main interest is to compare the outcomes changes over time between a population in the treatment and in the comparison group (Gertler et al., 2016). The difference-in-difference method requires an observation of both the treatment and comparison groups before and after the moment of treatment (Klaauw, 2014). The other previously mentioned methods are instrumental variables and propensity score matching. An important difference between these two methods is that instrumental variables can correct for omitted variable bias due to unobserved characteristics, while propensity matching can correct only for bias from observed characteristics.

To investigate the effect of educational financial assistance on school enrollment, school continuation and child labor, several approaches are used in this study. First of all, this study

employs the propensity score matching method. The propensity score matching method was developed by Rosenbaum and Rubin (1983) and is extensively used in educational studies (Haskell, 2016; Tucker, 2010). This method belongs to the quasi-experimental studies since it is not a kind of randomized assignment method, but tries to imitate it (Gertler et al., 2016). The matched sampling approach is designed to reduce bias in observational studies in estimating causal effects (Rubin, 1973; Rubin & Thomas, 1996). This method allows us to minimize the effects of observed confounding when observational data is used to estimate treatment effects (Haskell, 2016; Rosenbaum & Rubin, 1983; Schneider et al., 2007).

The main challenge in an impact analysis is to identify a comparison (control) group with similar characteristics to the treatment group so that researchers can justify that the difference between those groups after the treatment can be attributed to the program. By using observational or non-randomized data, the propensity score matching method allows us to estimate causal treatment effect by assuming that there is a mechanism to assign individuals to groups when the assignment is non-random. Different from the regression discontinuity design where it is assumed that individuals in the two groups have similar characteristics, the propensity score matching method matches individuals on the basis of combined characteristics having similar propensities (Schneider et al., 2007). The matching is not based on each covariate but based on aggregating all covariates into one score (Tucker, 2010). Principally, the propensity score matching method approximates a randomized assignment by ensuring that the individuals have equivalent chances of being in the treatment group.

The propensity score matching method is one of the most favorable approaches using propensity score due to the simplicity of the method and the interpretation of the results (Austin & Stuart, 2015; Heckman, Ichimura, & Todd, 1997). In the propensity score matching method, pair matching is the most commonly implemented technique in which pairs of treated and control units are formed who share a similar value of the propensity score. The alternatives of matching methods utilization include nearest neighbor matching, many-to-one matching, variable-ratio matching and full matching.

In practice, program participants and non-participants are matched based on the probability of being in the program treatment group using a number of observable characteristics. The propensity score, which is the probability that an individual will be in the program treatment conditional on observed covariates, is computed for each of the individuals in the participants and non-participants groups (Curtis, 2007; Elze et al., 2017). Typically, either logit or probit regression models can be used, which usually yield similar results, to estimate the propensity score (Caliendo & Kopenig, 2005; Curtis et al., 2007; Elze et al., 2017; Heckman et al., 1997; Rosenbaum & Rubin, 1983). The propensity score produced will be between the value of 0 and 1 which reflects the influence of the observed characteristics on the likelihood of individuals to be enrolled in the program. The propensity score itself will be used to compare individuals with similar scores.

According to Rosenbaum (1983) the propensity score is denoted as follow:

$$e(x) = \text{pr}(z = 1|x)$$

where:

$$\text{pr}(z_1, \dots, z_n | x_1, \dots, x_n) = \prod_{i=1}^N e(x_i)^{z_i} \{1 - e(x_i)\}^{1-z_i}$$

Once the propensity score is calculated and the matched sample generated, the average treatment effect on the treated group (ATT) can be computed. The average treatment effect on the treated group is the average difference if those in the treated group received treatment compared with if none of them received treatment. The average treatment effect on the treated group enables us to infer causality using the existing data assuming that the sample is large enough.

The advantage of using propensity score matching is that the method uses aggregated characteristics, instead of individually, so that it is easier to match those in the treatment and non-treatment groups based on their propensity scores. The propensity score matching can overcome the difficulties or infeasibilities of using covariate matching as it may be very difficult to

find any untreated that have the same characteristics with the treated based on each covariate when the number of covariates is large (Tucker, 2010). Moreover, the difference in the outcomes produced by this method would be closer to the difference that we would expect from a random assignment because their pretreatment is more likely to be similar in their characteristics (Schneider et al., 2007).

However, despite the possibility of using the propensity score matching in many conditions, there are several limitations of this method that should be noted. Firstly, a large sample of datasets and satisfactory common supports between treatment and non-treatment groups are required. Secondly, the matching is based on the observable characteristics so that unobserved characteristics could not be incorporated in the propensity score calculation to be matched. Therefore, bias originating from unobserved characteristics could not be ruled out with any certainty. Moreover, in practice, matching methods are often used when other options, including randomized assignment, instrumental variables and regression discontinuity design, are not possible (Gertler et al., 2016).

There are several other alternative approaches to estimate the treatment effect in observational studies using the propensity score, namely covariate adjustment, stratification and inverse probability weighting (Austin & Stuart, 2015; Elze et al., 2017). The covariate adjustment is the conventional method where all relevant treatment characteristics are included in a regression model (Elze et al., 2017). With stratification using propensity scores, the average effect is calculated within each stratum which might show potential heterogeneity of treatment effects across strata (Curtis et al., 2007; Elze et al., 2017). Meanwhile, the inverse probability weighting (IPW) allows researchers to deal with a common issue in observational data, namely censoring. Due to the lack of guidance in choosing the most appropriate propensity score approach (Elze et al., 2017), it is often suggested that utilizing a number of approaches is reasonable (Caliendo & Kopenig, 2005).

This study explores the use of the inverse probability weighted regression adjustment. The inverse probability weighting was introduced by Hirano and Imbens (2002). Compared to using

the true propensity score, weighting by the inverse of a nonparametric estimate of the propensity score produces an efficient estimate of the average treatment effect (Hirano & Imbens, 2002; Hirano et al., 2003). Combining weighting based on the propensity score with regression adjustment is suggested to deliver a double robust technique. The advantage is that the double robust estimation allows for misspecification in the model (Caliendo & Kopenig, 2005; Hirano & Imbens, 2002).

The use of propensity score weighting is often suggested over matching because weighting retains and utilized all of the control and treatment groups for the analysis while matching can significantly reduce sample sizes as the observations that failed to be matched are excluded in the analysis. When the propensity score is used as weights, it produces a balanced sample of treated and untreated observations so that the sample distribution of variables approximate the population distribution (Caliendo & Kopenig, 2005). Moreover, Hirano and Imbens (2002) also highlighted that combining the use of regression adjustment with weighting produces more stable estimates than solely utilize regression adjustment or propensity score weighting.

In addition, this study also explores the use of Heckman's two-step procedure. Some earlier studies employ both the propensity score matching and the Heckman's two-step procedures as an alternative approach. In principle, the propensity score matching addresses the selection bias due to observable while Heckman's two-step procedure addresses selection bias due to unobservable (Tucker, 2010).

Heckman and Hotz (1989) highlighted that earlier program impact evaluations using non-experimental designs produce a wide range of different estimates and diverge from the estimates using experimental designs for the same program. The selection bias is the major problem found in studies using the non-experimental design where participation is nonrandom. Regression methods, including the ordinary least squares, logit and probit, suffer from endogeneity and selection problems causing inconsistencies of estimates (Klaauw, 2014). In this situation, using the ordinary least squares regression will produce an inconsistent and inefficient estimation if such an issue is not solved (Klaauw, 2014; Nonvide, 2017). If the selection bias can

be addressed, the different non-experimental designs would produce the same inference about program impact (Heckman & Hotz, 1989). The doubt of the estimates of non-experimental evaluation has triggered Heckman (1979) to propose a method of dealing with the selection problem.

Sample selection bias might occur due to the self-selection by individuals into the program or due to decisions by data processors with similar mechanisms to self-selection (Catsiapis & Robinson, 1982; Heckman, 1979). The selection issues in the non-experimental design might refer to selection on observables and selection on unobservables. Selection bias due to observables comes from sample differences that can be observed but fail to be controlled by researchers (Tucker, 2010). Controlling for the observed variables might solve the selection bias issue in the former but not the latter (Heckman & Hotz, 1989). If selection bias is mainly caused by observable factors and bias from unobservable factors is not a major concern, the propensity score matching method can be applied. Meanwhile, if the bias caused by unobservables can not be ignored, the use of inverse Mill's ratio can be applied in the second stage of Heckman's model (Tucker, 2010).

To overcome the selection problem, Heckman (1976) developed a treatment for a statistical approach for truncation, sample selection and limited dependent variables which then permits the use of ordinary least squares and probit models. It is identified that the use of incomplete observations in both truncated and censored samples causes bias. For instance, sample attrition is a potential source of selection bias. However, the issue of attrition, such as over the course of study, is often ignored which might result in bias caused by disregarding those who do not continue the education. To control for this bias, the Heckman's two-steps model can be utilized (W. E. Becker & Powers, 2001; Grasdahl, 2001; Grimes & Nelson, 1998).

Heckman's selection model consists of two steps: a selection (or participation) equation and outcome equation (Jung et al., 2013; Nonvide, 2017). The estimation using Heckman's method is only appropriate if the first stage estimation is performed using probit and the second stage estimation is performed using linear regression (Tucker, 2010). Although estimations based on probit and logit model are often interchangeable, the use of a probit, instead of logit, model is

required in the Heckman's selection model due to the different assumption between probit and logit models where the probit uses normality and the logit uses log normality (Bushway, Johnson, & Slocum, 2007). When logit is used, the estimation must be transformed so that functions are normally distributed, not logistically distributed (Tucker, 2010).

The estimation of the omitted regressor (the inverse Mill's ratio) is firstly performed using probit analysis in the selection equation and then the inverse of Mill's ratio obtained from the predicted probability of the probit estimation is included as an additional explanatory variable in the outcome equation using the ordinary least square equation (Bushway et al., 2007; Heckman, 1979; Jung et al., 2013; Klaauw, 2014). The probit analysis is performed on the entire sample while regression analysis is estimated for the subsample of those the outcome is observed (Heckman, 1979; Klaauw, 2014).

A procedure that needs to be performed in the Heckman's selection model to reduce multicollinearity among predictors is the exclusion restriction. Exclusion restriction is performed by identifying variables that influence the selection into treatment (first stage) but not to the outcome equation (second stage). It should be based on theoretical grounds (Bushway et al., 2007). In the absence of exclusion restriction, the standard errors can be significantly inflated (Bushway et al., 2007).

When the selectivity issue is trivial, the inverse Mill's ratio (λ) becomes so small that the estimates of least squares have optimal properties (Heckman, 1976). Principally, in the case of the insignificance of the inverse Mill's ratio, the selection bias is indicated absence in the model (Bushway et al., 2007). If it is statistically significant, the inclusion of inverse Mill's ratio is necessary to avoid bias.

4.4 Empirical Methods

As mentioned previously, the first objective of the study is to investigate demand-side factors influencing the schooling enrollment of junior and senior secondary school-aged children (aged 13-18) in Indonesia by taking into account selected individual, household and community

characteristics.

To answer the first research question, ‘What is the association between key demand-side factors and schooling enrollment of junior and senior secondary school-aged children in Indonesia?’, the logistic regression method will be performed using the STATA statistical software version 14. The individual, household and community characteristics variables, as shown in Figure 4.1, are used to predict schooling enrollment of children aged 13-15 and children aged 16-18 separately. For individual characteristics, the age, sex and birth order of the children are included. For household characteristics, several variables included are the number of siblings, household head’s age, household head’s age squared, head of household’s level of education, missing father, missing mother and per capita household consumption. For community characteristics, location (urban or rural) is used.

Furthermore, the estimation will also be performed separately on selected samples, namely gender (boys and girls), location (urban and rural) and wealth groups (poor, medium and rich). The reason for performing analysis for each selected sample group is to allow comparison of results between gender, location and wealth groups. For the interpretation of the results, the regression estimates will be shown as the set of coefficient estimates and odds ratio. While odds express the likelihood of an occurrence relative to the likelihood of a non-occurrence, odds ratios refer to the ratios of odds.

The other objectives of this study are to examine the impact of the *Program Indonesia Pintar* (Smart Indonesia Program) on school enrollment, school continuation and child labor participation of junior and senior secondary school-aged children in Indonesia. There are five research questions raised in these objectives.

To answer the following research questions: ‘To what extent does the provision of the *Kartu Indonesia Pintar* (Smart Indonesia Card) affect schooling enrollment in junior and senior secondary education?’, ‘What is the cost-efficiency of the *Program Indonesia Pintar* (by the provision of Smart Indonesia Card) in increasing school enrollment between junior and senior secondary education?’, ‘To what extent does the provision of financial assistance through the

Program Indonesia Pintar (Smart Indonesia Program) affect schooling continuation in junior and senior secondary education?’, ‘What is the cost-efficiency of the *Program Indonesia Pintar* (by the provision of financial assistance) in increasing school continuation between junior and senior secondary education?’ and ‘To what extent does the provision of financial assistance through the *Program Indonesia Pintar* (Smart Indonesia Program) affect child labor participation of junior and senior secondary school-aged children?’, the OLS, the Heckman’s two-stage model, the propensity score matching and the inverse probability weighted regression adjustment will be performed using STATA statistical software version 14. Furthermore, the examination of the heterogeneity of the impacts of financial assistance will also be provided by gender (boys and girls), location (urban and rural) and wealth groups (poor, medium and rich) as well.

These approaches are mainly used to address the biases mentioned beforehand. Guo and Fraser (2015) note that in observational studies where selectivity is unavoidable, scholars must take into account selection bias so that alternative approaches to deal with the selection issues must be explored. In this setting, the estimation using ordinary least squares (OLS) regression tends to be inconsistent and biased.

In this study, the issues in establishing causality in the effect of financial benefit on the outcomes is the presence of endogeneity or selection bias associated with the treatment status. The fact that children are not randomly assigned to receive financial assistance from the *Program Indonesia Pintar* suggests that certain background characteristics are likely to affect the relationship between financial assistance and the outcomes. Financial assistance eligibility is often determined by factors such as socioeconomic status so that the recipients may differ significantly in such aspects from non-recipients. Thus, to address such an issue, this study utilized propensity score matching (Rosenbaum & Rubin, 1983) alongside estimation using the propensity score weighted regression adjustment (Hirano et al., 2003).

It should be noted that the selection into entering treatment and entering the study sample are different (Guo & Fraser, 2015). Savoca (1991) highlights that the estimation of the effect of financial assistance using data limited to those attending the school may lead to sample selection

bias. In this study, for instance, one must have graduated from primary school to be selected in the sample in estimating the effect of financial assistance on school enrollment at junior secondary school. Similarly, one must be enrolled in junior secondary school to be selected in the sample in estimating the effect of financial assistance on school continuation. Such a mechanism that influences which observations can enter the study sample and which are excluded is the source of bias as well. To address such an issue, this study utilizes Heckman's two-step procedure (Heckman, 1976).

In the propensity score matching analysis, to address the endogeneity issue, the first procedure in this study is the estimation of the propensity score to be in the treatment group (receiving financial assistance) by using logistic regression following Rosenbaum and Rubin (1983). This procedure is performed to find a comparison group of non-recipients likely to be similar to the recipient group based on observable characteristics. The propensity score is computed for each of the observations which do not have any missing values of the covariates. The set of variables of sample characteristics included in the estimation of propensity scores are the observable characteristics that are likely to predict the probability of receiving financial assistance and influencing schooling outcomes, as will be presented in Table 4.14.

In particular, the measures of per capita household consumption, which become the main consideration for receiving financial assistance, along with other household characteristics are included to minimize the potential of omitted variable bias. The propensity score produced will be between the value of 0 and 1 which shows the influence of the observed characteristics on the likelihood of individuals to obtain financial assistance. After deriving each observation's propensity score, the score is then used to match or weight treated and control individuals in preparation for the final outcome model.

The validity of the matches is determined by the sample distribution in the region of common support to ensure that there is sufficient overlap in the characteristics between treated and untreated observations. Emphasis must also be placed on achieving balance to assess whether the model has been sufficiently specified and in order to reduce bias. Therefore, checking the region of

common support and balance diagnostics will be performed.

Trimming the sample is an option to be taken after the estimation of propensity score when the balance issues are not satisfied. There are several methods to trim the sample, including (1) minima and maxima comparison and (2) based on the density distribution (Caliendo & Kopenig, 2005). In minima and maxima comparison, the main principle is to delete observations with propensity scores smaller than the minimum and larger than the maximum of the opposite group. Trimming can be beneficial to avoid extreme weights in the inverse probability weighting approach as well. The trimming procedure will be performed in the analysis in this study, when necessary.

Furthermore, the average treatment effect on the treated (ATT) is estimated to find the average difference in the outcomes between the treatment units and comparison units for those samples within common support. The estimation result thus measures the effect of financial assistance on children's schooling as well as child labor for that observation. The set of variables used in the estimation of the ATT is mainly the same set of variables used in the estimation to predict the probability of receiving financial assistance.

For the use of the inverse probability weighted regression adjustment (IPWRA) in the analysis of this study, the procedure follows Hirano et al. (2003). The weight is estimated and applied for each of the observations in the treatment and comparison groups. In estimating the average treatment effect on the treated (ATT), observations for treated participants are given a weight of 1 and those non-participants are given a weight of $p/(1 - p)$ where p is the predicted probability of participation estimated from the logistic regression. In principle, comparisons with similar observable characteristics to treatment are assigned higher weights and those with relatively different observable characteristics to treatment are assigned lower weights. Meanwhile, to estimate the average treatment effect (ATE), observations for treated participants are given a weight of $1 / p$ and those non-participants are given a weight of $1 / (1 - p)$ (Guo & Fraser, 2015).

For the Heckman selection model, to address the sample selection issue, the first stage of the analysis identifies selection into entering the study sample as mentioned above. The probit

analysis is performed to estimate the probability of individuals to graduate from primary schooling or junior secondary schooling (schooling enrollment model) and to be enrolled in junior secondary schooling or senior secondary schooling (schooling continuation model). The individual, household and community characteristics used in the analysis are presented in Table 4.14. Once the probability is predicted, Mill's ratio is then calculated.

In the second stage of the analysis, the inverse Mill's ratio is included as a variable into the outcome equation using the ordinary least squares (OLS). The variables included in the second stage are mostly identical to those specified for the first stage. The inverse Mill's ratio indicates whether selection bias exists in the model. If it is significant, then the selection bias in the model exists. Thus, the estimation from the second stage of the Heckman model is preferable to the OLS as it leads to a robust estimator. Meanwhile, when the inverse Mill's ratio is not significant, the selection bias is not detected. Thus, the OLS results will not be so different from the second step of the Heckman model.

4.5 Data Description

Data for this study are drawn from the Indonesian National Socioeconomic Survey (Susenas) datasets, a nationally representative household survey collecting information on social and economic aspects, in 2015 from the Central Bureau of Statistics (*Badan Pusat Statistik*) of Indonesia. The datasets consist of the Core Module and the Social Culture Education Module of the Indonesian National Socioeconomic Survey (Susenas). The Core Module was carried out in March 2015 while the Social Culture Education Module was collected in September 2015 (Central Bureau of Statistics, 2016b).

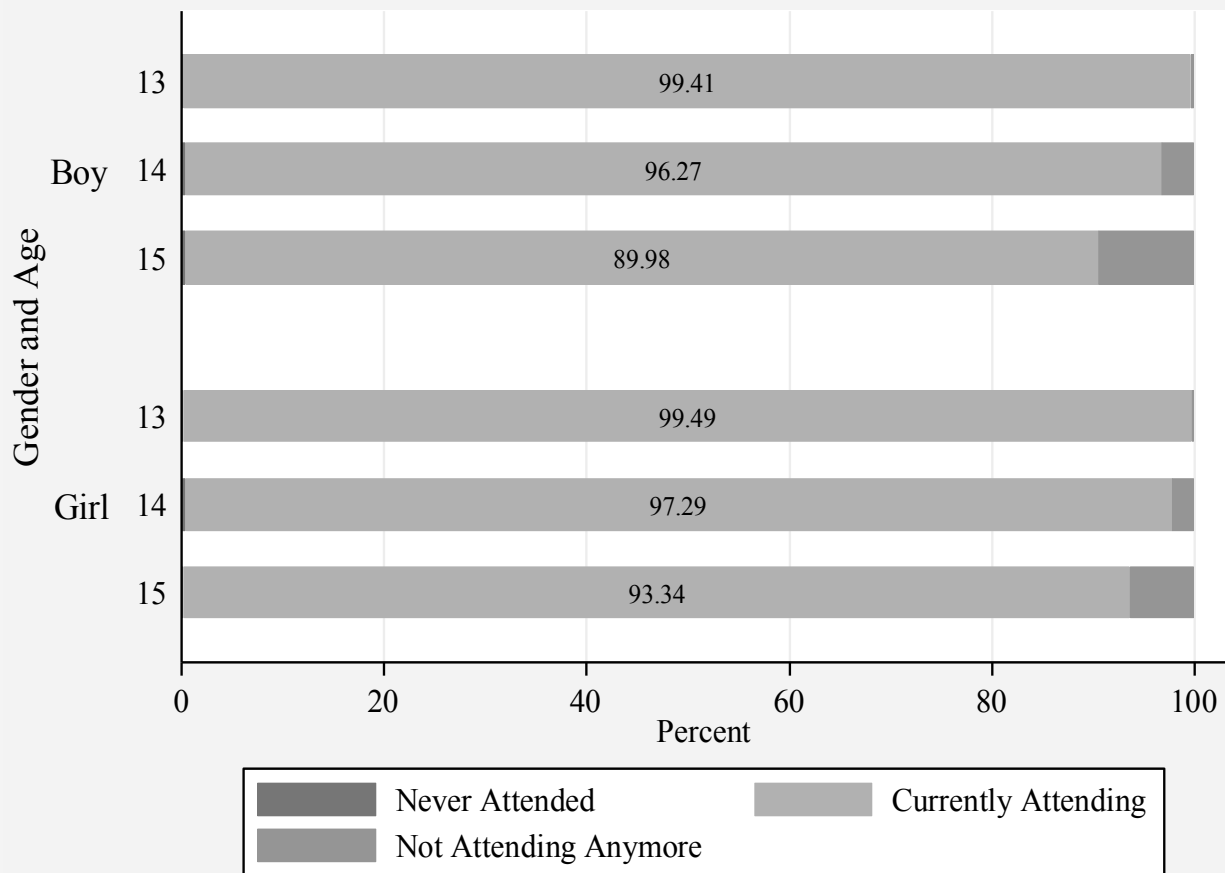
The Core Module is an annual survey collecting information on individual and household characteristics, covering basic information on education, employment and consumption. Meanwhile, the Social Culture Education Module is usually carried out once every three years to obtain more specific information on education and sociocultural issues covering various information including costs of schooling, transportation to and from school and financial

assistance to students. The samples in the Susenas survey are selected by the two-stage stratified sampling method.

The Susenas 2015 database covers 271,345 individuals from 71,568 households from all provinces in Indonesia. Of the sample contained in the Susenas survey, only children aged 13-18 are selected and utilized as the sample of this study, where those aged 13-15 represent junior secondary schooling age and those aged 16-18 represent senior secondary schooling age. Given the large and nationally representative dataset, the Susenas dataset should be ideal to be used in the analysis that requires a large sample size to provide both a treatment and a control group. Among the various types of information collected in the Susenas survey, this study mostly uses information from the Social Culture Education Module and complemented by data from the Core Module of the Susenas.

The following figures and tables describe some relevant basic information obtained from the Susenas dataset used in this study. Figure 4.2 presents the composition of children aged 13-15 who were attending school, not attending school anymore and never attending school at the time of the survey in 2015 by gender and age. The table shows that the proportion of children attending school was highest at the age of 13 years old (99.41% for boys and 99.49% for girls) and got lower as the age increased for both genders. Schooling attendance was higher for girls compared to boys of all ages. The gender gap in schooling increased as age increased, where boys were more disadvantaged than girls especially from the age of 15 years old.

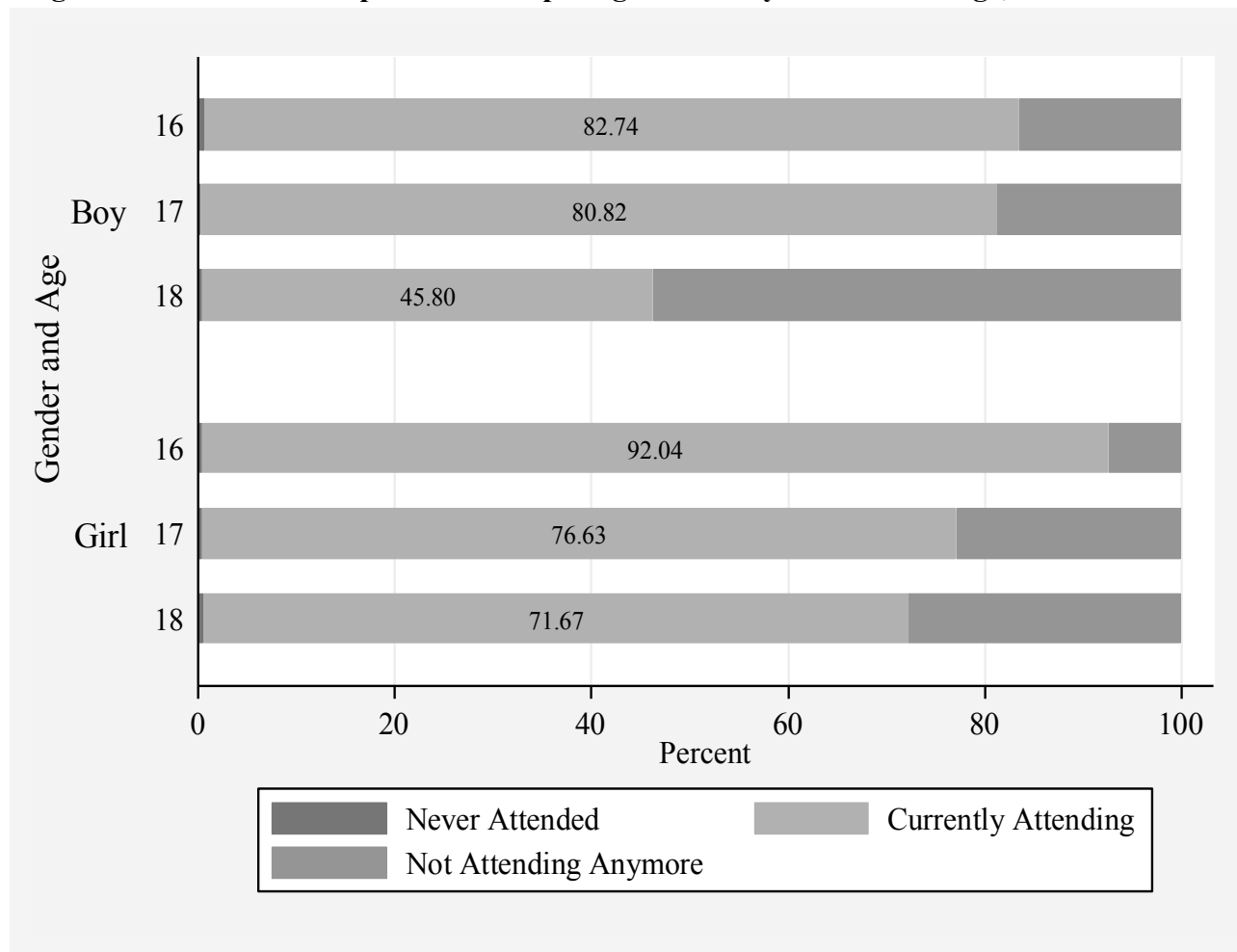
Figure 4.2: School Participation of Sample Aged 13-15 by Gender and Age, 2015



Source: Created by the author using Susenas 2015.

Similarly, Figure 4.3 shows that the proportion of school attendance of children aged 16-18 was highest at the age of 16 years old (82.74% for boys and 92.04% for girls) and gets lower as the age increases, for both boys and girls. Again, schooling attendance was higher for girls compared to boys, except for the age of 17 years. The largest schooling attendance difference between gender was found at the age of 18 years old where boy's attendance was 45.80 percent while girl's attendance was 71.67 percent.

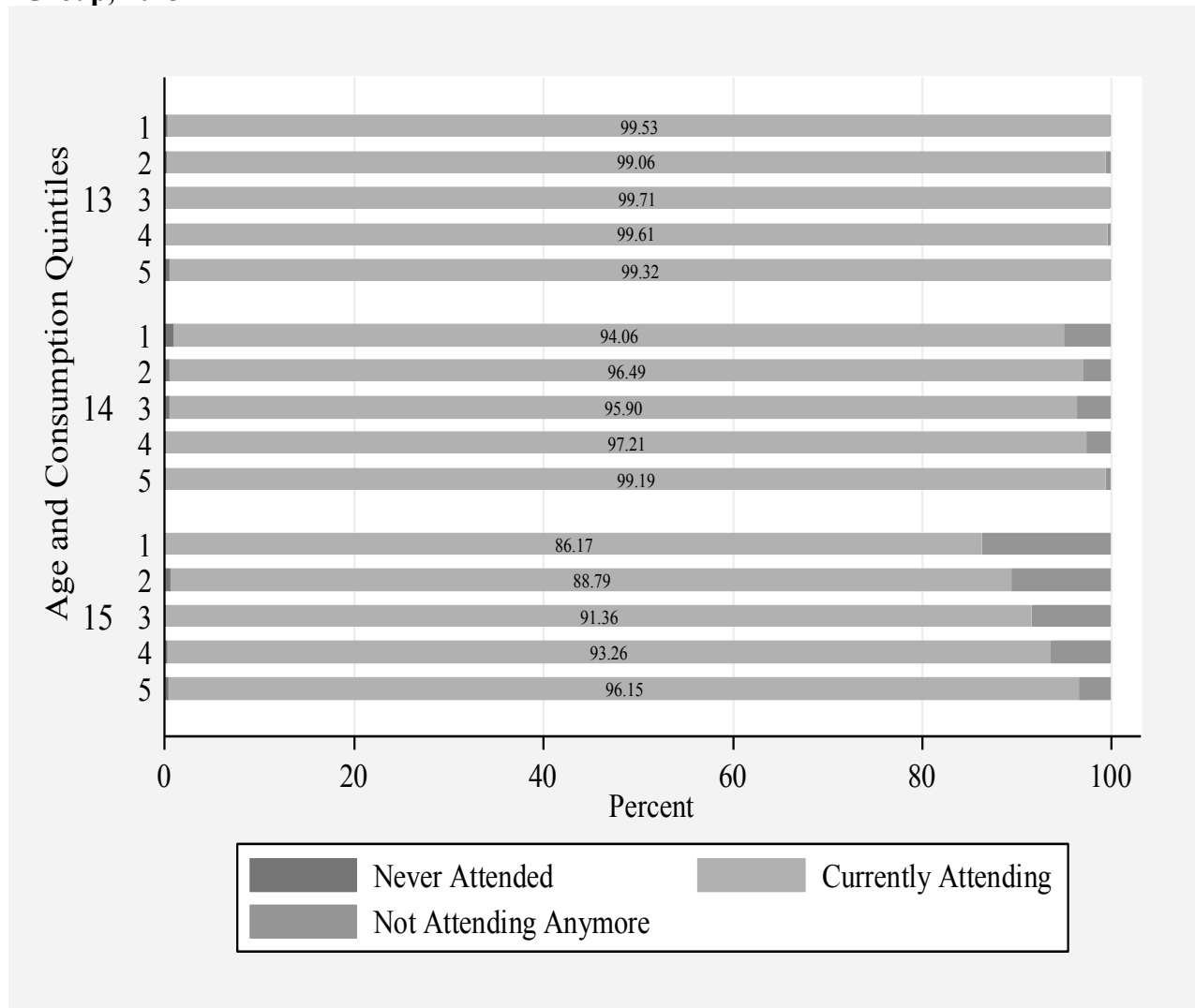
Figure 4.3: School Participation of Sample Aged 16-18 by Gender and Age, 2015



Source: Created by the author using Susenas 2015.

Figure 4.4 presents the composition of children aged 13-15 who were attending school, not attending school anymore and never attending school by the household's consumption group and age. The table indicates that children from richer families have a better tendency to attend schooling than those from poorer families. The gap increases as age increases and the largest gap was found at the age of 15 years old, where the attendance was 86.17 percent (Q1/the poorest), 88.79 percent (Q2), 91.36 percent (Q3), 93.26 percent (Q4) and 96.15 percent (Q5/the richest) respectively.

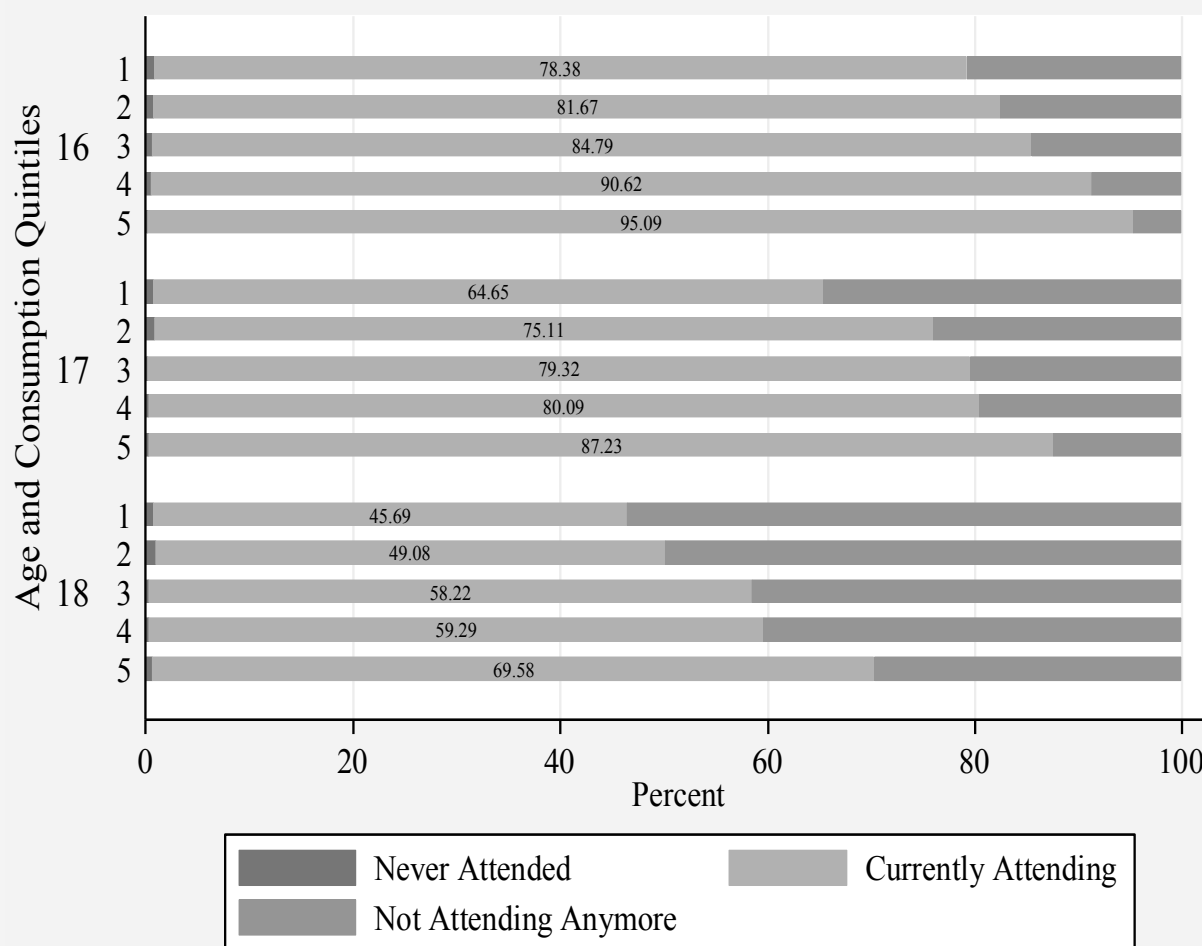
Figure 4.4: School Participation of Sample Aged 13-15 by Age and Household's Consumption Group, 2015



Source: Created by the author using Susenas 2015.

Of the sample of children aged 16-18 in the dataset, Figure 4.5 also indicates that children from richer families have a better chance to attend schooling than those from poorer families. For instance, at the age of 16 years old, the attendance of children based on the household's consumption groups was as follows: 78.38 percent (Q1/the poorest), 81.67 percent (Q2), 84.79 percent (Q3), 90.62 percent (Q4) and 95.09 percent (Q5/the richest) respectively. Again, the attendance gap tends to increase as age increases.

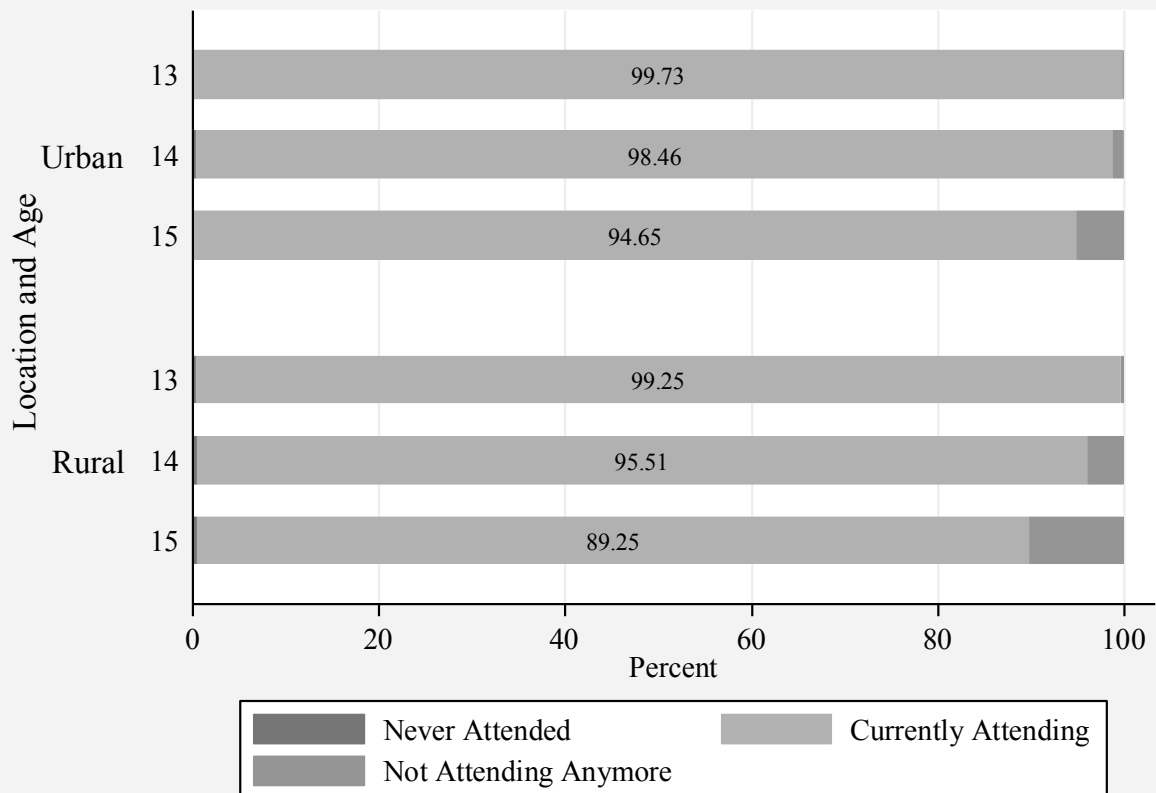
Figure 4.5: School Participation of Sample Aged 16-18 by Age and Household's Consumption Group, 2015



Source: Created by the author using Susenas 2015.

Figure 4.6 presents the composition of children aged 13-15 who were attending school, not attending school anymore and never attending school at the time of survey by location (urban and rural) and age. The table shows that schooling attendance was higher in urban than in rural areas. The difference in attendance was more visible at older ages, where attendance in urban areas was 94.65 percent while in rural areas attendance was 89.25 for children ages 15 years old.

Figure 4.6: School Participation of Sample Aged 13-15 by Location and Age, 2015

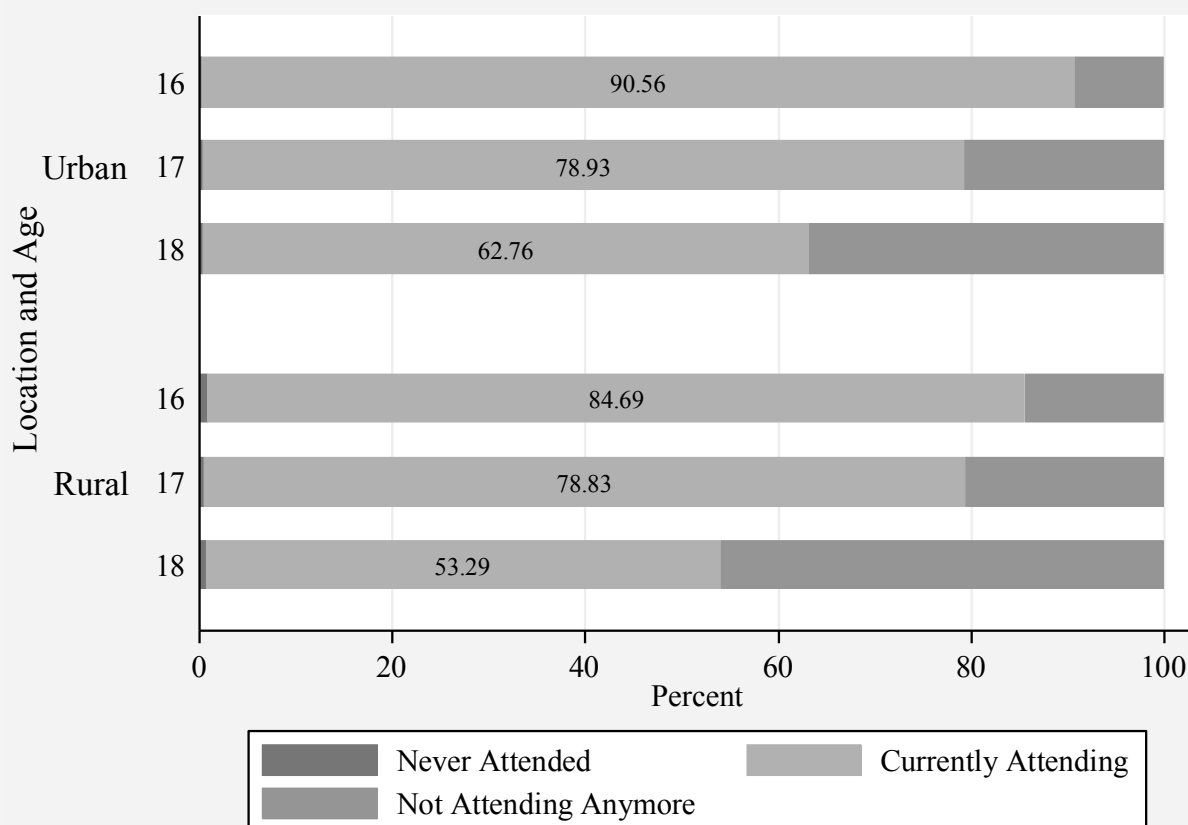


Source: Created by the author using Susenas 2015.

Of the sample of children aged 16-18 in the dataset, Figure 4.7 shows that schooling attendance was higher in urban than in rural areas as well. For children aged 16, the attendance was 90.56 percent (urban) and 84.69 percent (rural). For children aged 17, the attendance was 78.93 percent (urban) and 78.83 percent (rural). Meanwhile, for children aged 18, the attendance was 62.76 percent (urban) and 53.29 percent (rural).

Table 4.1 presents the average distance to school and the time needed to travel to school by level of education and location (urban and rural). As mentioned before, the distance and time to school can reflect the supply-side of education, especially the availability of schools. The table shows that both the distance and time to school were increasing as the level of education increased, which occurs in both urban and rural settings.

Figure 4.7: School Participation of Sample Aged 16-18 by Location and Age, 2015



Source: Created by the author using Susenas 2015.

Table 4.1: Distance and Time to School by Level of Education and Location, 2015

Level of Education	Distance to School (in km)			Time to School (in minute)		
	Urban	Rural	All	Urban	Rural	All
Primary Education	1.37	1.22	1.28	11.34	13.05	12.38
Junior Secondary Education	2.71	3.03	2.90	15.64	19.15	17.72
Senior Secondary Education	3.90	5.01	4.48	19.48	22.41	21.01
Higher Education	9.56	20.27	12.57	27.90	45.00	32.70

Source: Created by the author using Susenas 2015.

Furthermore, in almost all cases, the distance and time to travel to school were larger in rural than in urban areas. For instance, the average distance to junior secondary schools was 2.71 kilometer in urban areas and 3.03 kilometer in rural areas. The average distance to senior secondary school was 3.90 kilometer in urban areas and 5.01 kilometer in rural areas. Meanwhile, the average time needed to travel to junior secondary school was 15.64 minutes in urban areas and 19.15 minutes in rural areas. The average time needed to travel to senior secondary school was 19.48 minutes in urban areas and 22.41 minutes in rural areas. Overall, the data indicate that the availability of schools in urban areas was generally better than in rural areas.

Table 4.2 shows the costs of schooling by the level of education and location. In the Susenas survey, the questionnaire asked respondents to disclose the cost of schooling in the period of July – September 2015. The table shows that, on average, the costs of schooling tend to increase as the level of education increases, from primary education (Rp. 198,920) to junior secondary education (Rp. 262,111), senior secondary education (Rp. 278,906) and higher education (Rp. 513,642) respectively.

The table also shows that the costs of schooling in urban areas was larger than in rural areas. For instance, the average cost of schooling in junior secondary education was Rp. 313,548 in urban areas and Rp. 225,880 in rural areas. Meanwhile, the average cost of schooling in senior secondary education was Rp. 293,437 in urban areas and Rp. 260,428 in rural areas.

Table 4.2: Cost of Schooling by Level of Education and Location, July-September 2015

Level of Education	Location		
	Urban	Rural	All
Primary Education	257,230	166,432	198,920
Junior Secondary Education	313,548	225,880	262,111
Senior Secondary Education	293,437	260,428	278,906
Higher Education	570,696	388,352	513,642

Source: Created by the author using Susenas 2015.

Table 4.3 shows the costs of schooling by level of education and type of school, whether public or private school. Related to the previous table, the average cost of schooling information was also obtained from the Susenas survey questioning the cost of schooling in the period of July – September 2015. The costs include school fees and supplies, but transportation costs and pocket money were excluded.

The table shows that the average cost of schooling was higher as the level of education increases for both public and private schools. A comparison between public and private schools shows that the average costs of schooling in private schools were much higher than in public schools. For instance, the average cost of schooling in public junior secondary school was Rp. 460,897 while in private junior secondary school was Rp. 683,817. Moreover, the average cost of schooling in public senior secondary school was Rp. 670,554 while in private senior secondary school was Rp. 1,032,523.

Table 4.3: Cost of Schooling by Level of Education and Type of School, July-September 2015

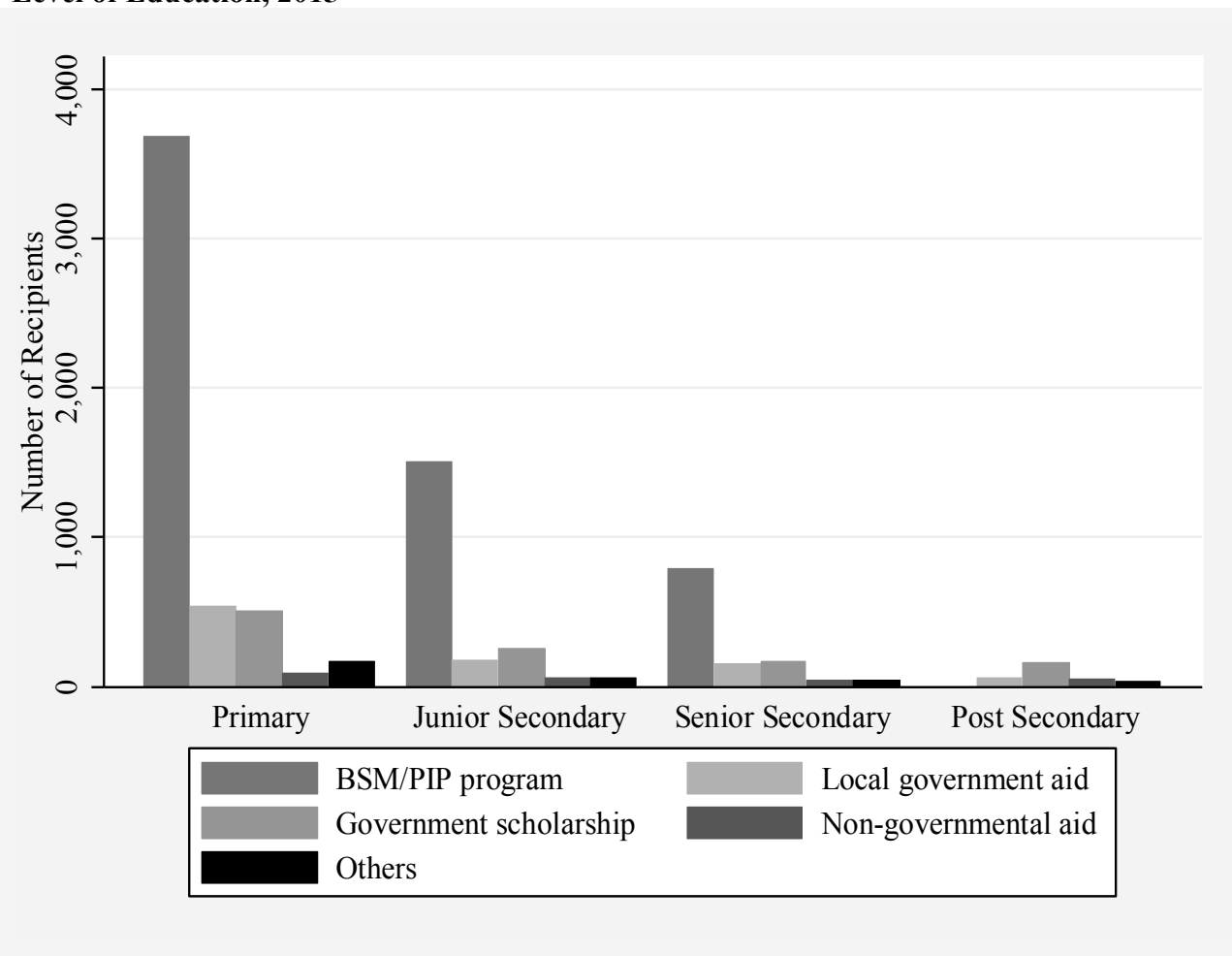
Level of Education	Type of School	
	Public	Private
Primary Education	289,852	593,124
Junior Secondary Education	460,897	683,817
Senior Secondary Education	670,554	1,032,523
Higher Education	1,981,406	2,382,531

Source: Created by the author using Susenas 2015.

Figure 4.8 shows the various kinds of financial assistance in education for each tier of schooling. Based on the Susenas questionnaire, the source of financial supports is categorized into: (1) *Bantuan Siswa Miskin* (Cash Transfer for Poor Students)/*Program Indonesia Pintar* (Smart Indonesia Program), (2) financial assistance from local government, (3) government scholarship, (4) financial assistance/scholarship from non-governmental organization and (5) others.

The figure confirms that the *Program Indonesia Pintar* (Smart Indonesian Program), as a continuation of the *Bantuan Siswa Miskin* (Cash Transfer for Poor Students), takes account as the largest contributor for primary education, junior secondary education and senior secondary education. After that, government scholarships and local government aid contribute more in comparison to financial support from non-governmental institutions. The majority contribution of the *Program Indonesia Pintar* became one of the justifications of this study to focus specifically upon the *Program Indonesia Pintar*. In addition, the figure shows that the number of *Program Indonesia Pintar* recipients was much larger in primary education compared to junior secondary and senior secondary education.

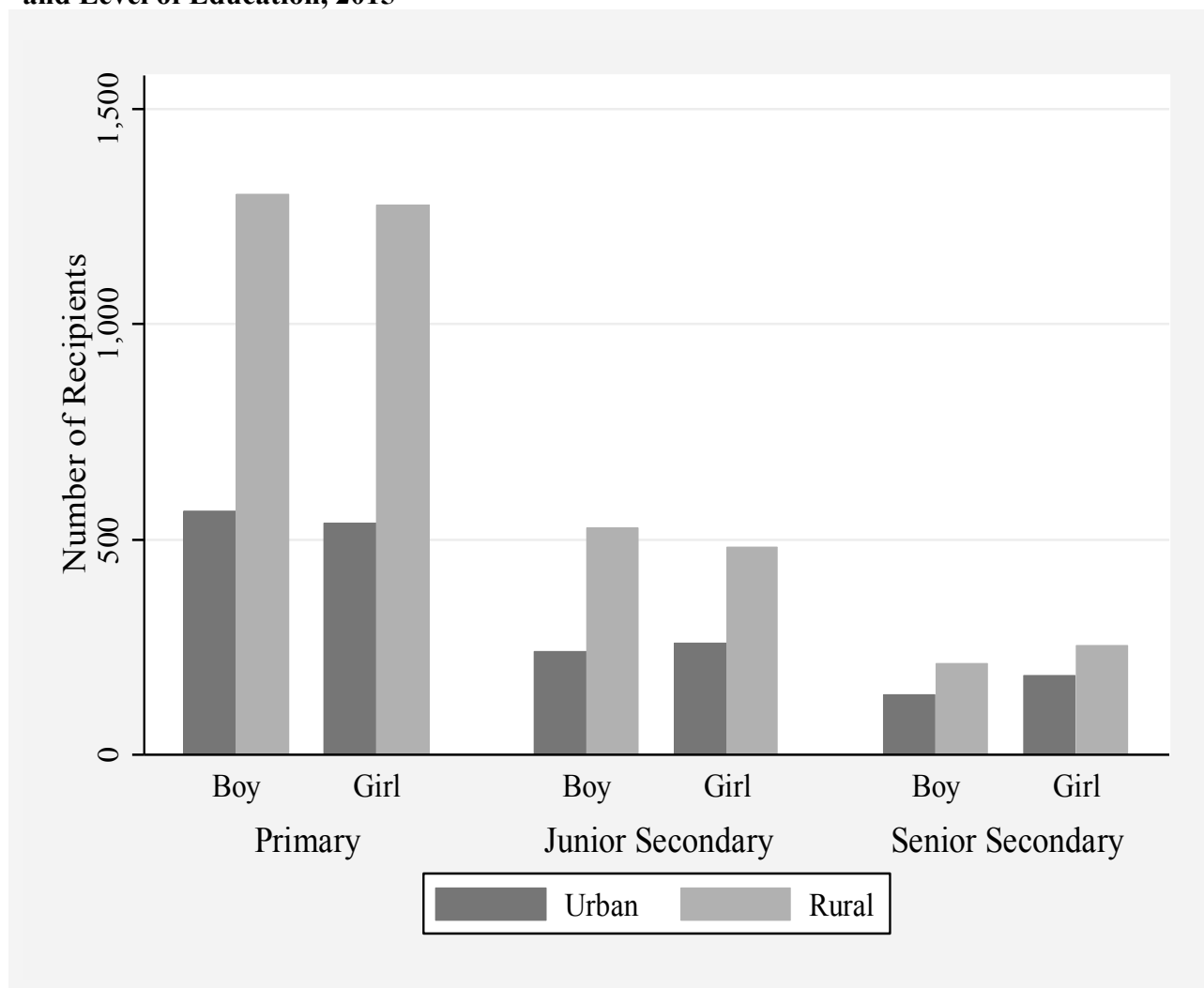
Figure 4.8: Recipients of Financial Assistance on Education by Source of Assistance and Level of Education, 2015



Source: Created by the author using Susenas 2015.

Figure 4.9 shows the coverage of the *Program Indonesia Pintar* (Smart Indonesian Program) by location (urban or rural), gender and level of education. Firstly, the figure shows that boys and girls have a similar chance of becoming a program recipient so that gender discrimination was not present. However, there are differences in the distribution of the program based on location. A larger proportion of program recipients was found in rural compared to urban areas, whether in primary education, junior secondary education or senior secondary education.

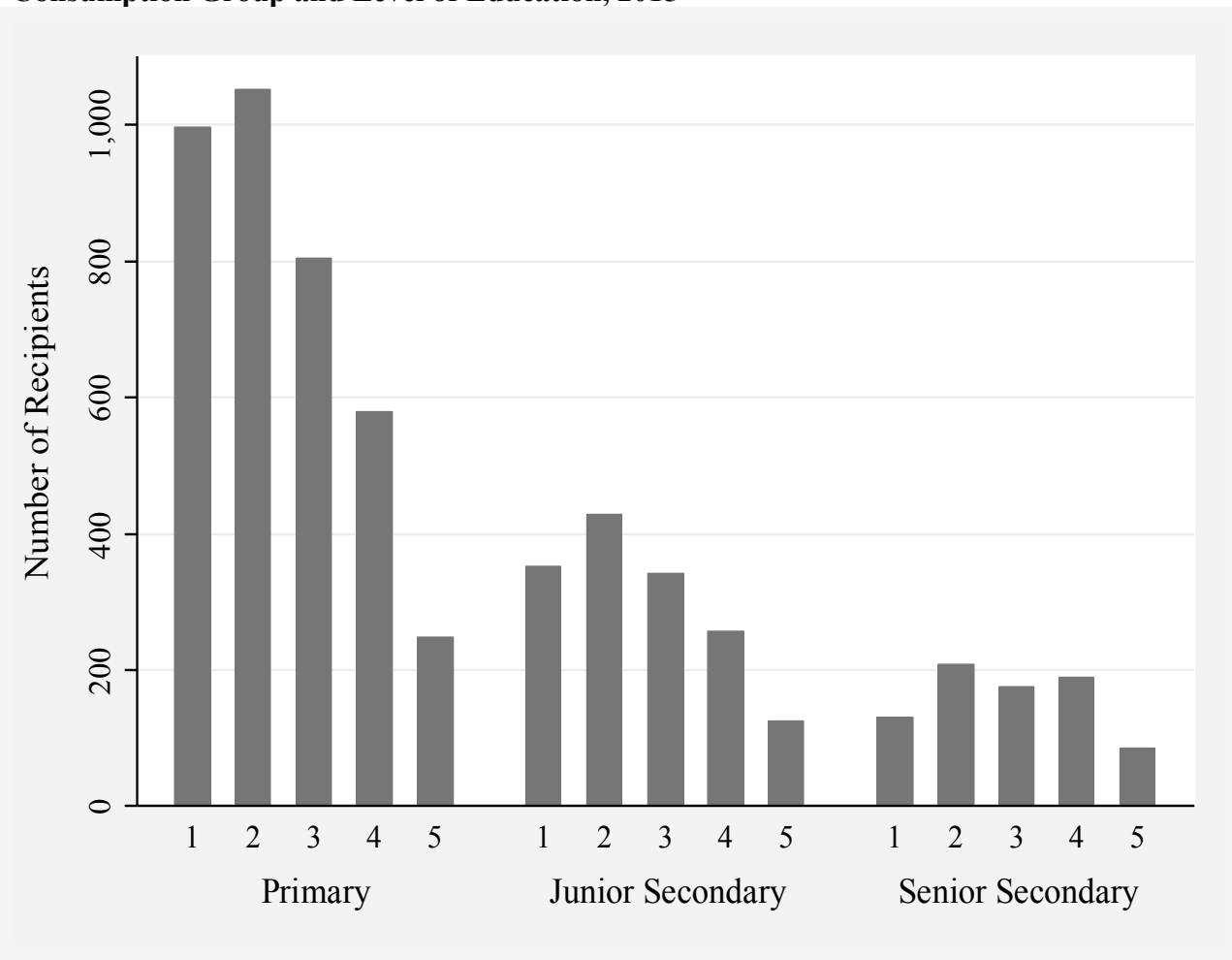
Figure 4.9: Characteristics of *Program Indonesia Pintar* (PIP) Recipients by Location, Gender and Level of Education, 2015



Source: Created by the author using Susenas 2015.

Figure 4.10 presents the coverage of the *Program Indonesia Pintar* (Smart Indonesian Program) by household consumption quintile and level of education. The data shows that at primary and junior secondary levels of education, children from poorer households (Q1 and Q2) were more likely to receive financial assistance compared to those from socioeconomically better-off households (Q4 and Q5). Meanwhile, in senior secondary education, a less clear association was observed. The design of the program itself is targeted for poor households so that those from better economic households should be excluded. In fact, the inclusion and exclusion error in the distribution of financial assistance persists.

Figure 4.10: Characteristics of *Program Indonesia Pintar* (PIP) Recipients by Household's Consumption Group and Level of Education, 2015



Source: Created by the author using Susenas 2015.

4.6 Description of Variables

As mentioned beforehand, the analysis of this study is limited to children aged 13-18 since this group encompasses junior secondary (aged 13-15) and senior secondary (aged 16-18) schooling-age in Indonesia. Table 4.4 provides a description of the dependent and independent variables used in the analysis of this study. Each of the variables is captured through self-reporting of the respondents in the Susenas survey.

Dependent Variables

The main dependent variable selected to correspond with the research questions is the schooling enrollment of children aged 13-15 and aged 16-18. It is constructed from a question in the original survey on the schooling participation at the time of the survey asking whether respondents “never/have not attended school”, “currently attending school” or “not attending school anymore”. In this study, the indicator is treated as a binary outcome variable where a value of “1” is assigned when a child is enrolled in school and the value of “0” is assigned when a child is not enrolled in school at the time of the survey. The schooling non-attendance is used as the reference group in the analysis of this study.

Another dependent variable in this study is the school continuation which is treated as a binary outcome variable. The value of “1” is assigned when a child is enrolled at junior or senior secondary education and continue to attend schooling at the time of the survey.

The final outcome variable estimated in this study is the child labor participation of children aged 13-15 and aged 16-18. In the original survey, respondents are asked whether they are involved in labor work. In this study, the indicator is treated as a binary outcome variable where a value of “1” is assigned when a child participates in labor work and a value of “0” is assigned when a child is not involved in labor work.

Explanatory Variables

The explanatory variables in the first analysis of this study include three main categories: individual characteristics, household characteristics and community characteristics. Three

measures of individual characteristics are used as the independent variables, namely age, girl, and birth order. Household characteristics are composed of eight variables: number of siblings, household head age, household head age squared, head of household education, missing father, missing mother, and log of per capita household consumption. Lastly, a variable, namely of those from rural areas, is used to represent community characteristics. These variables are selected and categorized mainly based on earlier literature. In addition, in the further analysis of this study, government policy intervention through financial assistance is used as a treatment indicator. The description of each explanatory variable is as follows:

Age

Age is included as a control in this study which is obtained from the question regarding the age of household members in the original survey. A dummy variable of the age of children is then constructed for children aged 13 to 18 years old. Aged 13 is used as the reference group for the analysis of aged 13-15 (junior secondary school age) while aged 16 is used as the reference group for the analysis of aged 16-18 (senior secondary school age).

Girl

A variable indicating the sex of a child is used and obtained from a question regarding the sex of household members in the original survey. A dummy variable of the sex of children, namely girl, is then constructed as a girl for a value of “1” and as a boy for a value of “0”. Boy is used as the reference group in the analysis.

Birth order

Birth order is a variable measured by a child’s order of birth among other siblings in the family. The variable is constructed based on two question items as parts of the demographic section in the original survey, specifically regarding the age and the relationship to the household head. Regarding the relationship to the head of the household question, several options are provided as an answer: (1) the head of the household, (2) wife/husband, (3) biological children, (4) adopted children, (5) son/daughter in law, (6) grandchildren, (7) parent/parent in law, (8) housemaid, (9)

others. In this study, both biological and adopted children are treated equivalently in the analysis. Based on the age, the birth order of a child in the household is then constructed.

Number of siblings

The number of siblings is measured by the total number of older and younger siblings in the family. It reflects the size of the family. The variable is constructed after all children in the family are identified and then summed, which are obtained from the demographic section in the original questionnaires.

Household head age

Household head age is the age of the household head at the time of the survey. The data is obtained from a question in the original survey asking the age of each household member in the family.

Household head age squared

Household head age squared is included as a control. The motive to include this variable is that the possibility of increasing enrollment as the age of the household head increases but it is not linear, so that the coefficient of age is positive and the coefficient of age squared negative.

Head of household education

Head of household education is a variable measured by the highest level of education that the head of the household completed. The variable is constructed based on a question in the Susenas survey regarding the highest education certificate that each of the household members obtained. The original survey provided several alternatives of response: (1) none, (2) package A, (3) primary school (general/Islamic/special), (4) package B, (5) junior secondary school (general/Islamic/special), (6) package C, (7) senior secondary school (general/Islamic/special), (8) vocational senior secondary school, (9) diploma I/II, (10) diploma III, (11) diploma IV/bachelor, (12) masters and (13) doctor. For the purpose of this study, the responses are then converted and coded to construct the variable. Those having no certificate (1) are coded “0” for no schooling (treated as the base reference). Those having a primary school and equivalent certificate (2 and 3) are coded “1” for primary schooling. Those having a junior secondary school and equivalent

certificate (4 and 5) are coded “2” for junior secondary schooling. Those having a senior secondary school and equivalent certificate (6, 7 and 8) are coded “3” for senior secondary schooling. Lastly, those having a certificate for all levels of schooling beyond the senior secondary education such as diploma, undergraduate and postgraduate degree (9, 10, 11, 12 and 13) are coded “4” for post-secondary schooling.

Missing father

Missing father is a dichotomous dummy variable coded “1” if a father is not present in the household and coded “0” (treated as the base reference) if they are present. The presence of a father in the family is identified from the demographic section in the original survey. This variable does not distinguish whether the absence of a father is due to death, divorce or other reasons.

Missing mother

Missing mother is a dichotomous dummy variable coded “1” if a mother is not present in the household and coded “0” (treated as the base reference) if they are present. The presence of a mother in the family is also identified from the demographic section in the original survey. Similarly, this variable does not distinguish whether the absence of the mother is due to death, divorce or other reasons.

Log of per capita household consumption

Log of per capita household consumption is a continuous variable calculated from the log of the total household consumption divided by the number of household members. It is used as a proxy for household income. The information on the consumption per capita is already available in the original survey so that it is converted to a log form. The use of consumption in this study is based on the consideration that the household income is often under-reported in household surveys in developing countries. Moreover, the per capita consumption is preferred in order to standardize comparison across different sized families.

Rural

Rural is a dichotomous dummy variable coded “1” if the household lives in a rural area while it is

coded “0” (treated as the base reference) if the household lives in an urban area. The information is available in the original survey.

Financial Assistance (Treatment)

The treatment variable is constructed in two ways:

- a. For the purpose of examining the effect of the *Program Indonesia Pintar* (Smart Indonesia Program) through the provision of the *Kartu Indonesia Pintar* (Smart Indonesia Card) on school enrollment, the treatment variable is obtained from a question in the Susenas survey asking whether the respondent has received the *Kartu Indonesia Pintar* or not. The variable is coded as a dummy variable for each child with a value of “1” for those having the *Kartu Indonesia Pintar* and value of “0” for those not having the *Kartu Indonesia Pintar*.
- b. For the purpose of examining the effect of the *Program Indonesia Pintar* (Smart Indonesia Program) on school continuation and child labor, the treatment variable is obtained from a question in the Susenas survey asking for the source of the financial assistance for education received by children, which may come from (1) *Bantuan Siswa Miskin* (Cash Transfer for Poor Students)/*Program Indonesia Pintar* (Smart Indonesia Program), (2) financial assistance from local government, (3) government scholarship, (4) financial assistance/scholarship from non-governmental organization and (5) others. As this study is focusing on the impact of the *Program Indonesia Pintar*, the variable is coded as a dummy variable for each child with a value of “1” for those receiving financial assistance from the *Program Indonesia Pintar* in the academic year 2014/2015 and a value of “0” for those not receiving the financial assistance from the *Program Indonesia Pintar*.

Table 4.4: Description of Variables

Variable	Description
Dependent variables	
- Enrolled (aged 13-15)	Children aged 13-15 enrolled in school (1=yes, 0=no)
- Enrolled (aged 16-18)	Children aged 16-18 enrolled in school (1=yes, 0=no)
- Continuation (aged 13-15)	Children aged 13-15 enrolled and still attending school (1=yes, 0=no)
- Continuation (aged 16-18)	Children aged 16-18 enrolled and still attending school (1=yes, 0=no)
- Labor (aged 13-15)	Children aged 13-15 participating in child labor activities (1=yes, 0=no)
- Labor (aged 16-18)	Children aged 16-18 participating in child labor activities (1=yes, 0=no)
Individual Characteristics	
- Age	Age of children (dummy: 13/14/15/16/17/18)
- Girl	Sex of children (1=girl, 0=boy)
- Birth order	Birth order in the family
Household Characteristics	
- Number of siblings	Number of siblings in the family
- Household head age	Age of household head
- Household head age squared	Age of household head squared
- Head of household education	Education attainment of the household head (0=no schooling, 1=primary, 2=junior secondary, 3=senior secondary, 4=post-secondary)
- Missing father	Father is missing in the family (1=yes, 0=no)
- Missing mother	Mother is missing in the family (1=yes, 0=no)
- Log of per capita household consumption	Log of per capita monthly consumption of household
Community Characteristics	
- Rural	Location (1=rural, 0=urban)
Government Policy Intervention	
- Financial Assistance (Treatment)	a. Children having the <i>Kartu Indonesia Pintar</i> (1=yes, 0=no) b. Children received financial assistance from the <i>Program Indonesia Pintar</i> (1=yes, 0=no)

Source: Created by the author using Susenas 2015.

4.7 Descriptive Statistics

The descriptive statistics of the variables used in the analysis are provided in this part of the study and might further be complemented in the Annexes. Table 4.5 shows the descriptive statistics of variables used to investigate the demand-side factors influencing the schooling enrollment for the sample of children aged 13-15 and 16-18. The table shows information regarding the number of observations, mean and standard deviation of the dependent and independent variables. As shown in Table 4.5, the total sample used in the analysis includes 13,989 children aged 13-15 and 10,877 children aged 16-18. From the dataset, there is around 96 percent (aged 13-15) and 76 percent (aged 16-18) of the sample enrolled in school which is not so much different to the population as shown in Figure 2.3. The proportion of boys and girls in the sample is almost balanced, where girls are approximately 48 percent (aged 13-15) and 47 percent (aged 16-18). The proportion of samples located in urban and rural residences is almost balanced as well, where those located in rural areas are around 58 percent (aged 13-15) and 55 percent (aged 16-18).

Meanwhile, Table 4.6 and the following tables in this chapter provide descriptive statistics of the variables used in the analysis of the impact of financial assistance through the *Program Indonesia Pintar* (Smart Indonesia Program) on schooling enrollment (Table 4.6 and Table 4.7), schooling continuation (Table 4.8 and Table 4.9) and child labor participation (Table 4.10 and 4.11). The tables show the characteristics of treated samples in the left columns and the untreated samples in the right columns. The mean and standard deviation of the dependent and independent variables are provided along with the number of observations. The sample numbers are not the same due to the different methodological approaches of each analysis as previously mentioned in this chapter. Overall, the tables show the similarities of many characteristics between treated and untreated samples used in this study.

Table 4.5: Descriptive Statistics, Children Aged 13-15 and 16-18

Variable	Aged 13-15		Aged 16-18	
	Mean	Standard Deviation	Mean	Standard Deviation
Enrollment	.96	.20	.76	.43
Age	14.02	.82	16.92	.81
Sex (Girl)	.48	.50	.47	.50
Birth order	1.71	.92	1.58	.82
Number of siblings	1.82	1.34	1.82	1.39
Household head age	45.68	7.33	48.16	7.27
Household head age squared	2,140.26	708.72	2,372.36	737.80
Head of household education				
- No schooling	.17	.37	.18	.38
- Primary	.42	.49	.44	.50
- Junior Secondary	.13	.34	.12	.33
- Senior Secondary	.20	.40	.18	.38
- Post-Secondary	.08	.27	.08	.27
Missing father	.07	.26	.09	.29
Missing mother	.03	.16	.03	.17
Log of per capita household consumption	13.43	.62	13.48	.62
Location (Rural)	.58	.49	.55	.50
N	13,989		10,877	

Source: Created by the author using Susenas 2015.

Table 4.6: Descriptive Statistics, Children Aged 13-15 by Treatment Status (KIP)

Variable	Primary School Graduates			
	Recipient		Non-Recipient	
	Mean	Standard Deviation	Mean	Standard Deviation
Enrolled (Junior Secondary School)	1.00	.00	.98	.13
Treatment (KIP)	1.00	.00	.00	.00
Age	13.87	.80	13.93	.79
Sex (Girl)	.39	.49	.48	.50
Birth order	1.86	1.10	1.70	.91
Number of siblings	1.86	1.47	1.78	1.31
Household head age	46.10	8.05	45.51	7.28
Household head age squared	2,189.39	786.00	2,124.32	702.20
Head of household education				
- No schooling	.18	.39	.15	.36
- Primary	.45	.50	.43	.49
- Junior Secondary	.11	.31	.14	.34
- Senior Secondary	.19	.39	.20	.40
- Post-Secondary	.06	.25	.09	.28
Missing father	.05	.23	.07	.25
Missing mother	.05	.21	.02	.15
Log of per capita hh. consumption	13.27	.51	13.45	.62
Location (Rural)	.43	.50	.57	.49
N	110		11,122	

Source: Created by the author using Susenas 2015.

Table 4.7: Descriptive Statistics, Children Aged 16-18 by Treatment Status (KIP)

Variable	Junior Secondary School Graduates			
	Recipient		Non-Recipient	
	Mean	Standard Deviation	Mean	Standard Deviation
Enrolled (Senior Secondary School)	1.00	.00	.92	.26
Treatment (KIP)	1.00	.00	.00	.00
Age	16.77	.76	16.82	.76
Sex (Girl)	.48	.50	.50	.50
Birth order	1.62	.82	1.56	.80
Number of siblings	1.62	1.16	1.77	1.34
Household head age	48.16	6.84	48.03	7.11
Household head age squared	2,365.80	696.79	2,357.47	717.44
Head of household education				
- No schooling	.16	.37	.15	.36
- Primary	.46	.50	.44	.50
- Junior Secondary	.15	.36	.13	.33
- Senior Secondary	.20	.40	.19	.39
- Post-Secondary	.03	.18	.09	.28
Missing father	.07	.25	.09	.28
Missing mother	.03	.18	.03	.17
Log of per capita hh. consumption	13.51	.63	13.52	.62
Location (Rural)	.39	.49	.53	.50
N	61		7,704	

Source: Created by the author using Susenas 2015.

Table 4.8: Descriptive Statistics, Children Aged 13-15 by Treatment Status (Financial Assistance)

Variable	Students Enrolled in Junior Secondary School			
	Recipient		Non-Recipient	
	Mean	Standard Deviation	Mean	Standard Deviation
Continuation (Junior Secondary School)	1.00	.00	.99	.10
Treatment (Financial Assistance)	1.00	.00	.00	.00
Age	13.94	.78	13.91	.78
Sex (Girl)	.49	.50	.48	.50
Birth order	1.77	.99	1.69	.90
Number of siblings	2.07	1.47	1.75	1.29
Household head age	45.30	7.60	45.52	7.23
Household head age squared	2,109.81	737.53	2,124.38	696.59
Head of household education				
- No schooling	.22	.41	.14	.34
- Primary	.47	.50	.42	.49
- Junior Secondary	.16	.36	.13	.34
- Senior Secondary	.15	.35	.21	.41
- Post-Secondary	.01	.11	.10	.29
Missing father	.09	.29	.07	.25
Missing mother	.02	.16	.02	.15
Log of per capita hh. consumption	13.14	.48	13.49	.63
Location (Rural)	.66	.47	.55	.50
N	1,163		9,891	

Source: Created by the author using Susenas 2015.

Table 4.9: Descriptive Statistics, Children Aged 16-18 by Treatment Status (Financial Assistance)

Variable	Students Enrolled in Senior Secondary School			
	Recipient		Non-Recipient	
	Mean	Standard Deviation	Mean	Standard Deviation
Continuation (Senior Secondary School)	1.00	.00	.98	.15
Treatment (Financial Assistance)	1.00	.00	.00	.00
Age	16.72	.73	16.79	.75
Sex (Girl)	.55	.50	.50	.50
Birth order	1.53	.77	1.56	.80
Number of siblings	2.01	1.43	1.75	1.32
Household head age	47.77	7.12	48.00	7.02
Household head age squared	2,332.84	722.48	2,353.43	706.16
Head of household education				
- No schooling	.23	.42	.14	.35
- Primary	.46	.50	.43	.49
- Junior Secondary	.15	.36	.13	.33
- Senior Secondary	.15	.36	.21	.40
- Post-Secondary	.00	.09	.10	.30
Missing father	.11	.32	.08	.28
Missing mother	.02	.16	.03	.16
Log of per capita hh. consumption	13.27	.47	13.57	.62
Location (Rural)	.59	.49	.51	.50
N	524		6,656	

Source: Created by the author using Susenas 2015.

Table 4.10: Descriptive Statistics, Children Aged 13-15 by Treatment Status (Effect on Child Labor Participation)

Variable	Recipient		Non-Recipient	
	Mean	Standard Deviation	Mean	Standard Deviation
Child labor	.09	.29	.08	.26
Treatment (Financial Assistance)	1.00	.00	.00	.00
Age	13.97	.81	14.03	.82
Sex (Girl)	.49	.50	.47	.50
Birth order	1.79	.99	1.70	.91
Number of siblings	2.08	1.49	1.79	1.32
Household head age	45.50	7.68	45.70	7.29
Household head age squared	2,129.31	748.86	2,141.47	704.18
Head of household education				
- No schooling	.23	.42	.16	.37
- Primary	.47	.50	.42	.49
- Junior Secondary	.15	.36	.13	.33
- Senior Secondary	.14	.35	.20	.40
- Post-Secondary	.01	.11	.09	.29
Missing father	.09	.29	.07	.25
Missing mother	.03	.16	.03	.16
Log of per capita hh. consumption	13.15	.48	13.47	.63
Location (Rural)	.66	.47	.57	.50
N	1,388		12,601	

Source: Created by the author using Susenas 2015.

Table 4.11: Descriptive Statistics, Children Aged 16-18 by Treatment Status (Effect on Child Labor Participation)

Variable	Recipient		Non-Recipient	
	Mean	Standard Deviation	Mean	Standard Deviation
Child labor	.13	.33	.23	.42
Treatment (Financial Assistance)	1.00	.00	.00	.00
Age	16.65	.72	16.93	.81
Sex (Girl)	.53	.50	.47	.50
Birth order	1.58	.82	1.58	.82
Number of siblings	2.11	1.50	1.80	1.38
Household head age	47.84	7.24	48.18	7.27
Household head age squared	2,341.26	734.35	2374.20	738.00
Head of household education				
- No schooling	.25	.44	.17	.38
- Primary	.45	.50	.44	.50
- Junior Secondary	.14	.35	.12	.33
- Senior Secondary	.14	.35	.18	.38
- Post-Secondary	.01	.10	.08	.27
Missing father	.11	.31	.09	.29
Missing mother	.02	.16	.03	.18
Log of per capita hh. consumption	13.24	.47	13.49	.62
Location (Rural)	.62	.49	.54	.50
N	608		10,269	

Source: Created by the author using Susenas 2015.

CHAPTER V

RESULTS

This chapter presents the outcomes of the quantitative analysis to complete the research objectives and address the research questions of the study. The results are divided into four sections in this chapter. The first section provides the results regarding the factors associated with school enrollment. Meanwhile, the following sections provide the results regarding the effect of the *Program Indonesia Pintar* (Smart Indonesia Program) on school enrollment, school continuation and child labor participation, respectively.

5.1 Factors Associated with School Enrollment

This section provides the quantitative analyses of the demand-side factors associated with school enrollment of children aged 13-15 and aged 16-18 in Indonesia. In this study, the demand-side factors are classified into individual characteristics, household characteristics and community characteristics.

Firstly, the logistic regression is performed for the full sample of children aged 13-15 and the full sample of children aged 16-18 separately, as provided in Table 5.1. Furthermore, this study split the sample based on selected characteristics to make a comparison within each subgroup. Accordingly, the estimation is then performed separately based on categories of boys and girls (Table 5.2), urban and rural locations (Table 5.3) and also for different household consumption quintile groups (Table 5.4 and Table 5.5). Additionally, the summary of the results for children aged 13-15 (Table 5.6) and children aged 16-18 (Table 5.7) are also presented at the end of this section.

The logistic regression results are presented in the tables as the set of coefficient estimates and odds ratios, with standard errors in parentheses as well as the significance level signs for each of the independent variables and respective constant. According to scholars, including Liao (1994), the advantages of using the odds ratio is the clarity of result interpretation, making it more

desirable. An odds ratio less than one means a decreased chance of an event takes place than not, while an odds ratio larger than one means an increased chance of an event happening than not. The result tables also reported the sample size along with the logistic regression chi-square value and its significance as well as the pseudo-R-squared associated with the models. The description regarding the independent and dependent variables in the analysis has been presented in Chapter IV.

Table 5.1 shows the results of logistic regression using the full sample of children aged 13-15 and children aged 16-18. In general, the results show that there is an association between gender, child's age, presence of a mother in the household, education of the head of household, per capita household consumption and location (rural or urban) with the schooling of children aged 13-15. On the other hand, there is an association between gender, child's age, head of household's age, presence of a father in the household, education of the head of household and per capita household consumption with the schooling of children aged 16-18.

5.1.1 Logistic Regression Results for Children Aged 13-15

According to Table 5.1, the main findings are as follows. First, there is a significant and positive association between gender and schooling. Girls are almost 1.49 times more likely to attend schooling than boys. Second, as expected, children aged 14 and 15 years old are less likely to attend schooling than children aged 13 years old. Third, children from households without a mother are less likely to attend schooling than those from households with a mother. Fourth, children from families with a better-educated head of household are more likely to attend schooling than those from less-educated families. The result shows that the likelihood of children aged 13-15 to attend schooling is almost 1.53 times higher when the head of the household has completed primary education than those whose head of household has no schooling. The likelihood is even higher when the head of the household has completed junior secondary education (2.62 times), senior secondary education (5.50 times), and post-secondary education (26.30 times). Fifth, children from better economic backgrounds are more likely to attend

schooling than those from lower economic backgrounds. Sixth, those living in rural areas are less likely to be enrolled in school than those in urban areas with an odds ratio of around 0.66. Finally, the results show that there is no significant influence of birth order, number of siblings, age of the household head and the absence of a father in the household.

5.1.2 Logistic Regression Results for Children Aged 16-18

Based on Table 5.1, the main findings can be described as follows. First, there is a significant and positive association between gender and schooling. Girls are approximately 1.82 times more likely to attend schooling than boys. Second, children aged 17 and 18 years old are less likely to attend schooling than children aged 16 years old. Third, the age and the square of the age of the head of households are associated with children's schooling. The linear and quadratic terms are both significant and have opposite signs, which indicates that there is an increase at a decreasing rate as age increases. Fourth, children from households without a father are less likely to attend schooling than those from households with a father. Fifth, children from families with a better-educated head of households are more likely to attend schooling than those from less-educated families. It is shown that the likelihood of children to attend schooling is almost 1.26 times higher when the head of the household has completed primary education than those whose head of household has no schooling. The likelihood is even higher when the head of the household has completed junior secondary education (1.48 times), senior secondary education (2.09 times), and post-secondary education (4.22 times). Sixth, children from better economic backgrounds are more likely to attend schooling than those from lower economic backgrounds. Lastly, the results suggest that there is no significant influence of birth order, number of siblings, the absence of a mother in the household nor the location of the family (rural or urban).

Table 5.1: Logit Estimates of Children Aged 13-15 and 16-18 Being Enrolled in School, Full Sample

Variables	Aged 13-15		Aged 16-18	
	Coefficient	Odds Ratio	Coefficient	Odds Ratio
Girl	0.397*** (0.090)	1.488***	0.599*** (0.049)	1.821***
Age 14/Age 17	-1.853*** (0.218)	0.157***	-0.624*** (0.064)	0.536***
Age 15/Age 18	-2.848*** (0.209)	0.058***	-1.653*** (0.062)	0.192***
Birth Order	0.027 (0.064)	1.028	0.034 (0.038)	1.035
Number of Siblings	-0.023 (0.041)	0.978	0.010 (0.022)	1.010
Household Head Age	0.034 (0.049)	1.034	0.067* (0.030)	1.069*
Household Head Age Squared	-0.000 (0.034)	1.000	-0.001* (0.000)	0.999*
Missing Father	0.110 (0.170)	1.116	-0.262** (0.080)	0.770**
Missing Mother	-0.566** (0.218)	0.568**	-0.239 (0.133)	0.787
Head of Household Education:				
- Primary	0.425*** (0.100)	1.529***	0.230*** (0.063)	1.259***
- Junior Secondary	0.964*** (0.166)	2.623***	0.395*** (0.088)	1.484***
- Senior Secondary	1.706*** (0.206)	5.506***	0.735*** (0.088)	2.085***
- Post-secondary	3.270*** (0.717)	26.300***	1.440*** (0.160)	4.219***
Log of per Capita HH Consumption	0.577*** (0.095)	1.781***	0.616*** (0.051)	1.852***
Rural	-0.422*** (0.102)	0.656***	0.055 (0.051)	1.056
Constant	-3.627* (1.703)		-8.621*** (0.995)	
Observations	13,989		10,877	
LR chi ²	790.896		1,545.788	
Prob > chi ²	0.000		0.000	
Pseudo R ²	0.163		0.129	

Source: Created by the author using Susenas 2015.

Note: Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5.1.3 Heterogeneity of Association in Subpopulation

The heterogeneity of the association between demand-side factors and school enrollment is also explored in this study. The results of analysis by gender, location and household consumption groups are as follows.

Logistic Regression Results by Gender

Table 5.2 shows the logistic regression results for boys and girls separately of both children aged 13-15 and children aged 16-18. For children aged 13-15, most of the results are consistent with the estimation made using the full sample. Moreover, similar findings between boys and girls are predominantly apparent. The main contrasting finding between the sample of boys and girls is that the significant and negative relationship between the absence of a mother in the household and schooling is found for girls but not for boys. The result shows that girls from households without a mother are 0.46 times less likely to attend schooling than those from households with a mother. Therefore, the presence of a mother in the household is important for girls' schooling.

For children aged 16-18, many of the results are also consistent with the estimation made using the full sample. Several variables predict school enrollment similarly between boys and girls. However, several differences in findings between boys and girls are apparent. First, girls aged 17 years old are less likely to attend schooling than those aged 16 years old but no similar significant association is found for boys. Second, the significant association between the age, as well as the squared age, of household heads and children's schooling is only visible for boys but not for girls. Third, boys are almost 0.78 times less likely to attend schooling when the father is absent in the family than those from households with a father. However, such a result for girls is not found. Thus, the presence of a father in the household is very important for the schooling of boys. Fourth, boys in rural areas are almost 1.38 times more likely to attend schooling than those in urban areas. In contrast, girls in rural areas are almost 0.72 times less likely to attend schooling than girls in urban areas. Such contradictory results will be discussed in the next part.

Table 5.2: Logit Estimates of Children Aged 13-15 and 16-18 Being Enrolled in School, Boys and Girls

Variables	Aged 13-15				Aged 16-18			
	Boys		Girls		Boys		Girls	
	Coeff.	Odds Ratio	Coeff.	Odds Ratio	Coeff.	Odds Ratio	Coeff.	Odds Ratio
Age 14/Age 17	-1.906*** (0.290)	0.149***	-1.783*** (0.332)	0.168***	-0.118 (0.083)	0.889	-1.353*** (0.104)	0.258***
Age 15/Age 18	-2.954*** (0.278)	0.052***	-2.690*** (0.316)	0.068***	-1.753*** (0.079)	0.173***	-1.585*** (0.106)	0.205***
Birth Order	0.090 (0.085)	1.094	-0.049 (0.099)	0.952	0.038 (0.050)	1.038	0.051 (0.062)	1.052
Number of Siblings	-0.019 (0.053)	0.981	-0.036 (0.066)	0.965	-0.031 (0.030)	0.969	0.060 (0.035)	1.062
Household Head Age	0.100 (0.064)	1.105	-0.057 (0.084)	0.945	0.084* (0.042)	1.088*	0.070 (0.044)	1.073
Household Head Age Squared	-0.001 (0.001)	0.999	0.001 (0.001)	1.001	-0.001* (0.000)	0.999*	-0.001 (0.000)	0.999
Missing Father	0.148 (0.218)	1.159	0.073 (0.273)	1.075	-0.305** (0.107)	0.737**	-0.183 (0.127)	0.832
Missing Mother	-0.423 (0.301)	0.655	-0.773* (0.319)	0.462*	-0.255 (0.175)	0.775	-0.250 (0.211)	0.779
Head of Household Education:								
- Primary	0.308* (0.132)	1.361*	0.575*** (0.156)	1.777***	0.241** (0.085)	1.273**	0.227* (0.097)	1.255*
- Junior Secondary	0.664*** (0.202)	1.943***	1.525*** (0.309)	4.595***	0.320** (0.116)	1.377**	0.510*** (0.139)	1.665***
- Senior Secondary	1.418*** (0.243)	4.129***	2.271*** (0.406)	9.691***	0.650*** (0.116)	1.915***	0.858*** (0.140)	2.359***
- Post-secondary	2.708*** (0.725)	15.001***			1.488*** (0.199)	4.430***	1.465*** (0.279)	4.328***
Log of per Capita HH Consumption	0.548*** (0.120)	1.730***	0.600*** (0.155)	1.823***	0.578*** (0.067)	1.782***	0.721*** (0.081)	2.057***
Rural	-0.287* (0.127)	0.750*	-0.670*** (0.176)	0.512***	0.321*** (0.068)	1.379***	-0.332*** (0.081)	0.718***
Constant	-4.850* (2.147)		-1.232 (2.894)		-8.594*** (1.362)		-9.409*** (1.524)	
Observations	7,329		6,097		5,776		5,101	
LR chi ²	440.469		311.659		1021.867		607.391	
Prob > chi ²	0.000		0.000		0.000		0.000	
Pseudo R ²	0.153		0.163		0.147		0.123	

Source: Created by the author using Susenas 2015.

Note: Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Logistic Regression Results by Location (Rural/Urban)

Furthermore, the analysis is also performed separately by location (rural/urban). Table 5.3 presents the logistic regression results for children from rural and urban areas separately of both children aged 13-15 and children aged 16-18.

For children aged 13-15, most of the results are also consistent with the estimation made using the full sample. Moreover, similar findings between children from urban and rural areas are mostly visible. The main differing finding between the sample of urban and rural children is also related to the presence of a mother in the household. The results show that the significant and negative association between the absence of a mother in the household and schooling is found only in rural areas but not in urban areas. The result shows that, in rural areas, children from households without a mother are 0.59 times less likely to attend schooling than those from households with a mother. Thus, the presence of a mother in the household in rural areas is important for their children's schooling.

For children aged 16-18, many of the results are also consistent with the estimation made using the full sample. Several variables used in the analysis predict school enrollment similarly both in urban and rural areas. However, differences in results between urban and rural areas can be highlighted as follows. First, the significant association between the age, as well as the squared age, of the household head and children's schooling is found in urban areas but not in rural areas. Second, the association between the presence of a father in the household and their children's schooling is also apparent in urban but not in rural areas. The result shows that children in urban areas who have absentee fathers are almost 0.68 times less likely to attend schooling than those with a father in the household. Therefore, the presence of a father in the household in urban areas is important for children's schooling.

Table 5.3: Logit Estimates of Children Aged 13-15 and 16-18 Being Enrolled in School, Urban and Rural

Variables	Aged 13-15				Aged 16-18			
	Urban		Rural		Urban		Rural	
	Coeff.	Odds Ratio	Coeff.	Odds Ratio	Coeff.	Odds Ratio	Coeff.	Odds Ratio
Girl	0.724*** (0.187)	2.063***	0.287** (0.103)	1.333**	1.022*** (0.080)	2.779***	0.317*** (0.064)	1.373***
Age 14/Age 17	-1.765*** (0.486)	0.171***	-1.878*** (0.244)	0.153***	-0.986*** (0.105)	0.373***	-0.396*** (0.082)	0.673***
Age 15/Age 18	-3.039*** (0.461)	0.048***	-2.785*** (0.234)	0.062***	-1.811*** (0.105)	0.164***	-1.586*** (0.078)	0.205***
Birth Order	0.129 (0.132)	1.138	0.001 (0.074)	1.001	0.072 (0.062)	1.074	0.022 (0.050)	1.022
Number of Siblings	-0.087 (0.089)	0.917	-0.015 (0.047)	0.985	-0.032 (0.037)	0.969	0.023 (0.028)	1.023
Household Head Age	0.014 (0.118)	1.015	0.035 (0.054)	1.036	0.115* (0.052)	1.122*	0.041 (0.037)	1.042
Household Head Age Squared	-0.000 (0.001)	1.000	-0.000 (0.001)	1.000	-0.001* (0.001)	0.999*	-0.000 (0.000)	1.000
Missing Father	-0.041 (0.301)	0.960	0.182 (0.206)	1.200	-0.390** (0.124)	0.677**	-0.160 (0.107)	0.852
Missing Mother	-0.724 (0.422)	0.485	-0.520* (0.254)	0.594*	-0.205 (0.208)	0.815	-0.303 (0.175)	0.739
Head of Household Education:								
- Primary	0.759*** (0.214)	2.135***	0.334** (0.114)	1.396**	0.303** (0.114)	1.354**	0.206** (0.076)	1.229**
- Junior Secondary	0.967*** (0.292)	2.630***	1.022*** (0.205)	2.778***	0.400** (0.143)	1.492**	0.421*** (0.113)	1.523***
- Senior Secondary	1.717*** (0.321)	5.566***	1.784*** (0.279)	5.955***	0.720*** (0.132)	2.055***	0.775*** (0.129)	2.170***
- Post-secondary			2.424*** (0.720)	11.296***	1.401*** (0.206)	4.059***	1.474*** (0.284)	4.366***
Log of per Capita HH Consumption	0.813*** (0.186)	2.255***	0.475*** (0.111)	1.608***	0.766*** (0.077)	2.152***	0.500*** (0.068)	1.649***
Constant	-6.424 (3.642)		-2.700 (1.934)		-11.803*** (1.627)		-6.393*** (1.276)	
Observations	5,070		8,097		4,925		5,952	
LR chi ²	225.887		462.407		876.769		722.313	
Prob > chi ²	0.000		0.000		0.000		0.000	
Pseudo R ²	0.171		0.135		0.170		0.105	

Source: Created by the author using Susenas 2015.

Note: Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Logistic Regression Results by Household's Economic Background

Finally, the analysis is also performed separately by the household's economic background. The results are presented in Table 5.4 (for children aged 13-15) and Table 5.5 (for children aged 16-18).

For children aged 13-15, most of the results are also consistent with the estimation made using the full sample. Among the different household's economic backgrounds, the dissimilarities of results are highlighted as follows. First, girls are around 2.15 times more likely to attend schooling than boys in the middle economic background. However, no evidence of such a finding is present for poor and rich household groups. Second, children aged 14 years old are less likely to attend schooling than those aged 13 years old from poor and middle economic backgrounds but no evidence is found from rich families. Third, unexpectedly, an increased number of siblings in a family lower the likelihood of children from middle economic and rich households attending schooling but no significant relationship is found for children in poor families.

For children aged 16-18, many of the results are also consistent with the estimation made using the full sample. The main dissimilarities of results among the different household's economic backgrounds are as follows. First, similar to findings in the sample of children aged 13-15, unexpectedly, an increased number of siblings in a family also lowers the likelihood of children from middle economic and rich households attending schooling but no significant relationship is found for children in poor families. Second, the association between the presence of a father in the household and their children's schooling is only apparent in middle economic backgrounds but there is no evidence of this in poor and rich households. Third, children from poor households in rural settings are 1.33 times more likely to attend schooling than children from poor households in urban areas.

Table 5.4: Logit Estimates of Children Aged 13-15 Being Enrolled in School, Consumption Quintile

Variables	Aged 13-15					
	Poor (Q1)		Middle (Q3)		Rich (Q5)	
	Coeff.	Odds Ratio	Coeff.	Odds Ratio	Coeff.	Odds Ratio
Girl	0.149 (0.187)	1.160	0.764*** (0.195)	2.147***	0.501 (0.292)	1.651
Age 14	-2.654*** (0.605)	0.070***	-2.720*** (0.601)	0.066***	-0.208 (0.548)	0.812
Age 15	-3.533*** (0.591)	0.029***	-3.554*** (0.591)	0.029***	-1.842*** (0.453)	0.159***
Birth Order	-0.129 (0.170)	0.879	0.054 (0.128)	1.055	0.092 (0.197)	1.096
Number of Siblings	0.059 (0.100)	1.061	-0.156* (0.077)	0.855*	-0.290* (0.122)	0.748*
Household Head Age	-0.024 (0.094)	0.976	0.042 (0.088)	1.043	-0.026 (0.248)	0.974
Household Head Age Squared	0.000 (0.001)	1.000	-0.000 (0.001)	1.000	0.001 (0.003)	1.001
Missing Father	-0.135 (0.251)	0.874	0.607 (0.531)	1.834	0.463 (1.038)	1.589
Missing Mother	-0.387 (0.414)	0.679	-0.021 (0.542)	0.980	0.035 (1.099)	1.035
Head of Household Education:						
- Primary	0.355 (0.199)	1.427	0.357 (0.203)	1.429	0.414 (0.394)	1.514
- Junior Secondary	1.633** (0.534)	5.119**	1.187*** (0.350)	3.278***	0.400 (0.471)	1.492
- Senior Secondary	1.487* (0.615)	4.425*	2.145*** (0.483)	8.545***	1.620** (0.518)	5.056**
- Post-secondary					3.194** (1.068)	24.393**
Rural	-0.632* (0.249)	0.531*	-0.616** (0.218)	0.540**	-1.132*** (0.326)	0.322***
Constant	6.602** (2.433)		4.714* (2.245)		4.497 (5.757)	
Observations	1,929		3,067		2,926	
LR chi ²	151.162		189.335		113.124	
Prob > chi ²	0.000		0.000		0.000	
Pseudo R ²	0.155		0.167		0.207	

Source: Created by the author using Susenas 2015.

Note: Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5.5: Logit Estimates of Children Aged 16-18 Being Enrolled in School, Consumption Quintile

Variable	Aged 16-18					
	Poor (Q1)		Middle (Q3)		Rich (Q5)	
	Coeff.	Odds Ratio	Coeff.	Odds Ratio	Coeff.	Odds Ratio
Girl	0.321** (0.122)	1.379**	0.684*** (0.104)	1.982***	0.714*** (0.129)	2.043***
Age 17	-0.684*** (0.154)	0.505***	-0.390** (0.131)	0.677**	-1.050*** (0.189)	0.350***
Age 18	-1.469*** (0.152)	0.230***	-1.414*** (0.126)	0.243***	-2.123*** (0.181)	0.120***
Birth Order	0.227 (0.127)	1.255	0.002 (0.081)	1.002	0.005 (0.090)	1.005
Number of Siblings	-0.042 (0.062)	0.959	-0.128** (0.043)	0.879**	-0.141** (0.053)	0.869**
Household Head Age	0.078 (0.060)	1.081	0.034 (0.068)	1.035	0.144 (0.093)	1.154
Household Head Age Squared	-0.001 (0.001)	0.999	-0.000 (0.001)	1.000	-0.001 (0.001)	0.999
Missing Father	0.189 (0.155)	1.208	-0.517** (0.188)	0.596**	-0.202 (0.250)	0.817
Missing Mother	0.055 (0.279)	1.056	-0.112 (0.261)	0.894	0.225 (0.401)	1.252
Head of Household Education:						
- Primary	0.323* (0.137)	1.382*	-0.004 (0.136)	0.996	0.663** (0.203)	1.941**
- Junior Secondary	0.677** (0.240)	1.967**	0.216 (0.177)	1.242	0.631* (0.246)	1.879*
- Senior Secondary	0.796** (0.277)	2.216**	0.523** (0.185)	1.688**	1.156*** (0.223)	3.176***
- Post-secondary	0.884 (0.697)	2.421	1.153* (0.457)	3.166*	2.032*** (0.273)	7.631***
Rural	0.285* (0.133)	1.330*	0.075 (0.105)	1.078	-0.138 (0.131)	0.871
Constant	-1.547 (1.560)		0.738 (1.697)		-1.852 (2.341)	
Observations	1,312		2,367		2,465	
LR chi ²	137.714		236.716		360.137	
Prob > chi ²	0.000		0.000		0.000	
Pseudo R ²	0.080		0.090		0.173	

Source: Created by the author using Susenas 2015.

Note: Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5.1.4 Summary of Findings

Based on the results of the logistic regression analysis presented in Table 5.1 until Table 5.5, the summary of the relationship between the outcome and independent variables are presented in Table 5.6 (children aged 13-15) and Table 5.7 (children aged 16-18). The summary of findings shows the positive (+), negative (-) and non-significant (none) relationships between each variable and the outcome variable.

Table 5.6: Summary of the Relationship, Children Aged 13-15

Independent Variables	Children Aged 13-15							
	Full	Boys	Girls	Urban	Rural	Poor	Middle	Rich
Girl	+			+	+	none	+	none
Age 14	-	-	-	-	-	-	-	none
Age 15	-	-	-	-	-	-	-	-
Birth Order	none	none	none	none	none	none	none	none
Number of Siblings	none	none	none	none	none	none	-	-
Household Head Age	none	none	none	none	none	none	none	none
Household Head Age Squared	none	none	none	none	none	none	none	none
Missing Father	none	none	none	none	none	none	none	none
Missing Mother	-	none	-	none	-	none	none	none
HH Education (primary)	+	+	+	+	+	none	none	none
HH Education (junior sec.)	+	+	+	+	+	+	+	none
HH Education (senior sec.)	+	+	+	+	+	+	+	+
HH Education (post sec.)	+	+	none.	none.	+	none.	none.	+
Per Capita HH Consumption	+	+	+	+	+			
Rural	-	-	-			-	-	-

Source: Created by the author using Susenas 2015.

Table 5.7: Summary of the Relationship, Children Aged 16-18

Independent Variables	Children Aged 16-18							
	Full	Boys	Girls	Urban	Rural	Poor	Middle	Rich
Girl	+			+	+	+	+	+
Age 17	-	none	-	-	-	-	-	-
Age 18	-	-	-	-	-	-	-	-
Birth Order	none	none	none	none	none	none	none	none
Number of Siblings	none	none	none	none	none	none	-	-
Household Head Age	+	+	none	+	none	none	none	none
Household Head Age Squared	-	-	none	-	none	none	none	none
Missing Father	-	-	none	-	none	none	-	none
Missing Mother	none	none	none	none	none	none	none	none
HH Education (primary)	+	+	+	+	+	+	none	+
HH Education (junior sec.)	+	+	+	+	+	+	none	+
HH Education (senior sec.)	+	+	+	+	+	+	+	+
HH Education (post sec.)	+	+	+	+	+	none	+	+
Per Capita HH Consumption	+	+	+	+	+			
Rural	none	+	-			+	none	none

Source: Created by the author using Susenas 2015.

Gender – An interesting finding of this study is that, overall, girls in Indonesia are more likely to attend schooling than boys. For children aged 13-15, the findings are found for almost all estimations except for a subsample of poor and rich households. For children aged 16-18, the findings are consistent for all of the estimations.

Age of children – Controlling for the age of children is a necessity and suggested by previous literature. The results of this study show that children at an older age are less likely to attend schooling than the base group which might indicate that there may be an increase in the probability

of dropping out of school as children continue their educational progression regardless of their socioeconomic background. Such a finding is found for almost all estimations except for a subsample of rich households for children aged 13-15 and subsample of boys for children aged 16-18.

Birth order – After controlling for all other explanatory variables, this study found no significant association between birth order and the schooling of children for both samples of children aged 13-15 and children aged 16-18. The finding is consistent for all of the estimations in this study, whether the estimation is performed by using the full sample or performed separately based on categories of boys and girls, urban and rural settings or for different household consumption quintile groups.

Number of siblings – The findings mostly show no evidence of a significant association between the number of siblings in the family and the schooling of children for both those aged 13-15 and those aged 16-18 after controlling for all other explanatory variables. However, interestingly, a significant and negative association is found when the sample is restricted to middle economic and high economic backgrounds for both age groups. Thus, the results suggest that, for middle economic and high economic background, children aged 13-15 and 16-18 in bigger families are less likely to attend schooling than those in smaller families.

Household head age – The association between the age, as well as the squared age, of the household head and children's schooling are not found for children aged 13-15. In contrast, a quadratic relationship is found for children aged 16-18 when the estimation is performed for the full sample and when restricted for boys and for those living in urban areas. The results suggest that children aged 16-18 are more likely to attend schooling when the age of the head of household increases, but it increases at a decreasing rate, especially for boys and those in urban.

Missing father – This study finds no evidence of an association between the absence of a father in the household with children's schooling for children aged 13-15. This finding is consistent for all of the estimations whether using the full sample or performed separately based on categories of boys and girls, urban and rural settings or for different household consumption

quintile groups. However, for children aged 16-18, this study finds that children from households without a father are less likely to attend schooling than those from households with a father. Such a negative association is found for the full sample as well as when the sample is restricted to boys, those from urban areas and middle economic background samples.

Missing mother – This study finds that children aged 13-15 coming from households without a mother are less likely to attend schooling than those from households with a mother in the family. Such a negative association is found for the full sample as well as when the sample is restricted to girls and rural area samples. However, this study finds no evidence of an association between the absence of a mother in the household with the schooling of children aged 16-18 for all of the results, whether the estimations are performed using the full sample or separately based on categories of boys and girls, urban and rural settings or for different household consumption quintile groups.

Head of household education – In general, this study finds a strong association between the level of education of the head of household and children's schooling for both children aged 13-15 and children aged 16-18 groups. In most cases, the higher the educational level obtained by the head of the household, the higher the likelihood of children aged 13-15 and children aged 16-18 to attend schooling. Comparing the groups of children aged 13-15 and aged 16-18, the odds ratios is larger in the former group (Table 5.1).

Log of per capita household consumption – The log of per capita household consumption is used as a variable in this study as the proxy for household income. The variable represents the existing household resources so that it is expected to be positively associated with household demand for schooling. The results show that the log of per capita household consumption is a consistently strong predictor of schooling for both samples of children aged 13-15 and 16-18 in all models employed. The results suggest that children from financially better households are more likely to attend schooling than those from financially less able households. Between children aged 13-15 and 16-18, the results show that the odds ratios is higher for the latter age group, where the odds ratio is 1.78 for children aged 13-15 and 1.85 for children aged 16-18 (Table 5.1).

Rural – This study finds consistent results that, for children aged 13-15, those living in rural areas are less likely to attend schooling than those in urban areas. Such an association is found for the full sample as well as when the sample is restricted to boys, urban and middle economic background samples. Meanwhile, interesting findings are observed in the case of children aged 16-18. In the full sample, no association is found. Meanwhile, when the sample is restricted to boys, the results suggest that boys living in rural areas are more likely to attend schooling than those in urban areas. When the sample is restricted to girls, the results suggest that girls living in rural are less likely to attend schooling than those in urban. When the sample is restricted to poor households, the result suggests that children from poor households living in rural areas are more likely to attend schooling than those in urban areas. Lastly, no association is found when the sample is restricted to middle and high economic backgrounds.

5.2 Effect of Financial Assistance on School Enrollment

This section provides the quantitative analyses of the effect of financial assistance through the *Program Indonesia Pintar* (Smart Indonesia Program) on school enrollment of children aged 13-15 and aged 16-18 in Indonesia by employing several methodological approaches mentioned in Chapter IV, namely the OLS, the Heckman's two-stage model, the propensity score matching and the inverse probability weighted regression adjustment (IPWRA). In addition, an estimation using the IPWRA that incorporates the inverse Mill's ratio is also explored in this study. Those approaches are used to deal with the sample selection and endogenous treatment assignment issues which are common in an observational study. According to Guo and Fraser (2015), scholars need to consider using alternative approaches to deal with biases in the observational study.

The results of the first stage of Heckman's two-stage model to identify selection into entering as the study sample are provided in the Annexes. The rationale is that to be enrolled in junior or senior secondary school, one must graduate from primary or junior secondary school. Table A-3 provides the probit estimation predicting the likelihood of graduating from the primary school of children aged 13-15 while Table A-5 presents the probit estimation predicting the

likelihood of graduating from junior secondary school of children aged 16-18. In general, the results suggest that those from better socioeconomic backgrounds are more likely to be able to graduate from primary or junior secondary school. In addition, time spent for studying is also included as a covariate to deal with the exclusion restriction issue and it shows a positive association. Meanwhile, children are less likely to graduate when they either live in rural areas, have a larger number of siblings or a mother is not present in the family. These results are reasonable and expected. Furthermore, the inverse Mill's ratio (λ) yielded from the probit estimation is then included in the second-stage estimation.

The results of the first procedure of the propensity score analysis to address the endogeneity issue are also provided in the Annexes. The coefficient and their magnitudes are not of particular interest. Table A-7 presents the logit estimation predicting the likelihood of receiving treatment (KIP) of children aged 13-15 while Table A-9 provides the logit estimation predicting the likelihood of receiving treatment (KIP) of children aged 16-18. The tables consistently show that those from poor households, as indicated by the per capita household consumption, are more likely to receive the treatment. This result is relevant with the expectation since the original purpose of the *Program Indonesia Pintar* is to provide support for those from poor households. Other variables also predict the likelihood of receiving treatment, as shown in the tables.

The propensity score is calculated for each of the observations based on the observable characteristics that would predict them in receiving treatment. The propensity score is then used in the propensity score matching to match treated and control observations. It is also transformed and used as a weight in the inverse probability weighted regression adjustment (IPWRA) analysis.

The distribution of the propensity score is provided in a visual presentation in Annexes. The distribution of the propensity score of treated and untreated groups of the sample is shown in Figure A-7 (children aged 13-15) and Figure A-8 (children aged 16-18) of the Annexes. Overall, the figures suggested that there is a fairly strong overlap between treated and untreated groups suggesting that the observable variables predicting the receipt of treatment are distributed quite similarly across two groups. The common support condition seems to pose no barrier to further

analysis in this study.

Before performing the propensity score matching, the balancing test is necessary to ensure that the propensity score is balanced which suggests that the treatment and comparison observations have the same mean distribution of propensity score. In the propensity score matching analysis in this study, such a balancing procedure is also undertaken until the balancing property is satisfied for all of the estimations. The results suggest that the balancing property is satisfied for both the sample of children aged 13-15 and those aged 16-18 so that the sample trimming procedure is not necessary and the total sample can be used in the treatment effect calculation. The balance plot of the propensity score and the covariates are provided in Figure A-13 (aged 13-15) and Figure A-14 (aged 16-18) of the Annexes.

The propensity score matching in this study is estimated using three different methods, namely 1:1 nearest neighbor matching, 3:1 nearest neighbor matching and caliper matching (0.03). In the 1:1 nearest neighbor matching, a treated individual is matched with the closest individual from the control group. In the 3:1 neighbor matching, a treated individual is matched with three individuals from the control group according to their propensity score. Meanwhile, in the caliper matching, the individual from the control group within the distance of the specified caliper is selected to be matched with an individual from the treated group. The estimation provides the average treatment effect on the treated (ATT) which indicates the average difference if all those in the treated group received treatment compared with if none of them received treatment. Therefore, in this case, the ATT shows the effect of the treatment on school enrollment.

In the analysis of this study, the result tables provide the estimation by using various methodologies for the full sample as well as the sample based on selected subpopulation, namely location (urban and rural), gender (boys and girls) and household consumption quintiles (poor household, middle-income household and rich household). The coefficient and standard error of the estimates are shown in the tables. It should be noted that the samples are restricted to those who graduated from primary school (for children aged 13-15 in Table 5.8) and those who graduated from junior secondary school (for children aged 16-18 in Table 5.9) except for one of the OLS

estimations which also includes estimation for those not graduated from primary or junior secondary school as well.

5.2.1 Estimation Results for Children Aged 13-15

According to Table 5.8, the main findings are as follows. First, for the full sample, almost all models estimated a significant and positive treatment effect. After controlling for sample selection bias and endogeneity, the treatment effect ranging from 1.58 percentage points (Heckman model) to 2.73 percentage points (PSM). Thus, the *Program Indonesia Pintar* has a positive effect on increasing the likelihood of enrollment of children aged 13-15. Second, Heckman's two-stage model and IPWRA models produce a significant and positive treatment effect when performed to estimate the heterogeneity of effects by location, gender and household wealth group for almost all cases. This is not always the case when the estimation uses the ordinary least square and the propensity score matching analysis. It should be noted that the ordinary least square ignores selection bias. As shown in the table, the significant and negative value of the inverse Mill's ratio in Heckman's model indicates that the OLS results are overestimated and biased so that the Heckman's two-stage model should be preferable. On the other hand, propensity score matching requires a large sample size to produce an accurate matching result. As the number of the treated observation sample is considered small here, the propensity score matching result might be less precise. In this situation, the use of the inverse probability weighting has several advantages compared to matching, including the possibility of using all observations and the efficiency of estimates produced. Third, the table shows that the treatment effects are higher in rural areas than urban areas, for boys than girls and poorer than better economic households. Thus, the effect of the *Program Indonesia Pintar* on the school enrollment of children aged 13-15 is larger for those in rural areas, boys and those from poor households.

Table 5.8: Estimation Results, School Enrollment (Aged 13-15)

	Ordinary Least Squares		Heckman's Model (IMR)	Propensity Score Matching			Inverse Probability Weighted Regression Adjustment (IPWRA)	Combining IPWRA with IMR
	All Children Aged 13-15	Only Primary School Graduates		Nearest Neighbor (1:1)	Nearest Neighbor (3:1)	Caliper		
Full sample	.0699** (.028)	.0169 (.012)	.0158*** (.003)	.0273* (.016)	.0182** (.008)	.0273* (.016)	.0163*** (.002)	.0159*** (.002)
λ			-.165***					
Urban	.0171 (.030)	.0114 (.011)	.0114*** (.003)	.0159 (.015)	.0106 (.008)	.0159 (.016)	.0114*** (.002)	.0110*** (.002)
λ			-.113***					
Rural	.1330*** (.049)	.0231 (.021)	.0225*** (.005)	.0426 (.030)	.0426** (.019)	.0426 (.030)	.0234*** (.003)	.0224*** (.003)
λ			-.203***					
Boys	.1018** (.039)	.0201 (.016)	.0173*** (.004)	.0299 (.021)	.0199* (.011)	.0299 (.021)	.0198*** (.003)	.0186*** (.003)
λ			-.170***					
Girls	.0218 (.041)	.0128 (.017)	.0132*** (.003)	.0233 (.023)	.0078 (.008)	.0233 (.023)	.0122*** (.002)	.0128*** (.002)
λ			-.170***					
Poor (Q1)	.1520* (.079)	.0294 (.036)	.0232*** (.009)	.0455 (.045)	.0265 (.019)	.0455 (.045)	.0292*** (.007)	.0260*** (.007)
λ			-.258***					
Medium (Q3)	.0953* (.057)	.0192 (.024)	.0188*** (.007)	.0345 (.034)	.0115 (.012)	.0345 (.034)	.0166*** (.003)	.0168*** (.003)
λ			-.175***					
Rich (Q5)	.0493 (.067)	.0039 (.020)	.0047 (.003)	.0000 (.002)	.0000 (.002)	.0000 (.000)	.0033** (.001)	.0037** (.002)
λ			-.059***					

Source: Created by the author using Susenas 2015.

Note: Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5.9: Estimation Results, School Enrollment (Aged 16-18)

	Ordinary Least Squares		Heckman's Model (IMR)	Propensity Score Matching			Inverse Probability Weighted Regression Adjustment (IPWRA)	Combining IPWRA with IMR
	All Children Aged 16-18	Only Junior Secondary Graduates		Nearest Neighbor (1:1)	Nearest Neighbor (3:1)	Caliper		
Full sample	.1247** (.049)	.0775** (.033)	.0737*** (.011)	.1148*** (.042)	.0874*** (.022)	.1148*** (.041)	.0767*** (.005)	.0743*** (.006)
λ			-.494***					
Urban	.1159** (.056)	.0702* (.038)	.0845*** (.017)	.1081** (.052)	.0900*** (.026)	.1081** (.051)	.0674*** (.007)	.0721*** (.008)
λ			-.575***					
Rural	.1282 (.083)	.0973* (.057)	.0780*** (.016)	.1250 (.080)	.0833** (.038)	.1250* (.069)	.0959*** (.007)	.0842*** (.009)
λ			-.510***					
Boys	.1446** (.070)	.1094** (.049)	.1124*** (.017)	.0938* (.053)	.1458*** (.038)	.0938* (.052)	.0986*** (.008)	.0969*** (.010)
λ			-.516***					
Girls	.1168* (.067)	.0553 (.044)	.0467*** (.013)	.1034* (.057)	.0690** (.031)	.1034* (.057)	.0575*** (.006)	.0512*** (.008)
λ			-.519***					
Poor (Q1)	.4072** (.161)	.1884 (.121)	.1615*** (.056)	.2222 (.143)	.1944** (.089)	.2222 (.139)	.1715*** (.019)	.1518*** (.020)
λ			-.685***					
Medium (Q3)	.0487 (.133)	.0519 (.096)	.0499* (.026)	.0000 (.011)	.0417 (.041)	.0000 (.000)	.0633*** (.010)	.0610*** (.017)
λ			-.509***					
Rich (Q5)	.0369 (.082)	.0324 (.044)	.0355*** (.012)	.0714 (.069)	.0238 (.024)	.0714 (.069)	.0352*** (.007)	.0329*** (.008)
λ			-.346***					

Source: Created by the author using Susenas 2015.

Note: Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5.2.2 Estimation Results for Children Aged 16-18

Based on Table 5.9, the main findings are as follows. First, for the full sample, all models estimated a significant and positive treatment effect. All of the models produce a lower treatment effect than the OLS (7.75 percentage points) except for the propensity score matching estimation using three different methods. Thus, after controlling for the sample selection issue, the treatment effect is 7.37 percentage points (Heckman's model). After controlling for the endogeneity issue, the treatment effect is 7.67 percentage points (IPWRA). These results suggest that the *Program Indonesia Pintar* has a positive effect on increasing the likelihood of enrollment of children aged 16-18. Second, only Heckman's two-stage model and IPWRA models produce a significant and positive treatment effect for all cases when performed to estimate the heterogeneity of effects by location, gender and household wealth group. However, based on the argument mentioned earlier those approaches are more preferable compared to the others. Thus, the positive effect of the *Program Indonesia Pintar* is observed in all of those subpopulations. Third, again, the treatment effects are higher in rural than urban areas, for boys than for girls and for poor than better economic households.

5.3 Cost-efficiency of the Program on School Enrollment

This study attempts to estimate the cost-efficiency of the program in increasing the school enrollment between junior secondary and senior secondary levels of education in Indonesia. Considering that the program provides a different amount of financial assistance to junior secondary (Rp. 375,000 per semester) and senior secondary (Rp. 500,000 per semester), an adjustment needs to be made in order to make a direct comparison. This study chooses the results from the inverse probability weighted regression adjustment (IPWRA) estimations as the basis for the comparison.

The treatment effect is 1.63 percentage points for children aged 13-15 (Table 5.8). Therefore, it needs Rp. 230,061 to increase enrollment by 1 percentage point. On the other hand, the treatment effect is 7.67 percentage points for children aged 16-18 (Table 5.9) so that it needs Rp. 65,189 to

increase enrollment by 1 percentage points. Thus, to increase the same percentage points, the public resources spent for senior secondary level is only 28.34% compared to junior secondary level, which suggests that the provision of financial assistance is more efficient for senior secondary level.

5.4 Effect of Financial Assistance on School Continuation

This section provides the analyses of the effect of financial assistance through the *Program Indonesia Pintar* (Smart Indonesia Program) on school continuation of children aged 13-15 and aged 16-18 in Indonesia by employing several methodological approaches mentioned above.

In the Annexes, the results of the first stage of Heckman's two-stage model are provided (Table A-4 and Table A-6). Principally, children must be enrolled in school in order to be observed continuing their schooling. Table A-4 presents the probit estimation predicting the likelihood of enrolling junior secondary school for children aged 13-15 while Table A-6 provides the probit estimation predicting the likelihood of enrolling senior secondary school for children aged 16-18. Expectedly, the results suggest that those from better socioeconomic backgrounds are more likely to be able to be enrolled in junior or senior secondary school. On the other hand, children are less likely to be enrolled in school when they live in rural areas and when the mother is not present in the family. Other covariates are also significant as shown in the tables.

Meanwhile, the results of the first procedure of the propensity score analysis are provided in Table A-8 and A-10 in the Annexes. Table A-8 shows the logit estimation predicting the likelihood of receiving treatment (financial assistance) for children aged 13-15 while Table A-10 provides the logit estimation predicting the likelihood of receiving treatment (financial assistance) for children aged 16-18. Again, as the original target of the *Program Indonesia Pintar* is those from poor households, it is expected that household economic background is significantly associated with the likelihood of receiving treatment. The results confirm that those from poor households are more likely to receive treatment. Other covariates also predict the likelihood of receiving treatment, as shown in the tables.

The propensity score is calculated for each of the observations and the distribution of the propensity score is provided in the Annexes. Figure A-9 shows the distribution of the propensity score of treated and untreated groups of sample children aged 13-15 while Figure A-10 provides the distribution of the propensity score of treated and untreated groups of sample children aged 16-18. The figures show a fairly strong overlap between treated and untreated groups. In addition, the balance plot of the propensity score and the covariates are provided in Figure A-15 (aged 13-15) and Figure A-16 (aged 16-18).

In the propensity score matching analysis, the balancing test needs to be performed. Trimming of the observation is sometimes necessary to satisfy the balancing property. It should be noted that since the balancing property in the propensity score matching analysis of this study is not satisfied in the original sample, the observations are trimmed here. For children aged 13-15, 15 percent of the sample with the lowest and highest propensity score needs to be trimmed to satisfy the balancing property. Similarly, 15 percent of the sample of children aged 16-18 with the lowest and highest propensity score also needs to be dropped to satisfy the balancing property.

Again, the propensity score matching is estimated using the 1:1 nearest neighbor matching, 3:1 nearest neighbor matching and caliper matching (0.03). The average treatment effect on the treated (ATT) is estimated to show the average difference if all those in the treated group received treatment compared with if none of them received treatment. In this situation, the calculation aimed to show the effect of the provision of financial assistance on school continuation.

The estimations by utilizing various methodologies are provided in the result tables, whether for the full sample as well as the selected sample based on certain subpopulations, namely location (urban and rural), gender (boys and girls) and household consumption quintiles (poor household, middle-income household and rich household). The samples are restricted to those once enrolled in junior secondary school (aged 13-15 in Table 5.10) and those once enrolled in senior secondary school (aged 16-18 in Table 5.11) except for one of the OLS estimations which also includes estimations for those not enrolled in junior or senior secondary education.

5.4.1 Estimation Results for Children Aged 13-15

Based on Table 5.10, the main findings are as follows. First, for the full sample, all models show a positive and significant treatment effect which indicates that the *Program Indonesia Pintar* has a positive effect on increasing the likelihood of school continuation of children aged 13-15. After controlling for sample selection bias and endogeneity, the treatment effect is ranging from 0.68 percentage points (PSM) to 1.36 percentage points (IPWRA). Second, Heckman's two-stage model and IPWRA models also produce a significant and positive treatment effect for all cases when performed to estimate the heterogeneity of effects by location, gender and household wealth group. This is not always the case when the ordinary least square and the propensity score matching analysis are utilized. Third, the results also indicate that the positive effect of the *Program Indonesia Pintar* on school continuation of children aged 13-15 is larger for those in rural areas, boys and for those from poor households.

5.4.2 Estimation Results for Children Aged 16-18

According to Table 5.11, the main findings are as follows. First, for the full sample, all models also estimated a significant and positive treatment effect. After controlling for the sample selection issue, the treatment effect is 2.78 percentage points (Heckman's model). After controlling for the endogeneity issue, the treatment effect ranges from 2.66 percentage points to 2.93 percentage points. These results suggest that the *Program Indonesia Pintar* has a positive effect on increasing the likelihood of school continuation of children aged 16-18. Second, similarly to previous results, only Heckman's two-stage model and IPWRA models produce a consistently significant and positive treatment effect for all cases when performed to estimate the heterogeneity of effects by location, gender and household wealth group. Third, similar to previous results as well, the treatment effects are higher in rural than urban areas, for boys than for girls and for children from poor than from better economic households so that the effect of the *Program Indonesia Pintar* on the school continuation of children aged 16-18 is larger for those in rural area, boys and for those from poor households.

Table 5.10: Estimation Results, School Continuation (Aged 13-15)

	Ordinary Least Squares		Heckman's Model (IMR)	Propensity Score Matching			Inverse Probability Weighted Regression Adjustment (IPWRA)	Combining IPWRA with IMR
	All Children Aged 13-15	Only Those Once Enrolled in Junior Sec. School		Nearest Neighbor (1:1)	Nearest Neighbor (3:1)	Caliper		
Full sample	.0519*** (.005)	.0130*** (.003)	.0130*** (.001)	.0096*** (.004)	.0068*** (.002)	.0096*** (.004)	.0136*** (.002)	.0135*** (.002)
λ			-.036					
Urban	.0396*** (.008)	.0091** (.004)	.0091*** (.002)	.0100* (.006)	.0056* (.003)	.0100* (.006)	.0093*** (.002)	.0094*** (.002)
λ			.007					
Rural	.0576*** (.007)	.0149*** (.004)	.0148*** (.002)	.0131*** (.005)	.0100*** (.003)	.0131** (.005)	.0157*** (.002)	.0155*** (.002)
λ			-.049					
Boys	.0609*** (.008)	.0172*** (.005)	.0170*** (.002)	.0253*** (.009)	.0192*** (.005)	.0253*** (.008)	.0174*** (.003)	.0173*** (.002)
λ			-.023					
Girls	.0416*** (.007)	.0087*** (.003)	.0086*** (.002)	.0075*** (.004)	.0084*** (.003)	.0075* (.005)	.0097*** (.002)	.0094*** (.002)
λ			-.055					
Poor (Q1)	.0651*** (.014)	.0184** (.008)	.0189*** (.004)	.0140 (.010)	.0327** (.016)	.0140 (.011)	.0211*** (.005)	.0208*** (.005)
λ			-.138					
Medium (Q3)	.0518*** (.012)	.0138** (.006)	.0133*** (.003)	.0011 (.002)	.0092** (.004)	.0011 (.001)	.0133*** (.003)	.0130*** (.003)
λ			-.102					
Rich (Q5)	.0333*** (.013)	.0139 (.009)	.0133*** (.004)	.0137 (.019)	.0164 (.011)	.0137 (.014)	.0131*** (.004)	.0131*** (.004)
λ			-.016					

Source: Created by the author using Susenas 2015.

Note: Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5.11: Estimation Results, School Continuation (Aged 16-18)

	Ordinary Least Squares		Heckman's Model (IMR)	Propensity Score Matching			Inverse Probability Weighted Regression Adjustment (IPWRA)	Combining IPWRA with IMR
	All Children Aged 16-18	Only Those Once Enrolled in Senior Sec. School		Nearest Neighbor (1:1)	Nearest Neighbor (3:1)	Caliper		
Full sample	.2044*** (.015)	.0282*** (.006)	.0278*** (.002)	.0266*** (.008)	.0293*** (.006)	.0266*** (.009)	.0267*** (.002)	.0269*** (.002)
λ			.005					
Urban	.1903*** (.022)	.0271*** (.010)	.0271*** (.004)	.0247** (.012)	.0103** (.005)	.0247** (.012)	.0247*** (.003)	.0246*** (.003)
λ			-.056					
Rural	.2123*** (.020)	.0285*** (.009)	.0288*** (.003)	.0234** (.011)	.0218*** (.006)	.0234** (.010)	.0279*** (.003)	.0284*** (.003)
λ			.053					
Boys	.2466*** (.023)	.0398*** (.011)	.0388*** (.004)	.0265* (.015)	.0406*** (.011)	.0265** (.012)	.0351*** (.004)	.0357*** (.004)
λ			.020					
Girls	.1671*** (.019)	.0210*** (.008)	.0211*** (.003)	.0214* (.012)	.0214*** (.007)	.0214* (.011)	.0210*** (.003)	.0210*** (.003)
λ			-.005					
Poor (Q1)	.2920*** (.047)	.0344 (.022)	.0329*** (.008)	.0500 (.035)	.0396** (.019)	.0789* (.045)	.0369*** (.009)	.0363*** (.009)
λ			-.144					
Medium (Q3)	.2042*** (.033)	.0332** (.016)	.0327*** (.006)	.0211 (.015)	.0140** (.007)	.0211 (.015)	.0318*** (.005)	.0320*** (.005)
λ			.093					
Rich (Q5)	.1011*** (.036)	.0159 (.016)	.0157*** (.004)	.0000 (.004)	.0108 (.014)	.0000 (.000)	.0158*** (.004)	.0156*** (.004)
λ			-.089**					

Source: Created by the author using Susenas 2015.

Note: Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5.5 Cost-efficiency of the Program on School Continuation

This part of the study attempt to assess the comparison of the cost-efficiency of the program in increasing the school continuation at junior secondary and senior secondary levels of education. As mentioned before, the financial assistance provided to junior secondary (Rp. 375,000 per semester) and senior secondary (Rp. 500,000 per semester) are different in amount so that an adjustment needs to be made before comparing. Based on the earlier argument, the inverse probability weighted regression adjustment estimations are used as the basis for the comparison.

The treatment effect is 1.36 percentage points for children aged 13-15 (Table 5.10) so that it needs Rp. 275,735 to increase school continuation by 1 percentage point. On the other hand, the treatment effect is 2.67 percentage points for children aged 16-18 (Table 5.11). Thus, it needs Rp. 187,266 to increase school continuation by 1 percentage point. Based on these calculations, to increase the same percentage points, the public resources required to be spent for senior secondary level education is lower. It is approximately 67.92% compared to the resources needed at junior secondary education. Therefore, the provision of financial assistance seems to be more efficient for senior secondary compared to the junior secondary level.

5.6 Effect of Financial Assistance on Child Labor

This section provides the analyses of the effect of financial assistance through the *Program Indonesia Pintar* (Smart Indonesia Program) on child labor participation of children aged 13-15 and aged 16-18 in Indonesia by employing several methodological approaches, namely OLS, propensity score matching (1:1 nearest neighbor matching, 3:1 nearest neighbor matching and caliper matching) and inverse probability weighted regression adjustment (IPWRA).

The results of the first procedure of the propensity score analysis is shown in Table A-8 (children aged 13-15) and A-10 (children aged 16-18) in the Annexes. The logit estimates predicting the likelihood of receiving treatment results confirm that those from poor households are more likely to receive financial assistance. Other covariates also predict the likelihood of receiving treatment as well, as shown in the tables.

The distribution of the propensity score is shown in the Annexes. Figure A-11 shows the distribution of the propensity score of treated and untreated groups of sample children aged 13-15 while Figure A-12 provides the distribution of the propensity score of treated and untreated groups of sample children aged 16-18. Both figures indicate a fairly strong overlap between treated and untreated groups. Furthermore, the balance plot of the propensity score and the covariates are provided in Figure A-17 (aged 13-15) and Figure A-18 (aged 16-18) in the Annexes as well.

After performing the balancing test in the propensity score matching analysis, some observations need to be dropped in the analysis as the balancing property is not satisfied in the original sample. For children aged 13-15, 20 percent of the sample with the lowest and highest propensity score needs to be trimmed to satisfy the balancing property. Similarly, 20 percent of the sample of children aged 16-18 with the lowest and highest propensity score also needs to be dropped to satisfy the balancing property as well. Thus, it should be noted that a large portion of observations are dropped when the propensity score matching is performed, but not dropped for the other methods.

Similar to previous analyses, the propensity score matching here is estimated using the 1:1 nearest neighbor matching, 3:1 nearest neighbor matching and caliper matching (0.03) approaches as well. The average treatment effect on the treated (ATT) is then calculated here to show the effect of financial assistance provided through the *Program Indonesia Pintar* on child labor in Indonesia.

The estimations of treatment effect by utilizing the OLS, propensity score matching and the inverse probability weighted regression adjustment approaches are provided in Table 5.12 and 5.13. The estimations are performed for the full sample as well as the selected sample based on certain subpopulations, namely location (urban and rural), gender (boys and girls) and household consumption quintiles (poor household, middle-income household and rich household).

Table 5.12: Estimation Results, Child Labor (Aged 13-15)

	Ordinary Least Squares	Propensity Score Matching			Inverse Probability Weighted Regression Adjustment (IPWRA)
		Nearest Neighbor (1:1)	Nearest Neighbor (3:1)	Caliper	
Full sample	.0042 (.008)	.0258* (.013)	.0043 (.012)	.0258* (.014)	.0040 (.008)
Urban	-.0100 (.010)	-.0289 (.021)	-.0139 (.015)	-.0289 (.020)	-.0073 (.011)
Rural	.0108 (.011)	-.0018 (.020)	.0160 (.016)	-.0018 (.020)	.0086 (.011)
Boys	.0033 (.012)	.0090 (.020)	-.0023 (.017)	.0090 (.021)	.0034 (.013)
Girls	.0055 (.009)	.0221 (.017)	.0270* (.015)	.0221 (.018)	.0055 (.011)
Poor (Q1)	-.0297 (.018)	-.0206 (.036)	-.0036 (.029)	-.0157 (.040)	-.0327* (.017)
Medium (Q3)	-.0021 (.016)	.0072 (.025)	.0075 (.021)	.0072 (.025)	-.0004 (.016)
Rich (Q5)	.0397* (.020)	.0446 (.052)	.0845* (.044)	.0446 (.057)	.0327 (.026)

Source: Created by the author using Susenas 2015.

Note: Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5.13: Estimation Results, Child Labor (Aged 16-18)

	Ordinary Least Squares	Propensity Score Matching			Inverse Probability Weighted Regression Adjustment (IPWRA)
		Nearest Neighbor (1:1)	Nearest Neighbor (3:1)	Caliper	
Full sample	-.1074*** (.016)	-.1210*** (.032)	-.1153*** (.025)	-.1210*** (.032)	-.1037*** (.014)
Urban	-.0982*** (.024)	-.0592 (.040)	-.0636** (.030)	-.0592 (.040)	-.0919*** (.019)
Rural	-.1127*** (.023)	-.1590*** (.044)	-.1333*** (.034)	-.1590*** (.044)	-.1143*** (.019)
Boys	-.1422*** (.026)	-.1099** (.044)	-.1152*** (.035)	-.1099** (.044)	-.1403*** (.023)
Girls	-.0702*** (.020)	-.0705* (.040)	-.0962*** (.028)	-.0705* (.039)	-.0685*** (.017)
Poor (Q1)	-.1840*** (.047)	-.1343* (.079)	-.1829*** (.040)	-.1343 (.082)	-.1972*** (.029)
Medium (Q3)	-.1345*** (.037)	-.0542 (.047)	-.1076*** (.041)	-.0542 (.053)	-.1282*** (.028)
Rich (Q5)	.0111 (.044)	.1757** (.071)	.1306* (.074)	.1757** (.079)	.0152 (.048)

Source: Created by the author using Susenas 2015.

Note: Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5.6.1 Estimation Results for Children Aged 13-15

Table 5.12 shows that the results are mostly found to have no statistically significant effect of financial assistance on child labor participation for children aged 13-15 in almost all cases with few exceptions. There are some findings of positive effect, which is illogical, in some of the OLS and propensity score matching results. However, it should be noted that OLS ignores the endogeneity issue. Meanwhile, a large proportion of samples are dropped in the propensity score matching analysis, so that the estimation might not be so precise. Thus, the estimation using the inverse probability weighted regression adjustment (IPWRA) is more preferable in this situation. The IPWRA results show that the effect of the provision of financial assistance for children aged 13-15 was only found in the poor economic background sample. Children from poor economic backgrounds who receive financial assistance are less likely to participate in child labor than their counterparts.

5.6.2 Estimation Results for Children Aged 16-18

Based on Table 5.13, the main findings are as follows. First, for the full sample, all models show a negative and significant treatment effect which indicates that the *Program Indonesia Pintar* has an impact in decreasing the likelihood of children aged 16-18 to participate in child labor. The treatment effects range from -12.10 percentage points (PSM) to -10.37 percentage points (IPWRA). Second, using the IPWRA estimation, the treatment effects are higher in rural (-11.43 percentage points) than urban areas (-9.19 percentage points), for boys (-14.03 percentage points) than for girls (-6.85 percentage points) and for students from poor backgrounds (-19.72 percentage points) than students from better economic backgrounds so that the effect of the *Program Indonesia Pintar* on decreasing the likelihood of children aged 16-18 to participate in child labor is larger for those in rural areas, boys and those from poor households.

5.7 Summary of Findings

As shown in the first part of this chapter, this study finds that socioeconomic background still

plays a major role in the schooling of children in Indonesia. The next parts of the chapter show that the government's financing intervention through the *Program Indonesia Pintar* in Indonesia has a positive impact on increasing the likelihood of school enrollment and school continuation at junior and senior secondary levels of education. An examination of the cost-efficiency of the public expenditure on increasing the school enrollment and school continuation between those two levels of education is made. The results suggest that providing financial assistance for senior secondary schooling is more cost-efficient than for junior secondary schooling. The last parts of this chapter also show that the financial assistance program has an effect in decreasing the likelihood of child labor participation of children aged 16-18, while the limited impact only for those from poor households is found for children aged 13-15. Overall, the impacts of the financial assistance program on school enrollment, continuation and child labor participation are larger for those in rural areas, boys and those from poor households.

It should be noted that the results of the effects of the provision of financial assistance are potentially underestimated as those not receiving money from the *Program Indonesia Pintar* (Smart Indonesia Program) might receive financial support from other sources, such as through scholarships or financial assistance from their local government. Thus, for instance, providing demand-side financing interventions should increase schooling enrollment and continuation at a larger magnitude than the magnitudes provided in the results of this study.

Comparing the results between the OLS and the Heckman selection model that address the sample selection issue, it is shown that the coefficients are larger in the OLS model which indicates that the selection has an upward bias for the treatment effect. Additionally, the negative values of lambda (IMR) indicate that unobserved factors are more likely to be associated with lower outcomes (school enrollment and continuation). The small differences between the Heckman's two-stage and the OLS models are probably because some potentially important variables, especially supply-side factors, are not included in this study since this study focuses on demand-side factors. The inclusion of such variables will affect the IMR magnitude and may potentially reduce the treatment effect due to the selection issue.

On the other hand, although both the propensity score matching (PSM) and the inverse probability weighted regression adjustment (IPWRA) address the endogeneity issue, the results of this study show different magnitudes. It should be noted that both methods have different mechanisms. The PSM balances data through matching non-treated participants to treated participants on the probability of receiving treatment. By only choosing the control participants having similar propensity scores to treated participants, it will lead to the loss of participants as the unmatched participants will be eliminated from the estimation of the treatment effect. Meanwhile, the IPWRA balances data through weighting based on the probability of receiving treatment without a need to reduce the sample size. Furthermore, the propensity score weighting is combined with regression adjustment approach.

The results of this study show that the treatment effect obtained from the PSM estimation tends to be larger than using the IPWRA and even compared to the OLS results in some cases. It may be due to the omission of a significant proportion of samples in the PSM estimation (selecting only matched samples and additionally trimming the samples to satisfy balancing property when needed), thus may be limiting the ability to generalize the results. As noted by Guo and Fraser (2015), the PSM works better when the sample is large.

Meanwhile, the treatment effects using the IPWRA are smaller than the OLS showing that after the self-selection issue is addressed, the treatment effects are lowering. The small differences between the IPWRA and the OLS results are probably because there is an issue in the distribution of financial assistance. As highlighted in several program evaluation reports (also shown in the dataset), although the program is targeting poor households, there are inclusion and exclusion errors in the distribution of program recipients (due to the reduced accuracy of the database). The small pseudo-R-squared in the logit estimates might support this argument. If such issues do not persist, the overestimation of the OLS potentially even larger due to the self-selection issue.

All in all, the results in this study show consistently positive and statistically significant effects of the *Program Indonesia Pintar* on schooling by using those different methods. After addressing the selection issues, the effects are lower than the OLS estimates, indicating that the

OLS tends to overestimate the impact. Guo and Fraser (2015) note that there are often similarities of findings between the OLS and the propensity score analyses, but it does not mean that the use of the propensity score analyses is useless. Whether the results are similar or different, it depends on the empirical setting of the study, the choice of covariates and other factors. Scholars often suggest to use multiple approaches in the program evaluations as depending on the OLS results are risky due to potentially biased and inefficient estimates. However, the discussion of which of the methods is the most suitable is beyond the scope of this study. The next chapter provides further discussions and the conclusion of the results of this study.

CHAPTER VI

DISCUSSION AND CONCLUSION

This chapter summarizes and concludes the study, which is divided into three sections. The first section of this chapter discusses the findings of the study, as previously presented in Chapter V, to respond to the research questions of this study. The second section describes the main limitations of the study, which covers the data and methodological issues. Finally, the third section provides the conclusion of the study which describes how the findings of this study could be linked to the human capital framework and how the study could provide contributions to both theoretical and practical perspectives.

6.1 Discussion

The first part of this chapter provides a discussion of the findings in this study. As mentioned in the beginning, this study initially examines the key demand-side factors influencing school enrollment of junior and senior secondary school-age children in Indonesia to find out how those potentially important factors are associated with schooling decisions in households. This analysis is necessary to understand how educational inequities take place in the country from the start. Subsequently, an impact analysis is performed to reveal how the government financing intervention on education in Indonesia, through the *Program Indonesia Pintar*, could minimize the household's barriers to accessing education which then can lead to better schooling enrollment and continuation as well as reduce child labor participation.

Therefore, the discussion here is split into two parts. In the first part, discussions related to the findings regarding factors associated with school enrollment are presented. In the second part, we present the discussions related to the findings on the effect of financial assistance on school enrollment, school continuation and child labor.

6.1.1 Factors Associated with School Enrollment

The first research question of this study is: ‘What is the association between key demand-side factors and schooling enrollment of junior and senior secondary school-aged children in Indonesia?’. To answer this research question, the logistic regression method is employed to predict the influence of individual, household and community characteristics on school enrollment. Data used for this study come from the Core Module and the Social Culture Education Module of the Indonesian National Socioeconomic Survey (Susenas) in 2015 collected by the Central Bureau of Statistics of Indonesia which covers 271,345 individuals from 71,568 households in 34 provinces in Indonesia. In total, the sample used in this analysis is 13,989 children aged 13-15 and 10,887 children aged 16-18.

The findings of this study suggest that various individual, household and community characteristics are associated with the schooling of children aged 13-15 (junior secondary schooling age) and children aged 16-18 (senior secondary schooling age) in Indonesia. Among the variables used in this study, gender, child’s age, presence of a mother in the family, education of the head of household, per capita household consumption and location (rural or urban) are associated with the schooling of children aged 13-15. On the other hand, the following variables of gender, child’s age, head of household age, presence of a father in the family, education of the head of household and per capita household consumption are associated with the schooling of children aged 16-18. A more in-depth discussion of the findings for each indicator is provided below.

Gender

For children aged 13-15, the findings of this study show that girls are more likely to attend schooling than boys in Indonesia, which is a pattern for almost all estimations except for a subsample of poor and rich households. Meanwhile, for children aged 16-18, the findings are consistent for all of the estimations.

This finding is interesting since boys usually have a better chance of attending schooling

(Becker, 1991). There is a belief that in patriarchal societies, particularly in the Third World and developing countries, the school participation of girls is limited due to cultural reasons. In addition, Becker (1991) notes that girls are often disadvantaged in traditional societies where a preference for sons over daughters is more likely found. Moreover, gender often influences the intra-household allocation of resources by the heads of households (Rammohan & Dancer, 2008). Therefore, when boys are preferred over girls, it might have an influence on the lower enrollment of girls compared to boys.

However, in the context of Indonesia, Takahashi (2011) observed changes in the school enrollment pattern by gender. In the past, enrollment of girls was significantly lower than boys. However, the enrollment gap has disappeared in the more recent period. By using data from 1993 and 2000, boys in Indonesia were found to be about 5% more likely than girls to be enrolled in a junior secondary school. In senior secondary education, boys were about 8% more likely than girls to be enrolled in 1993. However, such a better chance of boys being enrolled in school was not found in 2007.

Furthermore, more recent data shows that school participation of girls aged 13-15 and 16-18 in Indonesia in 2013 and 2016 was higher than boys (Table 2.18). Not only that, a study by Ogawa and Iimura (2010) also confirm that females were more likely to be enrolled in tertiary education than males due to the rapid growth of females graduating from senior secondary schools in Indonesia. Thus, the results of this study are consistent with earlier studies in the context of Indonesia and indicate that discrimination towards girls regarding their education is not currently visible in Indonesia.

As noted by Buchmann (2000), patriarchal norms are unlikely to have any effect on the educational participation of girls as schooling is more likely to be decided upon by household resource constraints rather than by gender stereotypes. In Indonesia, the compulsory basic education policy which aimed to reduce schooling costs might have promoted girls' schooling by removing barriers that might have been faced in the earlier times.

Age of children

Another individual characteristics used in this study, the age of the children, is also found to correlate with children's participation in schooling for almost all of the analysis for both children aged 13-15 and children aged 16-18 with only a few exceptions. The results suggest that children aged 14 and 15 are less likely to attend schooling than children aged 13. Similarly, children aged 17 and 18 are less likely to attend schooling than children aged 16. These kind of results are to be expected, as there is typically an increase in the probability of dropping out of school as children continue their educational progression.

The use of a similar kind of variable is comparable to Takahashi (2011) where children aged 13 was used as the reference group for junior secondary school age and children aged 16 was used as the reference group for senior secondary school age for a study in Indonesia. In Takahashi (2011), the magnitude of negative association was larger for the older cohort. For instance, those aged 14 were 15 percent less likely to be in schooling and those aged 15 were 24 percent less likely to be in school compared to children aged 13, which acted as the base reference, in 1993. Furthermore, over the years, the magnitude of the negative relationships tended to decline. The implementation of the compulsory education policy in Indonesia was believed to influence this outcome.

The finding of this study is, thus, consistent with the findings of Takahashi (2011) which mainly focused on rural areas in Indonesia. Such a negative association between age and schooling enrollment suggests that some students are likely to drop out of school before completing their education.

Birth order

A consistent finding is shown regarding the relationship between birth order and children's schooling in this study. After controlling for other variables, this study found no significant association between birth order and the schooling of children for both children aged 13-15 and children aged 16-18.

Such a finding is not in agreement with an argument that parents may have individual preferences toward the household's resource allocation (Buchmann, 2000). In several previous findings, there are cases that later-born children are more likely to attend schooling (Rammohan & Dancer, 2008) or, in contrast, that later-born children are less likely to attend schooling (Black et al., 2005; Haan, 2010) than earlier-born children. Prior literature suggested that due to the limitation of family resources, parents might have a preference to allocate the existing household resources equally for each child or to allocate it differently, whether this be for earlier-born or later-born children (Buchmann, 2000; Haan, 2010). As a result, the birth order of a child might influence the allocation of available family resources.

However, the empirical findings in previous studies are mixed. In the case of Indonesia, a study by Pradhan (1998) finds that earlier-born children had an advantage over later-born children in schooling. The different findings in this study might suggest that, in recent times, there is no evidence of preference over earlier-born or later-born children regarding the intra-household allocation of resources in Indonesia. The implementation of the compulsory and free education policy in Indonesia may have contributed to the elimination of birth order influence in the educational enrollment of children. Another possible explanation is that the culture in Indonesia tends to treat all of the children in the family equally regardless of their birth order. The final alternative possibility is that earlier-born children usually provide financial support for their younger siblings once they finished schooling and can earn income, allowing their younger siblings to continue their schooling.

Number of siblings

The influence of the number of siblings on the schooling of children aged 13-15 and 16-18 in Indonesia is, in most cases, not found after controlling for other explanatory variables. However, a significant and negative association is found when the sample is restricted to the mid-level economic and high economic backgrounds for both age groups. The findings, thus, suggest that children aged 13-15 and 16-18 in larger families from mid-level economic and high economic

backgrounds are less likely to attend schooling than those in smaller families. However, for poor households, there is no evidence of such an influence.

Essentially, the number of siblings in the family is indistinguishable with family size. From the economic point of view, household resources are allocated to all family members so that the more siblings in the family, the more diluted the resources allocated to the education of each child are. Moreover, prior literature suggests that competition over siblings to parental resources, whether economic or non-economic, exist so that children from bigger families are associated with a lower chance of schooling (Becker, 1960; Becker & Lewis, 1973; Blake, 1981; Downey, 1995; Jæger, 2009). Such a negative association is found in previous studies, such as Blake (1981) and Downey (1995). However, Becker (1991) suggests that the human capital investment on children's schooling in rich families does not directly depend on the number of siblings as rich families are commonly able to self-finance or borrow money to finance the schooling of their children.

The findings of this study showing the negative association of the number of siblings with school enrollment in rich and mid-level economic families suggest that competition between siblings to parental resources exists. As mentioned beforehand, the availability of household resources allocated to each child decreases as the number of siblings increases so that the chance to attend schooling for children in bigger families is lower due to the competition over parental resources among siblings. This finding, therefore, is in agreement with earlier literature. On the other hand, the statistically insignificant results in poor families might indicate that those from poor families are constrained when accessing schooling regardless of the number of children in the family.

Furthermore, the insignificant association found in the other estimations of this study is reasonable and expected since the estimation of the analysis also controls for the per capita household consumption, as a variable to reflect the households' economic capability. A similar result is also found in Takahashi (2011), where there is no statistically significant effect of the number of school-aged children in the family on children's schooling in Indonesia.

Household head age

This study finds no evidence of an association between the age, as well as the square of the age, of household head and children's schooling for children aged 13-15. Meanwhile, a quadratic relationship of household head age and children's schooling is found for children aged 16-18 when the estimation is performed for the full sample and when restricted for boys and for those in urban areas. Children aged 16-18 are more likely to attend schooling as the age of the head of the household increases and then diminishing, especially for boys and those in urban areas.

A possible explanation of the findings is that as the age increases, parents are often steadier in both financial and non-financial respects. In this situation, children aged 16-18 living with steadier parents, especially boys and those living in urban areas, are likely more secure than those from less steady parents. They are less vulnerable to dropping out of school as their parents are more stable both financially and non-financially.

Missing father

For children aged 13-15, this study finds no evidence of an association between the absence of the father in the household and a child's schooling enrollment. In contrast, for children aged 16-18, this study finds that children from households without a father are less likely to attend schooling than those from households with a father. Such a negative association is found for the full sample as well as when the sample is restricted to boys, urban area children and mid-level economic background samples.

The negative association found in this study is consistent with findings in previous studies (Fitzsimons & Mesnard, 2013; Smits & Huisman, 2013). The loss of a parent can happen for a variety of reasons, whether due to accident, sickness, childbirth or others. In developing societies, the father is more likely to be considered as the head of the household and act as the main provider of household resources, so that losing a father is likely to influence the schooling of children. It may push children to stop schooling to better enable an immediate earning of revenue for households or to reduce household costs, or for a combination of both prior reasons.

The fact that the negative association is only found for children aged 16-18 might indicate that children at this age might choose to stop schooling and enter the labor market when they lose their father. At the ages of 13-15, such an option is difficult to take since there are more barriers to labor market entry due to the compulsory basic education policy as well as due to existing workforce regulations and practices.

Furthermore, this study also finds that the negative association is found for boys, those living in urban areas and also for those from a mid-level economic background. These findings suggest that, when a father is lost, boys aged 16-18 are more likely to be disadvantaged in relation to schooling as they may need to stop their schooling to help with collecting income for their family and to take on their father's responsibilities in non-financial respects as well. Considering that schooling and living costs are much higher in urban areas than in rural areas in Indonesia and the opportunity to earn income in urban areas is greater, these findings regarding urban subpopulations are reasonable.

Finally, a possible explanation for the findings regarding those from a mid-level economic background is that mid-level economic households may be able to invest in their children's education in normal conditions but the impact of losing a father will likely affect this allocation of household resources. Meanwhile, poor households may deal with financial constraints to investing in their children's education whether the father is missing or not. Finally, for rich households, the loss of a father may not affect children's schooling since they have sufficient savings and the ability to borrow money to cover the costs of schooling (Gertler, Levine, & Ames, 2004).

Missing mother

The findings of this study show that children aged 13-15 coming from households without a mother are less likely to attend schooling than those from households with a mother in the family. Such a negative association is found for the full sample as well as when the sample is restricted to girls and rural samples. On the other hand, there is no evidence of an association between the non-existence of mothers in the household with the schooling of children aged 16-18 for all of the

estimations performed in this study.

Such a negative association is consistent with Smits and Huisman (2013). The missing of a mother in a family might push children to suspend schooling and take over their mother's duties. The fact that, in this study, such a situation occurs specifically for girls is thus unsurprising since, compared to boys, girls may be more likely to be more engaged in household tasks in Indonesian society (Kazianga, 2012), so that they may need to stop their education to help carry out household chores when a mother is missing. The other possible reason is that no one takes care of the children when their mother is not present. Several possible reasons to stop schooling in some households are traumatic reasons (Gertler et al., 2004) and a lack of parental encouragement (Astone & McLanahan, 1991). Thus, the result suggests that when a mother is lost, girls are the most disadvantaged.

Another finding is that children living in rural areas who live in a household without a mother are less likely to attend schooling than those living in a household with a present mother. A possible explanation is that parents in rural societies are less likely to have an understanding of the long-term benefits of education than those in urban societies. Therefore, when the mother is missing in rural households, parents may focus primarily on short term interests and prefer to stop their children's schooling, whether this is to engage in household chores or to participate in child labor.

These findings, particularly that this pattern occurs across all economic backgrounds, might suggest that economic rationale is not the main reason. Instead, it might be driven by diminished parental involvement. This argument is based on the condition that the analysis is controlling for household expenditure and the fact that basic education in Indonesia is under the free compulsory education policy.

All in all, connected to the findings from studying the impact of the absence of the father on households presented beforehand, these findings suggest that the presence of a father and a mother in a family still plays an important role in children's schooling. The findings are in agreement with Amato and Anthony (2014), which suggest that there is a negative influence on schooling

outcomes when a parent is not present, whether due to death or divorce.

In the context of Indonesia, the findings are also consistent with an earlier study by using survey data between 1994-1996 (Gertler et al., 2004) which also found that parental death reduced the likelihood of children schooling in Indonesia. However, the loss of a parent should not affect a child's schooling when households still have sufficient savings, they can freely borrow money to finance the education of children or there is support from extended family.

Head of household education

The results of this study show a consistently positive association between the education of the head of household and children schooling for both children aged 13-15 and children aged 16-18, suggesting that children from households with a more-educated head of household are more likely to attend schooling than those from households with a less-educated head of household. Moreover, the magnitude of positive influence is found to be stronger when the education completed by the head of the household is beyond secondary education.

Such a positive association is in agreement with previous studies which suggests that children raised by better-educated parents are more likely to have better schooling (Buchmann, 2000; Lillard & Willis, 1994; Plug & Vijverberg, 2003). In the case of Indonesia, a previous study by Takahashi (2011) also found that the education of the household head is strongly and positively associated with children's schooling. The study finds that the magnitude of association is larger for children at senior secondary than junior secondary schooling age. The study also observes that the impact of the head of household's education tends to decrease over time, arguably due to the implementation of the compulsory free education policy in Indonesia. Thus, the findings of this study are consistent with findings by Takahashi (2011) as the positive influence of the head of household education on children's schooling is also consistently found.

Referring to Checchi (2006), there are several possible explanations for such a finding. The positive association between parent's and children's education might be explained by several channels: a transfer of unobservable ability from parents to children through genetics, because

educated parents understand the importance of education and because well-educated parents tend to have better income so that they do not face constraints to finance the education of their children. In this study, the strong association between the head of household's education and children's schooling persist even after controlling for a variable representing household income. Thus, it may suggest that the positive association is possibly caused by genetics or by the parental awareness of the long term benefits of education.

Log of per capita household consumption

As mentioned earlier, the log of per capita household consumption is used as a variable in this study as a proxy for household income. A strong association between per capita household consumption and children's schooling is found in this study for both children aged 13-15 and aged 16-18 in all models employed. Thus, it is suggested that children from households with a better economic background are more likely to attend schooling than those from households with lower economic backgrounds.

Such a positive association is consistent with previous studies, such as Behrman and Knowles (1999), which suggest that household demand for schooling tends to be higher when the household's financial resources are larger. A study by Checchi (2006) also highlights a strong association between income and secondary schooling enrollment, but the result for primary schooling statistically is insignificant, which suggests that constraints to accessing secondary education are more prevalent possibly due to higher costs of schooling at secondary education than primary education.

In the case of Indonesia, such a strong association is also found in Takahashi (2011). The study explains that the introduction of the compulsory education policy in Indonesia could not eliminate the income effect on children's schooling at the time of the investigation. Moreover, the persistence of the unequal opportunities to access education among poor and rich households in the country is most probably due to the school fees. The findings of this study are thus consistent with Takahashi (2011). Even in more recent times, constraints to access schooling remain visible

for junior and senior secondary schooling age children despite the implementation of the compulsory education policy.

The strong association between household income and children's schooling in this study indicates that wealthier parents have the ability to pay the direct costs of their children's schooling while poorer parents may still deal with financial problems. The results also show that for children aged between 13-15 and 16-18, the magnitudes of association tends to be higher for the latter age group. A possible explanation of such a finding is that the private costs of schooling that should be paid are higher at senior secondary education so that better ability to cover the costs of schooling will produce a higher probability of attending school.

Rural

For children aged 13-15, a consistent negative association is found in this study. Those living in rural areas are less likely to be enrolled in school than those living in urban areas. Such an association is found for the full sample as well as when the sample is restricted to boys, those living in urban areas and mid-level economic background samples.

This result is relevant with previous findings, such as Lavy (1996), suggesting that school participation in rural areas is lower than for urban areas, which might be due to the disadvantages of living in rural areas in relation to schooling. The lower availability of schools, the lower general quality of schools, the higher transportation costs to school and the lower education of parents in rural areas compared to urban areas are some of the possible factors explaining the lower demand for schooling in rural areas (Ilon & Moock, 1991). In addition, rural areas are disadvantaged over urban areas in terms of the facilities and job opportunities, so that the likelihood of children in rural areas to obtain an education is lower than those in urban areas (Huisman & Smits, 2009; Tansel, 2002).

However, mixed findings are observed in this study for children aged 16-18. No significant association is found in the full sample. Meanwhile, when the sample is restricted to boys, the result suggests that boys living in rural area are more likely to attend schooling than those in urban. A

possible explanation for this result is that, for boys at this age, the opportunities to enter the labor market are greater in urban areas than in rural areas so that boys in rural areas do not face choices as to whether to enter the labor market or to stay at school at this level. When the sample is restricted to girls, the results suggest that girls living in rural areas are less likely to attend schooling than those in urban areas. A possible explanation for the result is that, for girls at this age, the distance to school is higher in rural than urban areas so that it might become a barrier for some households in isolated areas.

When the sample is restricted to poor households, the results suggest that children from poor households living in rural areas are more likely to attend schooling than those in urban. A possible explanation for this result is, again, the higher attractiveness to enter the labor market in urban areas might push those from poor families to stop their schooling to earn income when they are facing financial problems. These findings are consistent with previous studies, such as Mugisha (2006).

Summary

As mentioned before, the first research question of this study asked: ‘What is the association between key demand-side factors and schooling enrollment of junior and senior secondary school-aged children in Indonesia?’. Regarding this research question, the study proposes the hypothesis: ‘Socioeconomic background influences schooling enrollment, especially for senior secondary school-aged children in Indonesia’.

Socioeconomic status is represented by mainly two variables of this study, namely household consumption (as a proxy for household income) and the education of the head of household. The findings of this study has consistently shown a strong and positive association of both variables with the schooling of children aged 13-15 (junior secondary schooling age) and children aged 16-18 (senior secondary schooling age), whether the analysis is performed for the full sample or when the sample is restricted to boys and girls, urban and rural and household economic backgrounds. The findings of this study, thus, provide evidence that children from

higher socioeconomic backgrounds are more likely to attend schooling than children from lower socioeconomic backgrounds.

The results of this study also show that the odds ratio of the per capita household consumption is 1.78 for children aged 13-15 and 1.85 for children aged 16-18. Such a finding provides evidence that the association between a household's economic background and schooling is stronger for senior secondary school-aged children (aged 16-18) than for junior secondary school-aged children (aged 13-15). Considering the established free and compulsory education policy in basic education (primary and junior secondary) in Indonesia, it is expected that the influence of socioeconomic background can be diminished for junior secondary school-aged children. The results of this study confirm that the influence is relatively smaller, although not vanished. Meanwhile, non-economic factors, namely the education of the head of household, still strongly predicts the school enrollment of junior secondary schooling age children.

From the above discussion, thus, the first hypothesis is basically confirmed. Socioeconomic status still plays a vital role in influencing the demand for schooling in Indonesia. In addition, the findings of this study also provide evidence regarding the influence of various individual, household and community characteristics on the schooling enrollment of junior and senior secondary schooling age children in Indonesia. Overall, the results are consistent with the relevant existing literature (Connelly & Zheng, 2003; Smits & Huisman, 2013; Takahashi, 2011; Tansel, 2002).

6.1.2 Effect of Financial Assistance on School Enrollment, School Continuation and Child Labor

This section presents discussions related to the findings on the effect of financial assistance on school enrollment, school continuation and child labor participation linked to the research questions of the study. Several methodological approaches are used to answer the related research questions, namely the ordinary least squares (OLS), the Heckman's two-stage model, the propensity score matching (PSM), the inverse probability weighted regression adjustment

(IPWRA) and the IPWRA that incorporates the inverse Mill's ratio. These various approaches are mainly utilized in order to address the sample selection and the endogeneity issues which normally occur in observational studies. The data used in this study come from the Core Module and the Social Culture Education Module of the Indonesian National Socioeconomic Survey (Susenas) in 2015 collected by the Central Bureau of Statistics of Indonesia.

The first question of this study has been addressed in the earlier section. The second research question of this study asked: 'To what extent does the provision of the *Kartu Indonesia Pintar* (Smart Indonesia Card) affect schooling enrollment in junior and senior secondary education?'. Regarding this research question, the study proposes the hypothesis: 'Children having received *Kartu Indonesia Pintar* (Smart Indonesia Card) are more likely to be enrolled in school than their counterparts'.

The results of this study show that the provision of the *Kartu Indonesia Pintar* in the *Program Indonesia Pintar* has a significantly positive effect on increasing the likelihood of enrollment at junior secondary school (aged 13-15) and senior secondary school (aged 16-18). For instance, by using the inverse probability weighted regression adjustment model, the treatment effects are 1.63 percentage points (aged 13-15) and 7.67 percentage points (aged 16-18). Further examination also finds that the effects of the program on the school enrollment of children aged 13-15 and 16-18 are larger for those in rural areas, boys and those from poor households.

A possible explanation of such a positive effect of the *Program Indonesia Pintar* on schooling enrollment is that the demand for the schooling of those from lower-income households is most often constrained by financial issues, an explanation applicable in many countries and not just Indonesia. By obtaining the *Kartu Indonesia Pintar*, children are guaranteed to receive financial assistance when they are enrolling in school. The provision of financial assistance will generate an income effect along with a substitution effect (Ferro et al., 2010). The income effect means that the cash transferred from the *Program Indonesia Pintar*, mainly to poor households, increases household resources and can be used to cover the costs of schooling. As a result, the financial constraints to enroll in school can be diminished by the program implementation.

Based on the findings of this study, the second hypothesis is thus confirmed. This finding is largely consistent with previous relevant literature and empirical findings which also observed that financial assistance, in a variety of mechanisms, significantly contributes to an increase in the enrollment of children in school or even contributes to improve other schooling outcomes (Attanasio et al., 2010; Bai, et al., 2017; Carruthers & Fox, 2016; Ferro et al., 2010; Heinrich, 2007; Yount et al., 2013).

The third research question of this study asked: ‘What is the cost-efficiency of the *Program Indonesia Pintar* (by the provision of Smart Indonesia Card) in increasing school enrollment between junior and senior secondary education?’. Regarding this research question, the study proposes the hypothesis: ‘*Program Indonesia Pintar* (by the provision of Smart Indonesia Card) is more cost-efficient in increasing the likelihood of school enrollment at senior secondary than junior secondary education’.

The result of this study suggests that to increase school enrollment at the same percentage points, the public resources required for senior secondary education is only 28.34 percent of the amount required for junior secondary education. Therefore, as the amount of input necessary to produce the same level output is very much lower, it can be concluded that the spending for senior secondary education is more cost-efficient. Based on this rationale, the third hypothesis is thus confirmed.

The possible explanation of such a finding is related to the difference in the magnitude of the effect of treatment on school enrollment. As mentioned above, the treatment effect at senior secondary education (7.67 percentage points) is very much larger than in junior secondary education (1.63 percentage points). This might be, to some extent, influenced by the much lower existing enrollment rate at senior secondary education (61.20 percent of NER in 2016) compared to junior secondary education (76.29 percent of NER in 2016) so that the room for improvement in increasing school enrollment is larger in the senior secondary level. As noted by Behrman et al., (2012), the effect of a program on the enrollment rate will tend to be small when the existing enrollment rate is already high. Therefore, the program intervention can create far more output in

senior secondary education compared to junior secondary education with only a relatively small difference of input.

Another possible explanation is that junior secondary education is under the national-level free and compulsory basic education policy. This policy has covered the mechanisms to decrease the private costs of schooling so that additional demand-side financing intervention through the *Program Indonesia Pintar* might follow the law of diminishing returns. Meanwhile, the implementation of free and compulsory policy on senior secondary education depends on the capacity of local governments. Thus, many children are still not covered by the policy when the fiscal capacity of local government is not sufficient. The data from the Central Bureau of Statistics also highlighted that those out of school at junior secondary levels of education mainly come from the poorest households, while those out of school at senior secondary education level also include those from middle-income households as well. As a result, *Program Indonesia Pintar* potentially increases enrollment at senior secondary more than junior secondary education with the same input level.

The fourth research question of this study asked: ‘To what extent does the provision of financial assistance through the *Program Indonesia Pintar* (Smart Indonesia Program) affect schooling continuation in junior and senior secondary education?’. Regarding this research question, the study proposes the hypothesis: ‘Children receiving financial assistance through the *Program Indonesia Pintar* (Smart Indonesia Program) are more likely to continue schooling than their counterparts’.

The results of this study suggest that the provision of financial assistance through the *Program Indonesia Pintar* has significantly positive impacts on increasing the likelihood of school continuation of both junior secondary students (aged 13-15) and senior secondary students (aged 16-18). By looking at the results using the inverse probability weighted regression adjustment model, the treatment effects are 1.36 percentage points (aged 13-15) and 2.67 percentage points (aged 16-18) respectively. Further examination also shows that the effects of the program on the school continuation of children aged 13-15 and 16-18 are larger for those in rural areas, boys and

those from poor households.

The possible explanation of the findings is that drop outs from schooling in Indonesia are mainly due to financial constraints. The provision of financial assistance can support children already enrolled in school to cover the costs of schooling and continue their education. As is known, demand-side financing interventions, such as the *Program Indonesia Pintar*, are generally intended to provide support to cover the direct and indirect costs of schooling to those who really need it. The treatment effects are not so largely different between junior and senior secondary students probably because the costs of continuing schooling, including transportation costs and pocket money, are not so largely different between them. The larger difference in costs of schooling between them is more likely occurs at enrollment.

Based on the findings of this study, the fourth hypothesis of this study is thus confirmed. In general, this finding is basically extent and consistent with earlier studies suggesting that demand-side financing interventions are positively affecting the schooling of children (Attanasio et al., 2010; Bai et al., 2017; Behrman et al., 2012; Brauw & Hoddinott, 2011; Carruthers & Fox, 2016; Ferro et al., 2010; Filmer & Schady, 2011; Glewwe & Kassouf, 2012; Heinrich, 2007). Such evidence is found in various kinds of demand-side financing programs in different countries with each unique mechanism.

The fifth research question of this study asked: ‘What is the cost-efficiency of the *Program Indonesia Pintar* (by the provision of financial assistance) in increasing school continuation between junior and senior secondary education?’. Regarding this research question, the study proposes the hypothesis: ‘Providing financial assistance through the *Program Indonesia Pintar* is more cost-efficient for senior secondary students than for junior secondary students in increasing the likelihood of school continuation’.

The results of this study show that to increase school continuation by 1 percentage point, the public expenditure needed in senior secondary education is only around 67.92 percent of the resources needed in junior secondary education. Therefore, it can be concluded that spending on senior secondary education is more cost-efficient. Based on this, the fifth hypothesis is thus

confirmed.

The possible explanation of this result is basically similar with the arguments provided in answering the research question regarding the cost-efficiency of *Program Indonesia Pintar* on school enrollment above. In addition, the possible explanation regarding the relatively smaller gap of efficiency in increasing school continuation than in increasing school enrollment is also influenced by the smaller difference in the costs of continuing schooling than the cost of enrolling at school.

The sixth research question of this study asked: ‘To what extent does the provision of financial assistance through the *Program Indonesia Pintar* (Smart Indonesia Program) affect child labor participation of junior and senior secondary school-aged children?’. Regarding this research question, the study proposes the hypothesis: ‘Children receiving financial assistance through the *Program Indonesia Pintar* (Smart Indonesia Program) are less likely to participate in child labor than their counterparts, especially for senior secondary school-aged children’.

The results of this study show that, in almost all cases, there is no statistically significant effect of providing financial assistance through the *Program Indonesia Pintar* on the child labor participation of children aged 13-15. Based on the estimation using the inverse probability weighted regression adjustment (IPWRA) model, a negative and significant effect is found to be limited in the subsample of children from low-income groups only. Thus, children from poor economic backgrounds are less likely to participate in child labor if they receive financial assistance compared to their counterparts.

The possible explanation for such results in the children aged 13-15 sample is that this age group is under the national-level basic compulsory education policy across the country. One of the aims of such a policy is to prevent children from participating in child labor as schooling and working are often substitutes. In this situation, whether financial assistance is existing or not, the likelihood of children aged 13-15 to be involved in child labor should be very low, much lower than for the older age group, as existing regulations prevent them from being involved in child labor. Those involved in child labor are most probably from the lowest income group. Therefore, it

is sensible that the effect of the program in reducing child labor is only visible in the subsample of the poorest households as children might be forced to work to meet the household's basic needs.

Other results of this study suggest that the provision of financial assistance through the *Program Indonesia Pintar* reduced the child labor participation of children aged 16-18. For instance, the result produces the treatment effect of -10.37 percentage points by using the inverse probability weighted regression adjustment model. Further examination also found that the negative effects are larger for those in rural areas, boys and for those from poor households. Such findings suggest that the provision of financial assistance through the *Program Indonesia Pintar* can further limit child labor participation of children aged 16-18.

The possible explanation of the results is that, according to prior literature, the demand-side financing intervention produces a substitution effect along with an income effect. Thus, children might not need to participate in child labor to generate income when financial assistance is provided. In this situation, the demand for schooling substitutes is reduced. Overall, based on the findings of this study, the sixth hypothesis of this study is thus confirmed. The findings also extend and are consistent with the results from earlier studies, (Dammert, 2009; Ferro et al., 2010; Galiani & McEwan, 2013; Ravallion & Wodon, 2000; Skoufias, Parker, Behrman, & Pessino, 2001).

6.2 Limitations of the Study

This study has a number of limitations that need to be acknowledged when interpreting the research findings. The important limitations of this study are as follows. First, this study utilizes cross-sectional secondary survey data which limits the choice of variables that can be used in the analyses. Some potentially important variables could not be included, as the survey does not ask about it. For instance, the supply-side factors which are likely to influence children's schooling are not covered in the current survey. Further study should include those potential variables that could not be included in this study.

Second, this study explores the assessment of the cost-efficiency of the provision of financial assistance between junior secondary and senior secondary levels to understand which

takes less input to produce the same level of output. However, it should be noted that the current schooling attainment, as well as the remaining out-of-school children at junior secondary and senior secondary levels in Indonesia, are largely different. This reality is not incorporated in the assessment in this study so that a cautious interpretation should be taken. Further study should explore the use of a different technique in the assessment of the cost-efficiency to confirm the findings of this study.

Third, this study discusses the difference in findings between junior secondary and senior secondary levels of education. However, we must be aware that the interpretation of the findings should not be based merely on the quantitative aspect because of the difference in the role of junior secondary and senior secondary education, as well as other levels of education, in the whole education system. For that reason, the qualitative aspect should be taken into account as well in order to provide a more comprehensive view, which can be explored and discussed in more detail in future studies.

In addition, regarding the methodological issue, future studies could explore the use of other quantitative methodological approaches utilizing panel data, repeated cross-sectional data or others instead of cross-sectional data. By doing so, a longer-term impact evaluation could be performed.

6.3 Conclusion

Investment in human capital through schooling is vital as it is often considered as an effective pathway to break the vicious circle of poverty. Understanding the importance of this, the government of Indonesia has allocated a larger proportion of the national budget to the education sector in recent times. In addition, a mixture of policies to promote education has been introduced in the country, including the compulsory education policy, the school construction program and various other kinds of supply-side and demand-side interventions. The demand-side financing intervention programs in Indonesia have been evolving from the School Grant Program in 1998, the *Bantuan Khusus Murid* (Scholarship Program for Poor Student) in 2001, the *Bantuan Siswa*

Miskin (Cash Transfer for Poor Students) in 2008 and most recently the *Program Indonesia Pintar* (Smart Indonesia Program) in 2014.

This study firstly intended to investigate demand-side factors influencing the schooling enrollment of junior and senior secondary school-age children in Indonesia to find out whether socioeconomic background remains an important predictor of children's schooling. Furthermore, this study also aimed to investigate the effect of the *Program Indonesia Pintar* (Smart Indonesia Program) on school enrollment, school continuation and child labor participation of junior and senior secondary school-aged children in Indonesia which have rarely been investigated by a quantitative approach in the Indonesian context. In addition, the cost-efficiency of financial assistance is also examined. This study further explores the heterogeneity of the impact of such kinds of demand-side financing intervention, whether by gender, location and across household wealth groups.

Consistent with previous research, this study finds that a number of individual, household and community characteristics are associated with the schooling of children aged 13-15 (junior secondary schooling age) and aged 16-18 (senior secondary schooling age) in Indonesia. More specifically, the socioeconomic status remains a strong predictor of children's schooling, where children from a low socioeconomic background are still disadvantaged despite the implementation of the compulsory and free basic education policy in the country. The strong association of household income with school enrollment indicates that financial issues remain a constraint for children from disadvantaged groups to access schools. This finding implies that further government intervention alternatives, in particular targeted for poor households, are necessary to close the schooling gap between the poor and non-poor.

This study also finds that the impact of the existing demand-side financing intervention program in Indonesia, the *Program Indonesia Pintar* (Smart Indonesia Program), is multidimensional. The program increases the likelihood of children enrolling and continuing at junior and senior secondary education. In addition, the program somewhat decreases the likelihood of children participating in child labor, particularly for children aged 16-18. The

consistent positive effect of the program to increase the likelihood of schooling enrollment and continuation suggests that providing financial assistance for junior secondary as well as senior secondary education remains necessary. The program might have a vital role in supporting the accomplishment of the government's target of achieving universal secondary education nationally, where all children attend school until graduating from, at least, senior secondary education. Such a positive impact of the program might be partially contributed to by the fact that the program requires that the money received by recipients be spent for specific purposes related to schooling needs, such as school uniforms and stationery. If households are given the same amount of money without specific conditionalities, the impact of the program might be different because households might prefer to use the money for other more immediate needs such as for food and housing. Therefore, the conditionality may possibly remain necessary to make sure that the program achieves what was intended.

In addition to achieving what was intended, the cost-efficiency issue should also be considered as the government deals with resource constraints. However, it should be noted that this study does not intend to oppose junior secondary and senior secondary education since both levels of education are strongly connected, where children must have already passed junior secondary education to attend senior secondary school. Moreover, each level of education has its own specific purposes for society. The findings of the cost-efficiency assessment in this study show that further expansion of the coverage of the financial assistance recipients for senior secondary students, particularly from disadvantaged backgrounds, is suggested to make sure that junior secondary graduates can progress their education to senior secondary schools. However, the provision of financial assistance for junior secondary students is still necessary to make sure that all children can finish junior secondary schools. The provision of financial assistance for junior secondary students is also necessary to address the equity issue because those attending junior secondary education are more likely to have a lower socioeconomic background than those attending senior secondary education. This is due to the tendency that children from poor households being more likely to drop out of their schooling progression due to financial

constraints.

Financial constraints also often push children to participate in child labor. This study finds that the demand-side financing intervention program has also contributed to reducing the likelihood of child labor participation in Indonesia, especially in senior secondary schooling age children. This finding is consistent with a number of earlier research studies that reveal the additional effect of such a program in reducing child labor although, in many cases, the impact in reducing child labor is weaker compared to increasing schooling attendance as child labor does not always substitute or otherwise prove to be incompatible with schooling. The findings of this study also indicate that other existing government policies, such as the compulsory and free basic education policy, might have prevented junior secondary school-aged children participating in child labor in the first place so that the program's effect in this regard is less apparent in the junior secondary school-aged children.

It is very important to make sure that the financial assistance gets to those who really need it. However, this study finds that inclusion and exclusion errors remain an issue in the distribution of the *Program Indonesia Pintar* (Smart Indonesia Program). In this situation, children who are not eligible are selected as beneficiaries and those who are eligible are excluded as beneficiaries of financial assistance. Such issues need to be resolved to enlarge the overall benefit of the program. This study has also shown that better targeting will lead to greater program impact. To address this issue, lessons learned from similar demand-side government intervention programs can be adopted. For instance, necessary actions to reduce the inclusion errors include verification of the database and home-visits. On the other hand, the dissemination of the program's information can be used to reduce exclusion errors. In the beginning, the eligibility criteria to receive financial assistance should be clear and consist of a clear set of indicators. Overall, to further increase the program's impact, the government can enhance the design and implementation of the program. There is room for improvement related to the targeting and distribution mechanism. In addition, transparency and accountability are also crucial so that leakage can be avoided.

It should be noted that this study focused on the demand-side perspective. Principally, the

demand-side intervention is mainly targeted to a specific group that really demands it, which in most cases will be poorer households. Improving demand-side alone is not enough to accomplish the main purpose of improving human capital through education. Therefore, other kinds of financial and non-financial government support should also be provided. For instance, literature suggests that several non-financial aspects, such as parent's awareness of the importance of education, also influence the schooling of children.

All in all, the findings of this study assert that demand-side financing intervention plays an important role in increasing school enrollment and school continuation as well as reducing child labor participation. For that reason, continuation and expansion are suggested. However, better distribution of financial assistance is required, by making sure that the poor are selected and those from better income households are excluded, in order to increase the significance of the program's impact and to, therefore, achieve its' objectives. Otherwise, the schooling gap between rich and poor might persists over time.

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ANNEXES

Annex I: Supplementary Tables

Table A-1: Summary of Sample, Aged 13-15

Table A-2: Summary of Sample, Aged 16-18

Table A-3: Probit Estimation Predicting the Likelihood of Graduating Primary School,
Children Aged 13-15

Table A-4: Probit Estimation Predicting the Likelihood of Enrolling Junior Secondary School,
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Table A-5: Probit Estimation Predicting the Likelihood of Graduating Junior Secondary School,
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Table A-6: Probit Estimation Predicting the Likelihood of Enrolling Senior Secondary School,
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Table A-7: Logit Estimation Predicting the Likelihood of Receiving KIP, Children Aged 13-15

Table A-8: Logit Estimation Predicting the Likelihood of Receiving Financial Assistance,
Children Aged 13-15

Table A-9: Logit Estimation Predicting the Likelihood of Receiving KIP, Children Aged 16-18

Table A-10: Logit Estimation Predicting the Likelihood of Receiving Financial Assistance,
Children Aged 16-18

Table A-1: Summary of Sample, Aged 13-15

Age	All	Graduated from Primary School	Enrolled in Junior Secondary School	Continue Attending Junior Secondary School
13	4,537	3,915	3,909	3,904
14	4,562	4,236	4,188	4,162
15	3,342	3,081	2,957	2,893
13-15	12,441	11,232	11,054	10,959

Source: Created by the author using Susenas 2015.

Table A-2: Summary of Sample, Aged 16-18

Age	All	Graduated from Junior Secondary School	Enrolled in Senior Secondary School	Continue Attending Senior Secondary School
16	4,006	3,109	2,975	2,942
17	3,451	2,970	2,779	2,722
18	2,030	1,686	1,426	1,357
16-18	9,487	7,765	7,180	7,021

Source: Created by the author using Susenas 2015.

Table A-3: Probit Estimation Predicting the Likelihood of Graduating Primary School, Children Aged 13-15

Variables	Aged 13-15	
	Coefficient	Marginal Effect
Age	.253*** (.022)	.031*** (.003)
Sex (Girl)	.216*** (.034)	.026*** (.004)
Birth Order	.010 (.024)	.001 (.003)
Number of Siblings	-.077*** (.016)	-.009*** (.002)
Household Head Age	.042** (.019)	.005** (.002)
Household Head Age Squared	-.000** (.000)	-.000** (.000)
Head of Household Education	.249*** (.018)	.031*** (.002)
Missing Father	-.051 (.064)	-.006 (.008)
Missing Mother	-.309*** (.093)	-.047*** (.017)
Log of per Capita Household Consumption	.169*** (.035)	.021*** (.004)
Rural	-.175*** (.037)	-.021*** (.004)
Studying Time	.008*** (.000)	.001*** (.000)
Constant	-5.811*** (.687)	
Observations		12,441
LR chi2		1,117.62
Prob > chi2		.0000
Pseudo R2		.1409

Source: Created by the author using Susenas 2015.

Table A-4: Probit Estimation Predicting the Likelihood of Enrolling Junior Secondary School, Children Aged 13-15

Variables	Aged 13-15	
	Coefficient	Marginal Effect
Age	.105*** (.020)	.017*** (.003)
Sex (Girl)	.255*** (.032)	.040*** (.005)
Birth Order	-.005 (.023)	-.001 (.004)
Number of Siblings	-.068*** (.015)	-.011*** (.002)
Household Head Age	.043** (.017)	.007** (.003)
Household Head Age Squared	-.000*** (.000)	-.000*** (.000)
Head of Household Education	.274*** (.017)	.043*** (.003)
Missing Father	-.065 (.060)	-.011 (.010)
Missing Mother	-.355*** (.087)	-.070*** (.021)
Log of per Capita Household Consumption	.223*** (.033)	.035*** (.005)
Rural	-.228*** (.035)	-.035*** (.005)
Constant	-4.341*** (.641)	
Observations	12,441	
LR chi2	846.79	
Prob > chi2	.0000	
Pseudo R2	.0973	

Source: Created by the author using Susenas 2015.

Table A-5: Probit Estimation Predicting the Likelihood of Graduating Junior Secondary School, Children Aged 16-18

Variables	Aged 16-18	
	Coefficient	Marginal Effect
Age	.271*** (.022)	.058*** (.004)
Sex (Girl)	.306*** (.033)	.065*** (.007)
Birth Order	-.031 (.025)	-.007 (.005)
Number of Siblings	-.046*** (.015)	-.010*** (.003)
Household Head Age	.057*** (.019)	.012*** (.004)
Household Head Age Squared	-.001*** (.000)	-.000*** (.000)
Head of Household Education	.206*** (.017)	.044*** (.004)
Missing Father	-.173*** (.054)	-.040*** (.013)
Missing Mother	-.219** (.088)	-.052** (.023)
Log of per Capita Household Consumption	.264*** (.034)	.056*** (.007)
Rural	-.246*** (.035)	-.052*** (.007)
Studying Time	.009*** (.000)	.002*** (.000)
Constant	-8.870*** (.739)	
Observations		9,487
LR chi2		1,385.74
Prob > chi2		.0000
Pseudo R2		.1542

Source: Created by the author using Susenas 2015.

Table A-6: Probit Estimation Predicting the Likelihood of Enrolling Senior Secondary School, Children Aged 16-18

Variables	Aged 16-18	
	Coefficient	Marginal Effect
Age	.026 (.019)	.007 (.006)
Sex (Girl)	.348*** (.030)	.100*** (.008)
Birth Order	-.047** (.023)	-.014** (.007)
Number of Siblings	-.002 (.014)	-.001 (.004)
Household Head Age	.075*** (.018)	.022*** (.005)
Household Head Age Squared	-.001*** (.000)	-.000*** (.000)
Head of Household Education	.250*** (.015)	.072*** (.004)
Missing Father	-.178*** (.050)	-.054*** (.016)
Missing Mother	-.275*** (.082)	-.087*** (.028)
Log of per Capita Household Consumption	.419*** (.031)	.121*** (.009)
Rural	-.203*** (.032)	-.058*** (.009)
Constant	-7.450*** (.678)	
Observations	9,487	
LR chi2	1,154.60	
Prob > chi2	.0000	
Pseudo R2	.1097	

Source: Created by the author using Susenas 2015.

**Table A-7: Logit Estimation Predicting the Likelihood of Receiving KIP,
Children Aged 13-15**

Variables	Aged 13-15	
	Coefficient	Standard Error
Age	-.094	(.120)
Sex (Girl)	-.316*	(.191)
Birth Order	.252*	(.144)
Number of Siblings	-.191*	(.105)
Household Head Age	-.156*	(.086)
Household Head Age Squared	.002**	(.001)
Head of Household Education	-.023	(.090)
Missing Father	-.303	(.396)
Missing Mother	.504	(.466)
Log of per Capita Household Consumption	-.636***	(.195)
Rural	-.891***	(.198)
Constant	9.235**	(3.56)
Observations	12,441	
LR chi2	41.15	
Prob > chi2	.0000	
Pseudo R2	.0313	

Source: Created by the author using Susenas 2015.

Table A-8: Logit Estimation Predicting the Likelihood of Receiving Financial Assistance, Children Aged 13-15

Variables	Aged 13-15	
	Coefficient	Standard Error
Age	-.037	(.038)
Sex (Girl)	.060	(.060)
Birth Order	-.013	(.043)
Number of Siblings	.051*	(.029)
Household Head Age	-.032	(.034)
Household Head Age Squared	.000	(.000)
Head of Household Education	-.146***	(.030)
Missing Father	.267**	(.108)
Missing Mother	.138	(.188)
Log of per Capita Household Consumption	-.849***	(.066)
Rural	.069	(.066)
Constant	10.504***	(1.25)
Observations	12,441	
LR chi2	392.50	
Prob > chi2	.0000	
Pseudo R2	.0475	

Source: Created by the author using Susenas 2015.

**Table A-9: Logit Estimation Predicting the Likelihood of Receiving KIP,
Children Aged 16-18**

Variables	Aged 16-18	
	Coefficient	Standard Error
Age	-.140	(.163)
Sex (Girl)	-.110	(.243)
Birth Order	.320*	(.188)
Number of Siblings	-.140	(.122)
Household Head Age	.133	(.191)
Household Head Age Squared	-.001	(.002)
Head of Household Education	-.159	(.118)
Missing Father	-.683	(.523)
Missing Mother	-.205	(.726)
Log of per Capita Household Consumption	-.118	(.238)
Rural	-.730***	(.257)
Constant	-3.503	(6.15)
Observations	9,487	
LR chi2	15.75	
Prob > chi2	.1508	
Pseudo R2	.0193	

Source: Created by the author using Susenas 2015.

Table A-10: Logit Estimation Predicting the Likelihood of Receiving Financial Assistance, Children Aged 16-18

Variables	Aged 16-18	
	Coefficient	Standard Error
Age	-.337***	(.058)
Sex (Girl)	.244***	(.085)
Birth Order	-.216***	(.066)
Number of Siblings	.131***	(.036)
Household Head Age	.083	(.056)
Household Head Age Squared	-.001	(.001)
Head of Household Education	-.170***	(.043)
Missing Father	.234*	(.140)
Missing Mother	-.079	(.272)
Log of per Capita Household Consumption	-.556***	(.090)
Rural	-.014	(.091)
Constant	8.311***	(2.00)
Observations	9,487	
LR chi2	164.29	
Prob > chi2	.0000	
Pseudo R2	.0364	

Source: Created by the author using Susenas 2015.

Annex II: Supplementary Figures

- Figure A-1: Educational Participation of Sample, Primary School Graduates (Aged 13-15)
- Figure A-2: Educational Participation of Sample, Junior Secondary School Entrance (Aged 13-15)
- Figure A-3: Educational Participation of Sample, Junior Secondary School Graduates (Aged 16-18)
- Figure A-4: Educational Participation of Sample, Senior Secondary School Entrance (Aged 16-18)
- Figure A-5: Comparison of the Average Schooling Cost, Financial Assistance and Per Capita Consumption by Consumption Quintile, Children Aged 13-15
- Figure A-6: Comparison of the Average Schooling Cost, Financial Assistance and Per Capita Consumption by Consumption Quintile, Children Aged 16-18
- Figure A-7: Kernel Density of Propensity Score Distribution, School Enrollment (Aged 13-15)
- Figure A-8: Kernel Density of Propensity Score Distribution, School Enrollment (Aged 16-18)
- Figure A-9: Kernel Density of Propensity Score Distribution, School Continuation (Aged 13-15)
- Figure A-10: Kernel Density of Propensity Score Distribution, School Continuation (Aged 16-18)
- Figure A-11: Kernel Density of Propensity Score Distribution, Child Labor (Aged 13-15)
- Figure A-12: Kernel Density of Propensity Score Distribution, Child Labor (Aged 16-18)
- Figure A-13: Covariate Balance Plots, School Enrollment (Children Aged 13-15)
- Figure A-14: Covariate Balance Plots, School Enrollment (Children Aged 16-18)
- Figure A-15: Covariate Balance Plots, School Continuation (Children Aged 13-15)
- Figure A-16: Covariate Balance Plots, School Continuation (Children Aged 16-18)
- Figure A-17: Covariate Balance Plots, Child Labor (Children Aged 13-15)
- Figure A-18: Covariate Balance Plots, Child Labor (Children Aged 16-18)
- Figure A-19: School Participation of Children Aged 13-15, 2015
- Figure A-20: School Participation of Children Aged 13-15, 2016

Figure A-21: School Participation of Children Aged 16-18, 2015

Figure A-22: School Participation of Children Aged 16-18, 2016

Figure A-23: School Availability in the Region, Junior Secondary School in 2011

Figure A-24: School Availability in the Region, Junior Secondary School in 2014

Figure A-25: School Availability in the Region, Senior Secondary School in 2011

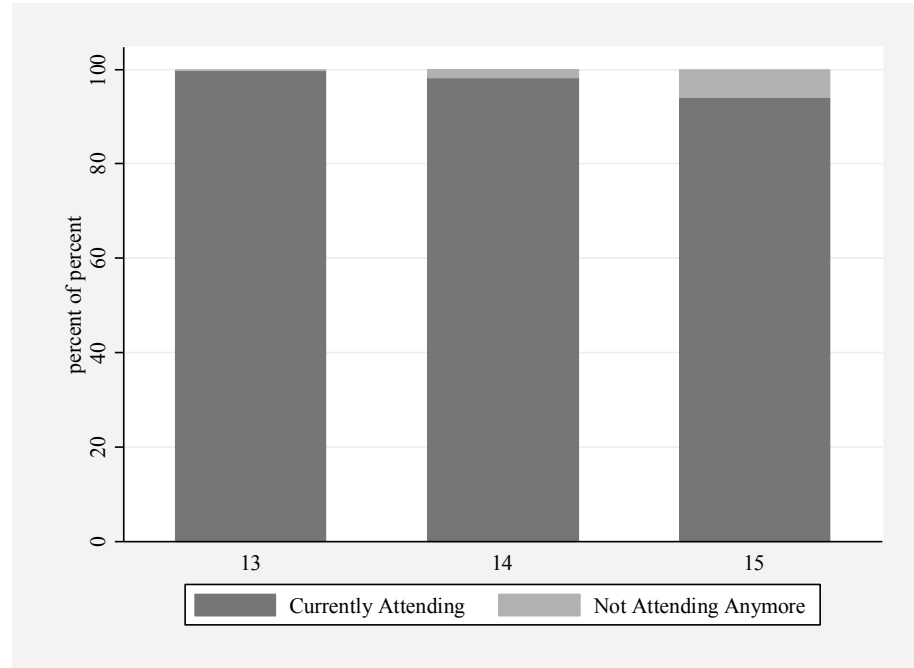
Figure A-26: School Availability in the Region, Senior Secondary School in 2014

Figure A-27: School Availability in the Region, Vocational Secondary School in 2011

Figure A-28: School Availability in the Region, Vocational Secondary School in 2014

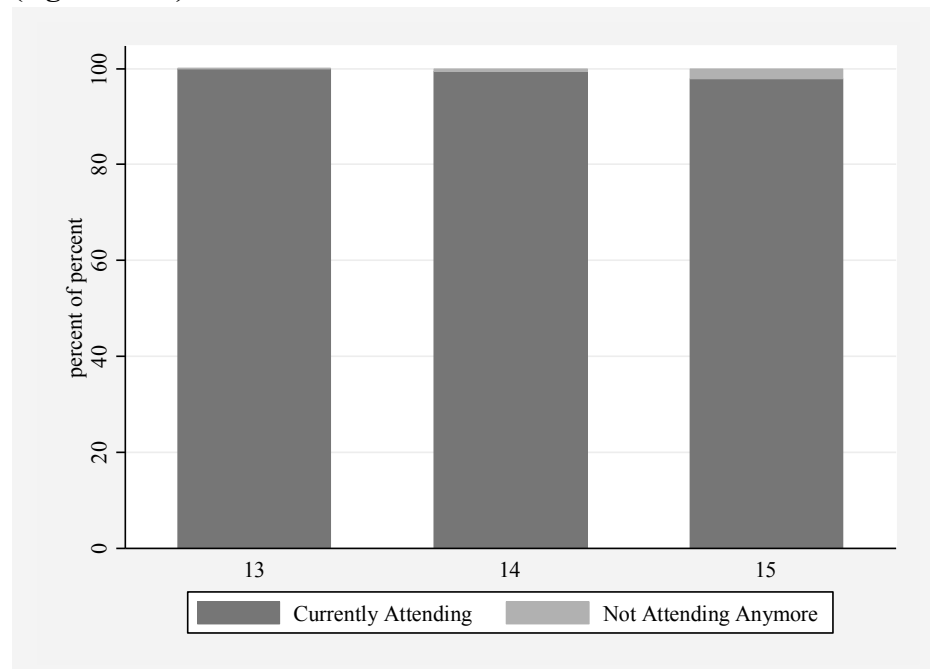
Figure A-29: Population Density, 2015

Figure A-1: Educational Participation of Sample, Primary School Graduates (Aged 13-15)



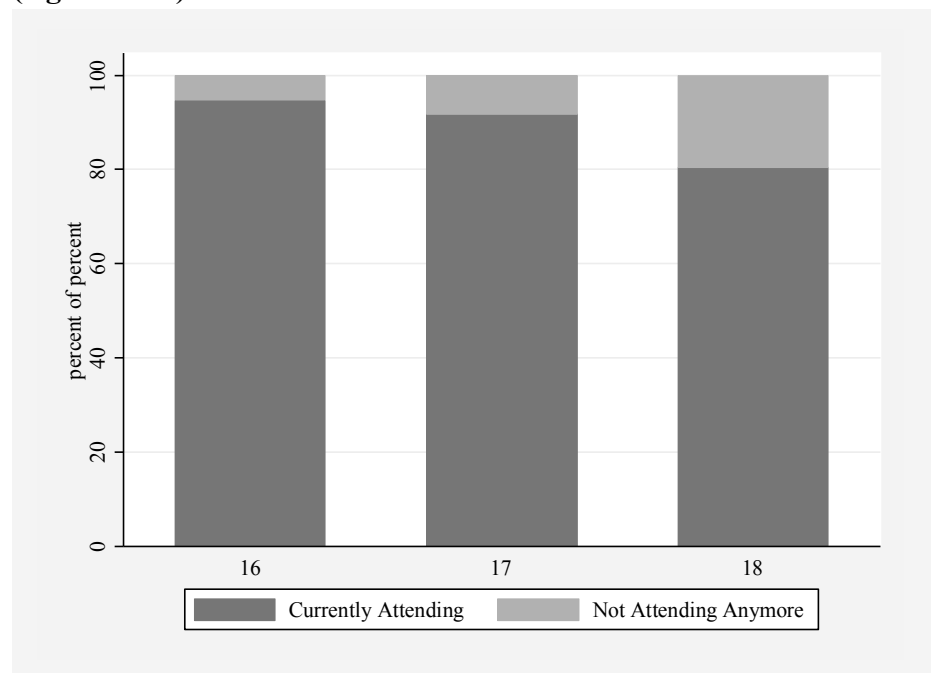
Source: Created by the author using Susenas 2015.

Figure A-2: Educational Participation of Sample, Junior Secondary School Entrance (Aged 13-15)



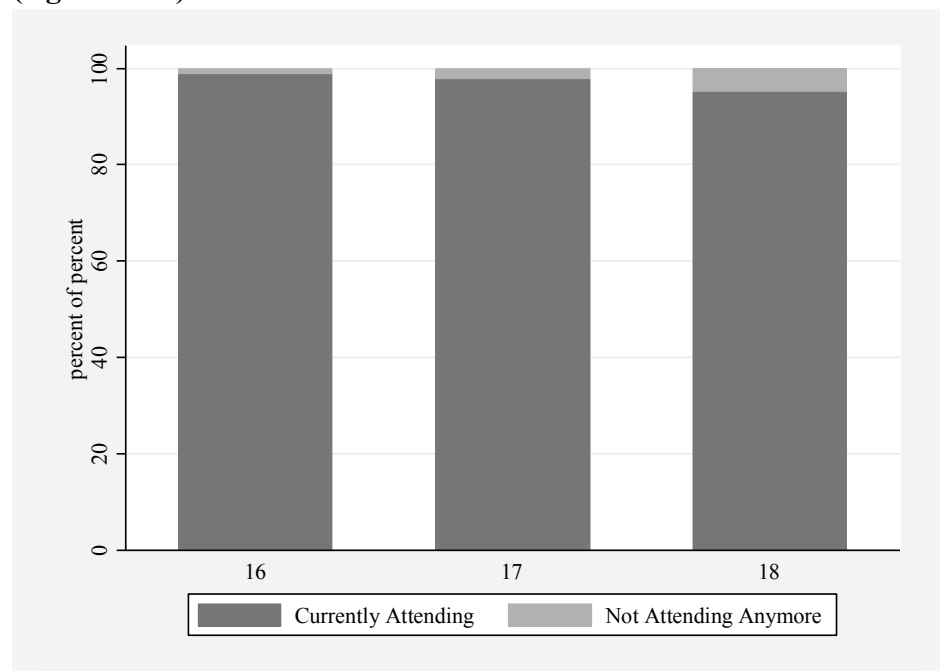
Source: Created by the author using Susenas 2015.

Figure A-3: Educational Participation of Sample, Junior Secondary School Graduates (Aged 16-18)



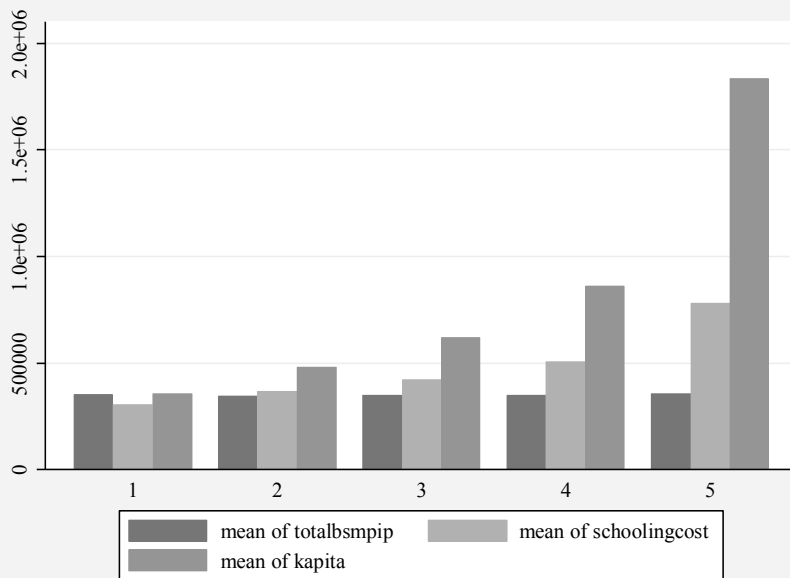
Source: Created by the author using Susenas 2015.

Figure A-4: Educational Participation of Sample, Senior Secondary School Entrance (Aged 16-18)



Source: Created by the author using Susenas 2015.

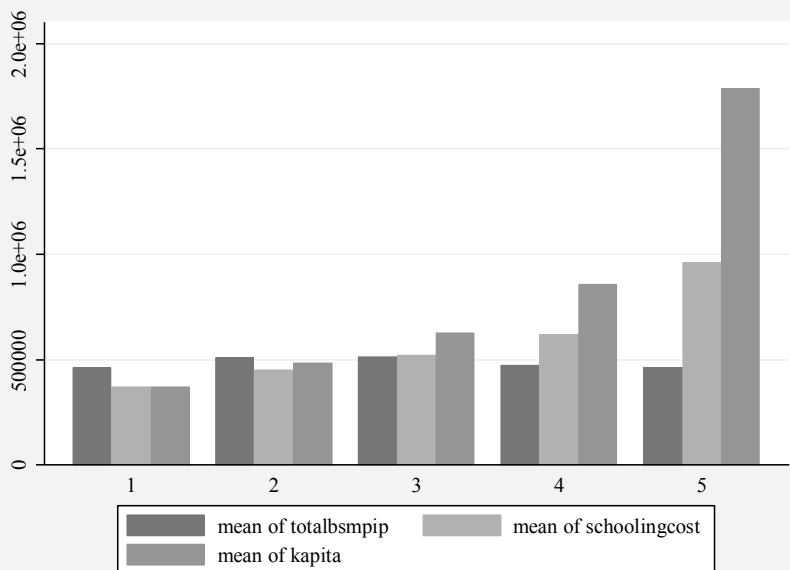
Figure A-5: Comparison of the Average Schooling Cost, Financial Assistance and Per Capita Consumption by Consumption Quintile, Children Aged 13-15



Source: Created by the author using Susenas 2015.

Note: 1 = poorest; 5 = richest.

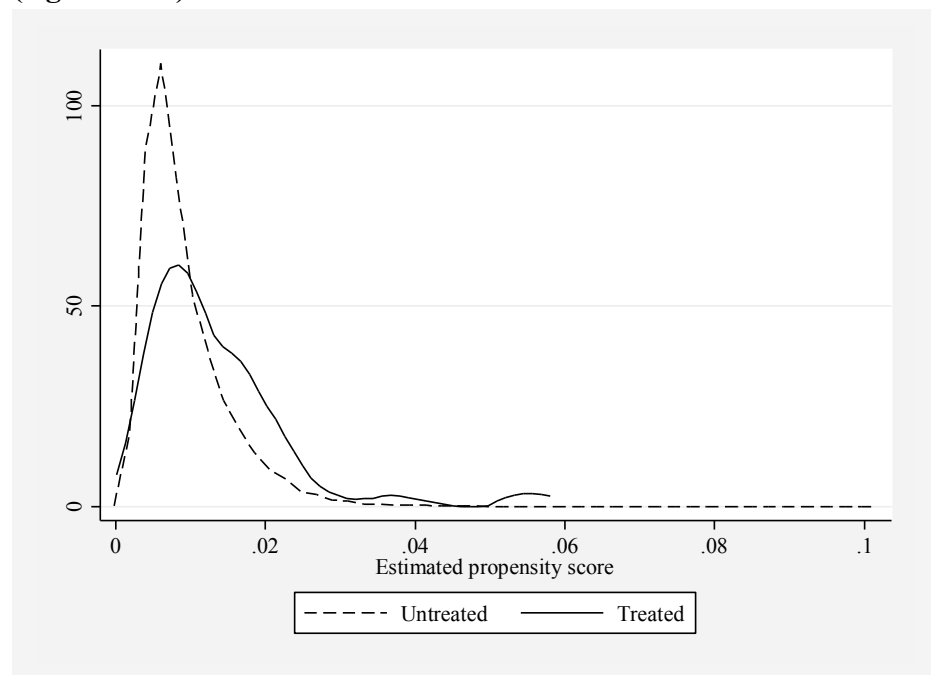
Figure A-6: Comparison of the Average Schooling Cost, Financial Assistance and Per Capita Consumption by Consumption Quintile, Children Aged 16-18



Source: Created by the author using Susenas 2015.

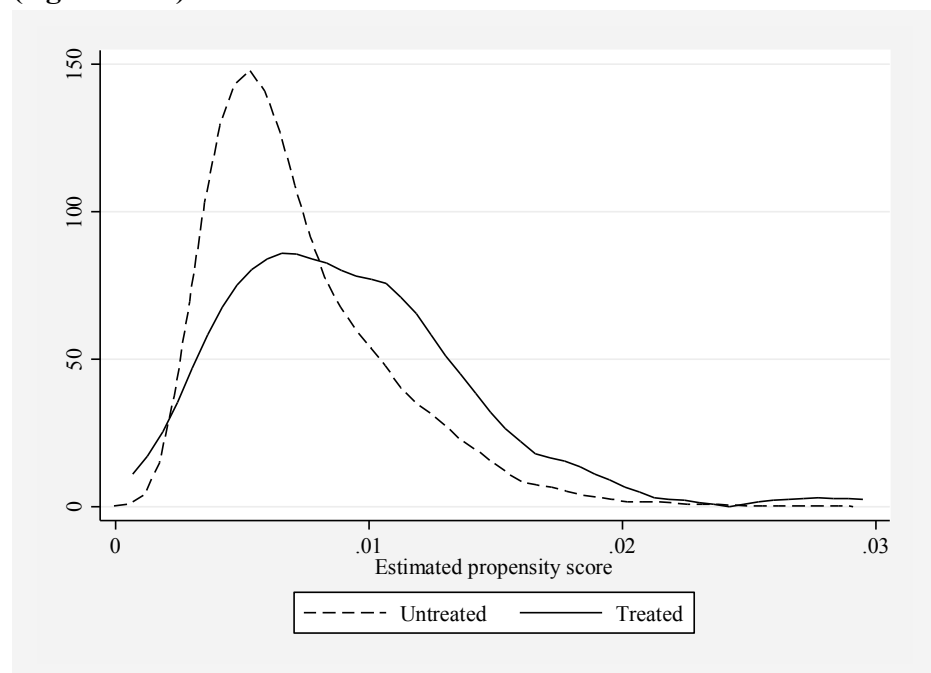
Note: 1 = poorest; 5 = richest.

Figure A-7: Kernel Density of Propensity Score Distribution, School Enrollment (Aged 13-15)



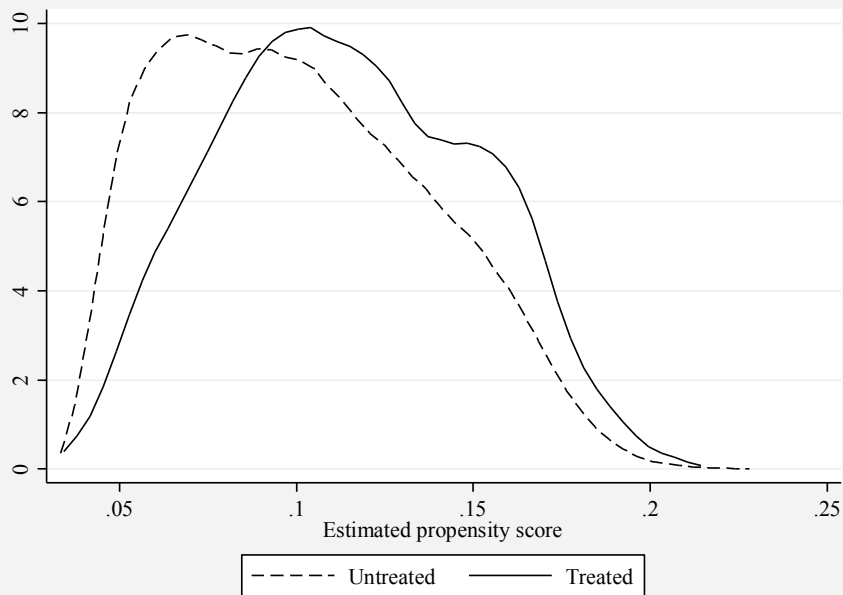
Source: Created by the author using Susenas 2015.

Figure A-8: Kernel Density of Propensity Score Distribution, School Enrollment (Aged 16-18)



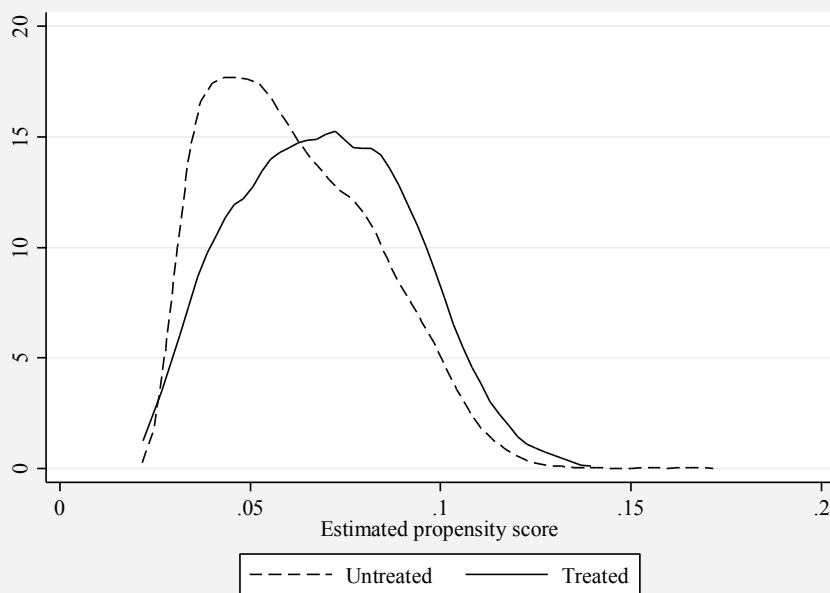
Source: Created by the author using Susenas 2015.

**Figure A-9: Kernel Density of Propensity Score Distribution, School Continuation
(Aged 13-15)**



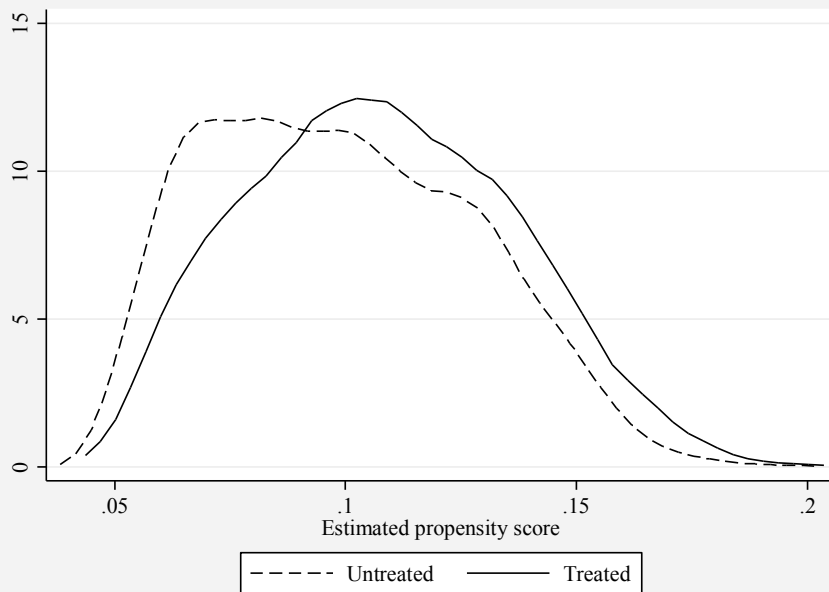
Source: Created by the author using Susenas 2015.

**Figure A-10: Kernel Density of Propensity Score Distribution, School Continuation
(Aged 16-18)**



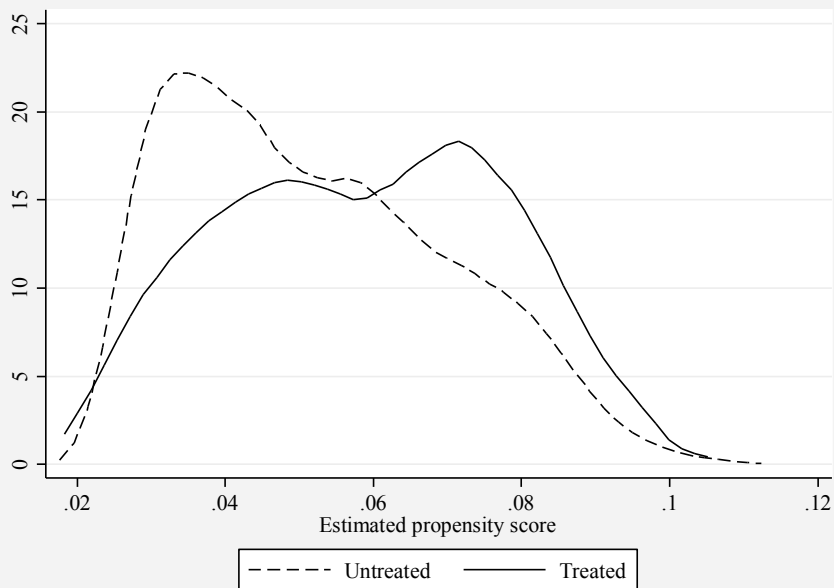
Source: Created by the author using Susenas 2015.

Figure A-11: Kernel Density of Propensity Score Distribution, Child Labor (Aged 13-15)



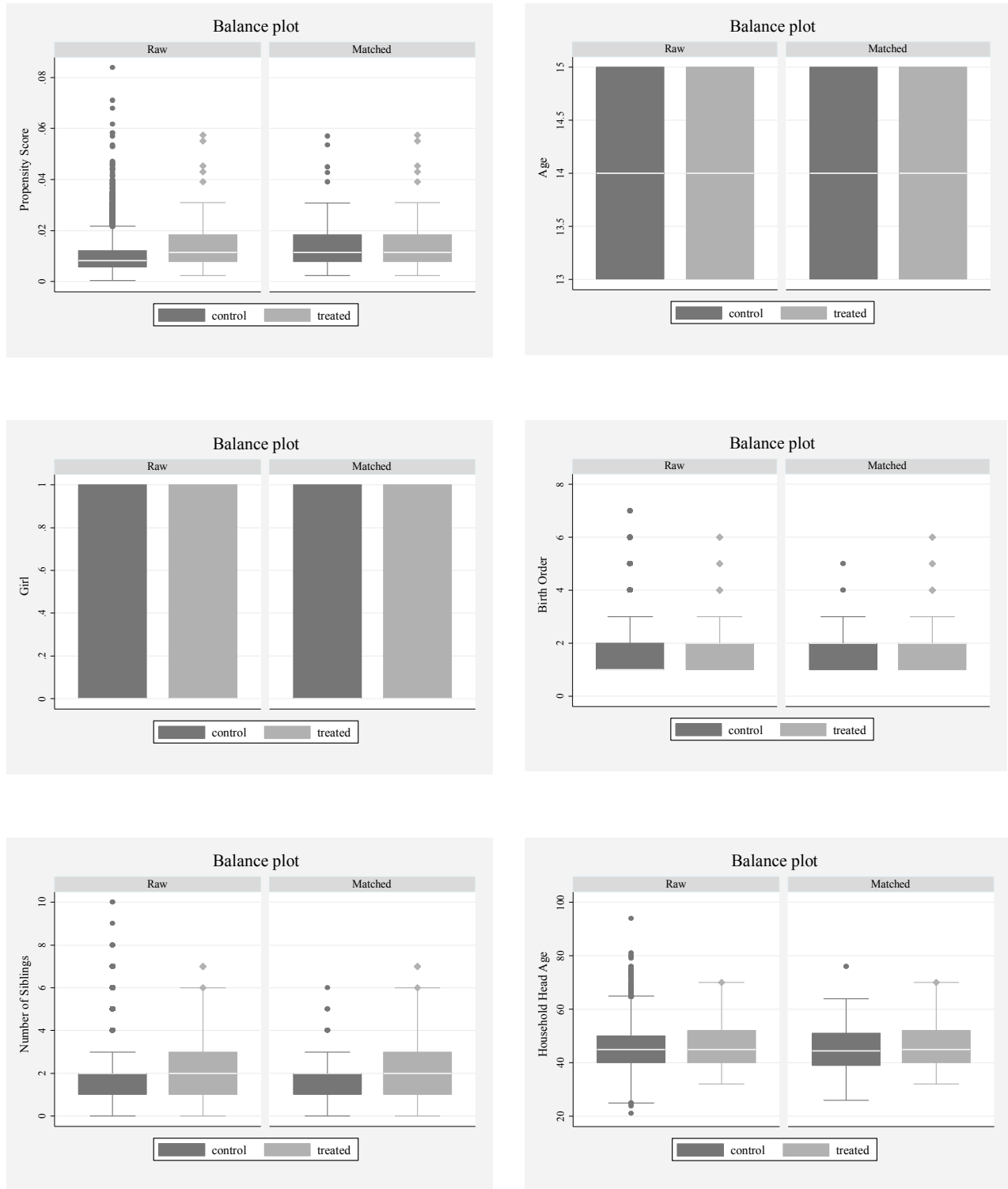
Source: Created by the author using Susenas 2015.

Figure A-12: Kernel Density of Propensity Score Distribution, Child Labor (Aged 16-18)



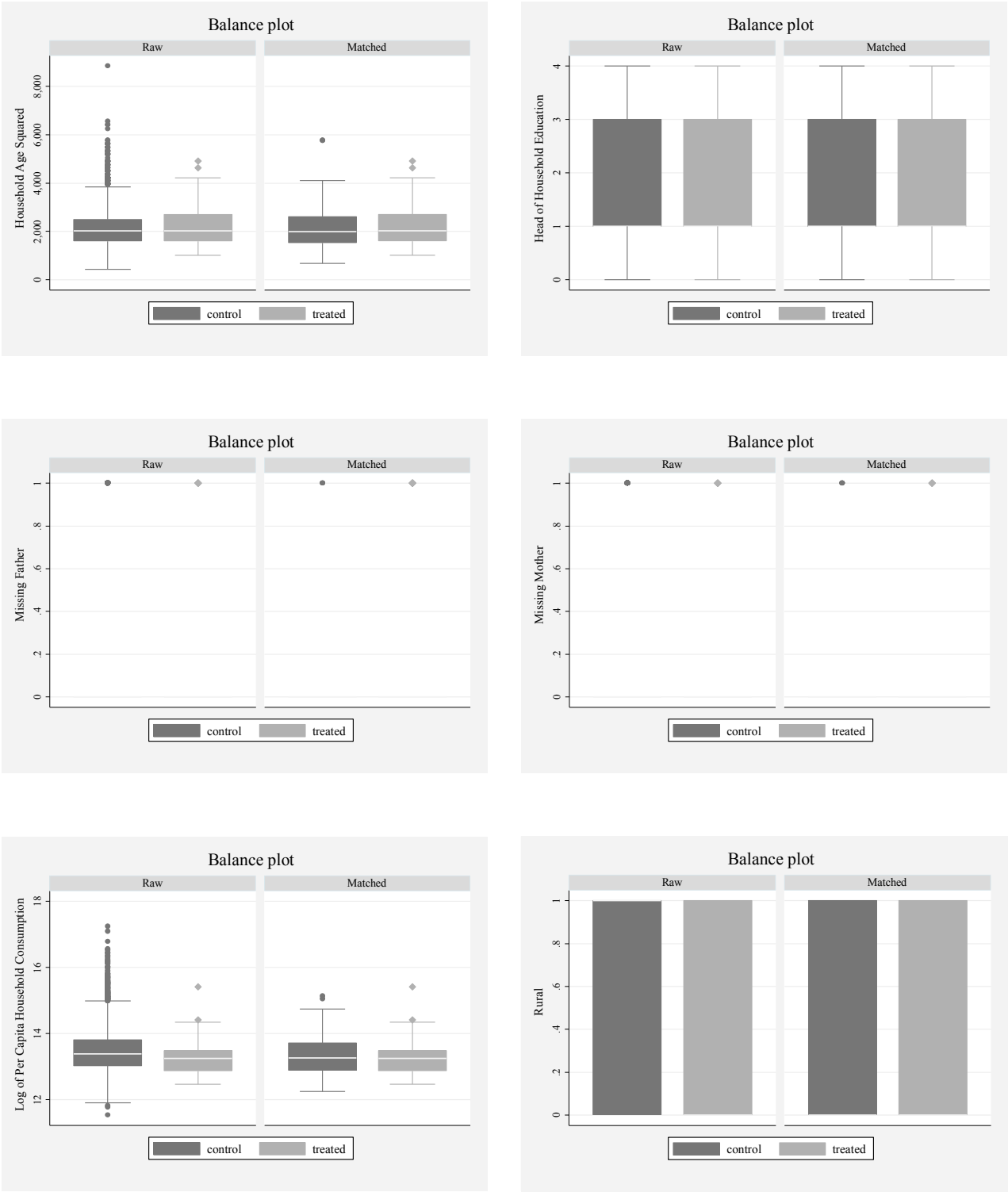
Source: Created by the author using Susenas 2015.

Figure A-13: Covariate Balance Plots, School Enrollment (Children Aged 13-15)



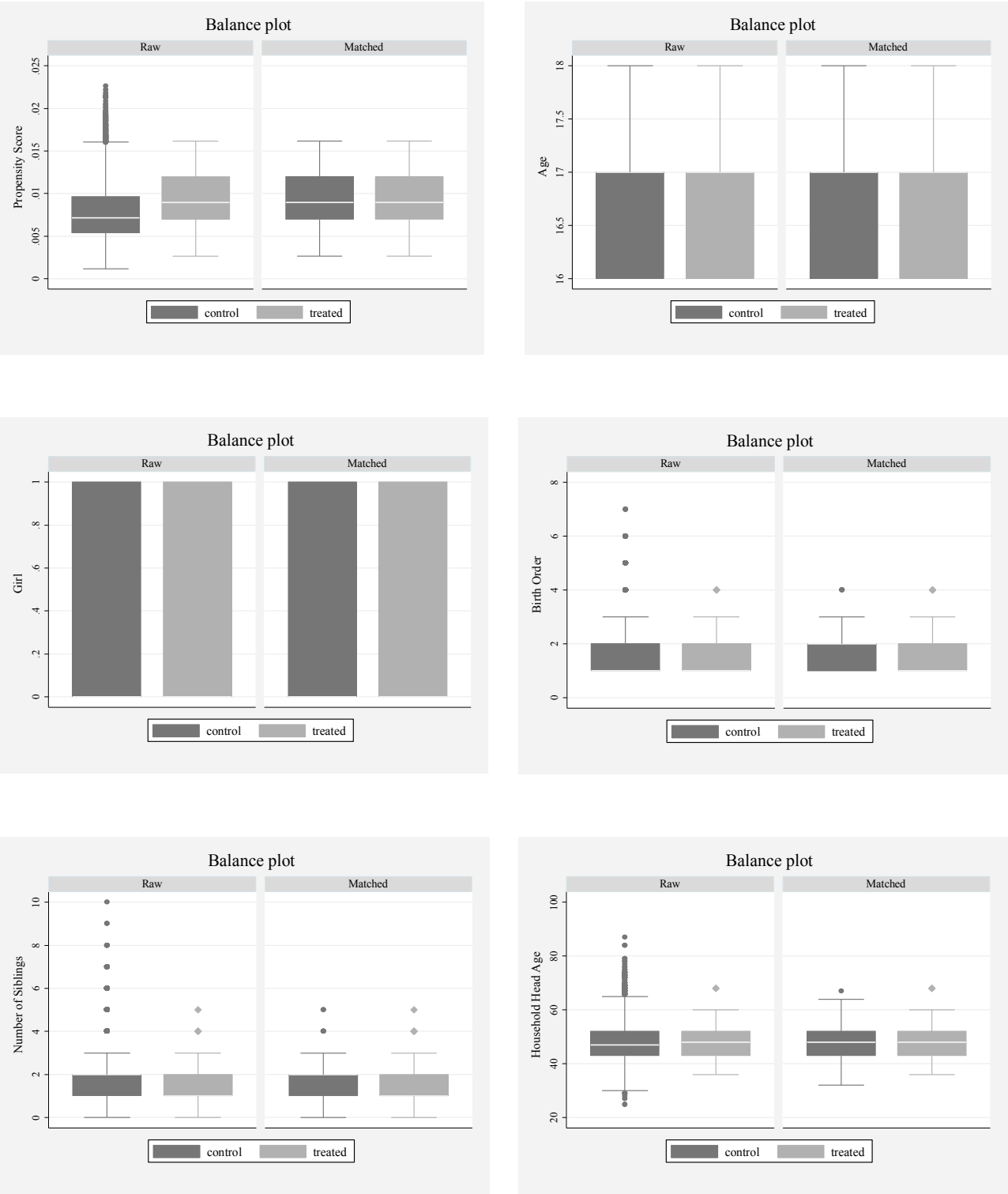
Source: Created by the author using Susenas 2015.

Figure A-13: Covariate Balance Plots, School Enrollment (Children Aged 13-15) (continued)



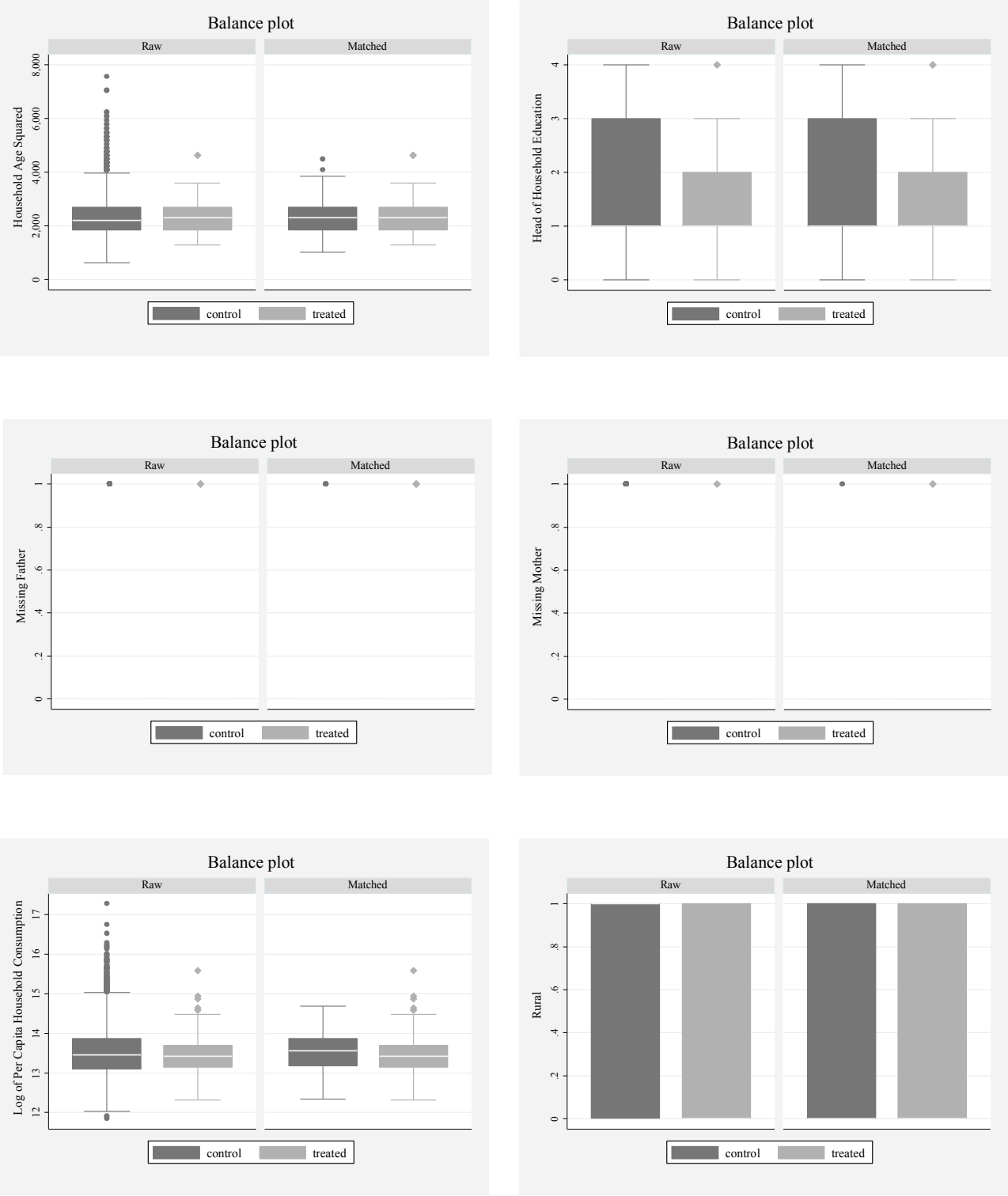
Source: Created by the author using Susenas 2015.

Figure A-14: Covariate Balance Plots, School Enrollment (Children Aged 16-18)



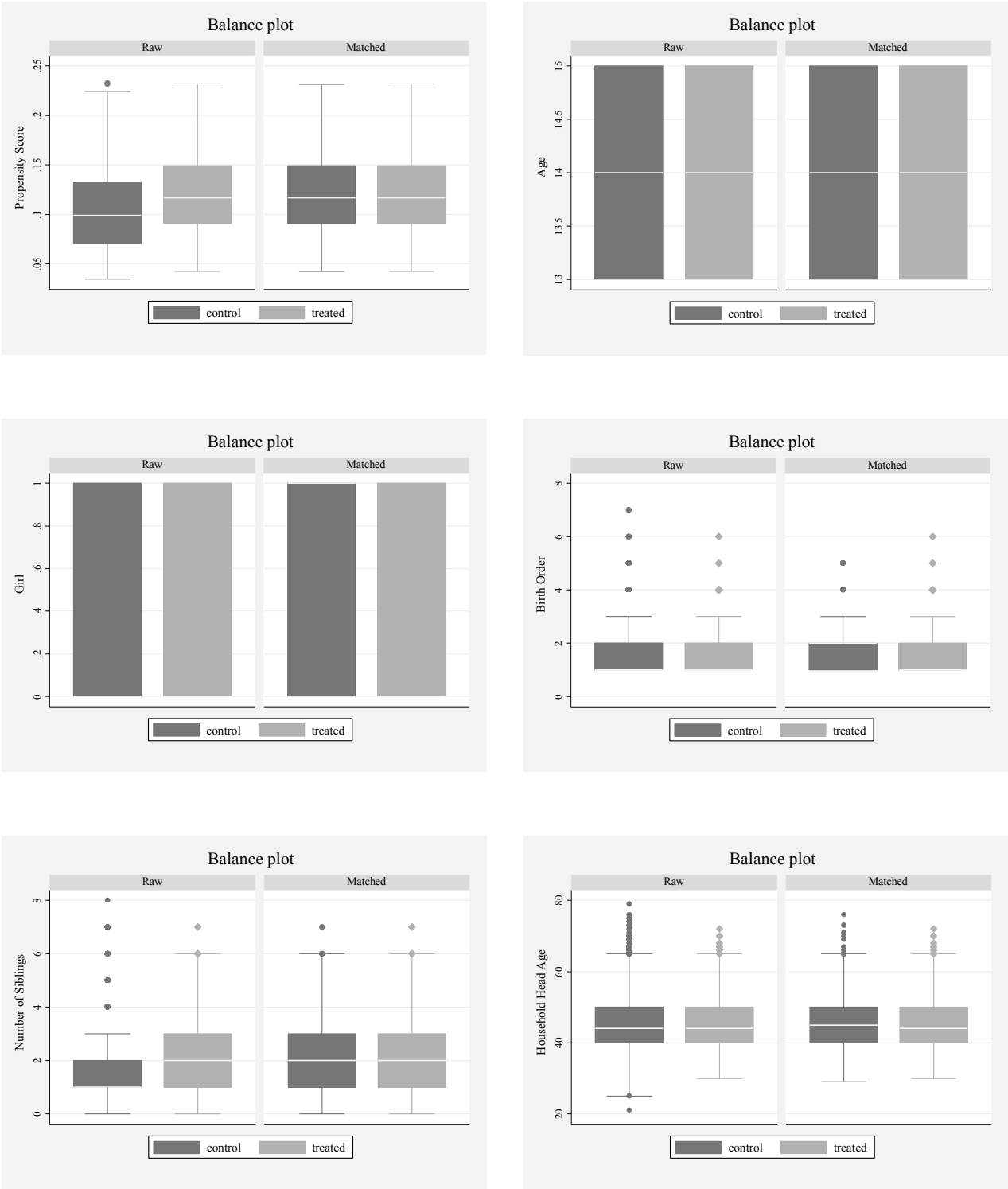
Source: Created by the author using Susenas 2015.

Figure A-14: Covariate Balance Plots, School Enrollment (Children Aged 16-18) (continued)



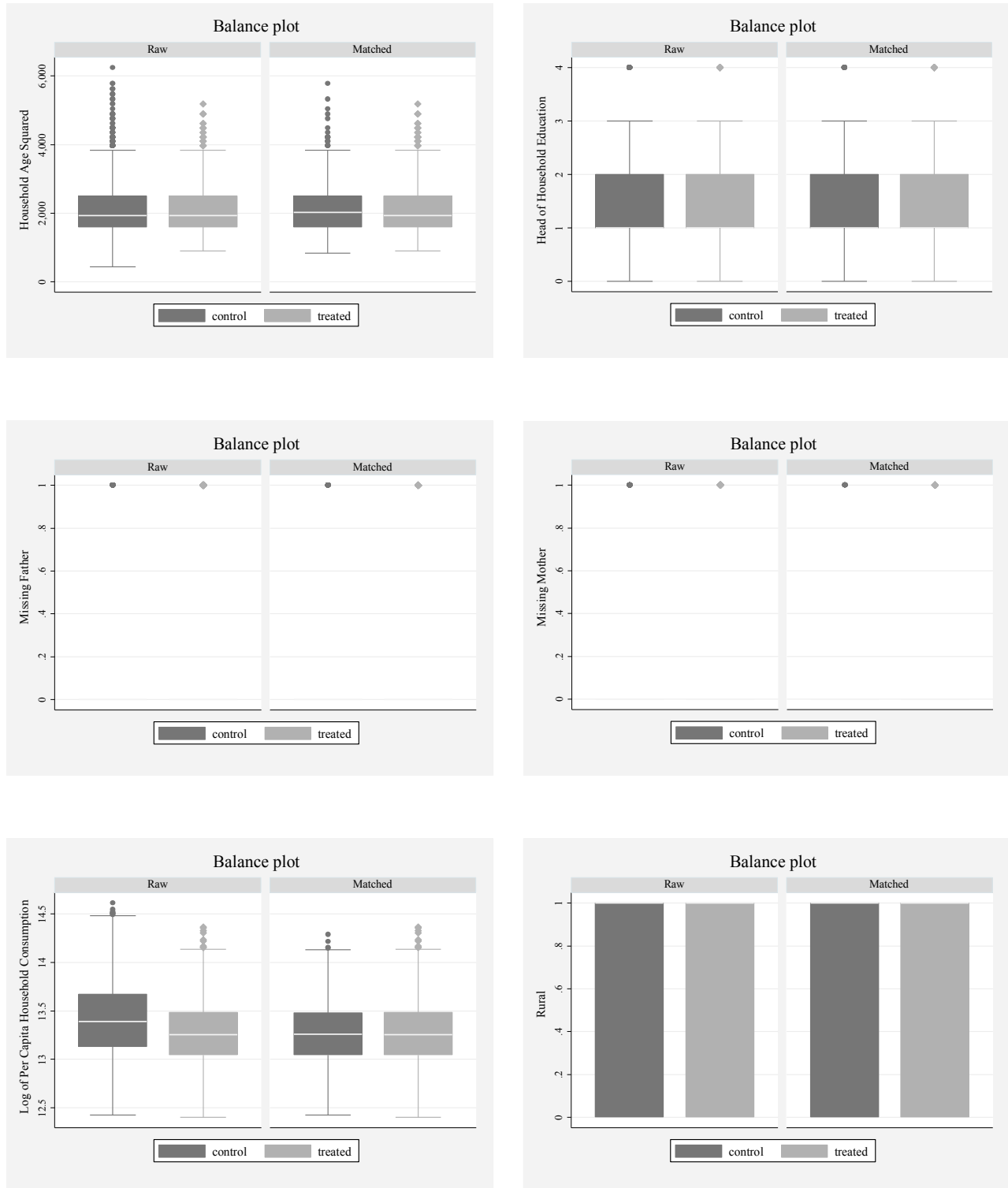
Source: Created by the author using Susenas 2015.

Figure A-15: Covariate Balance Plots, School Continuation (Children Aged 13-15)



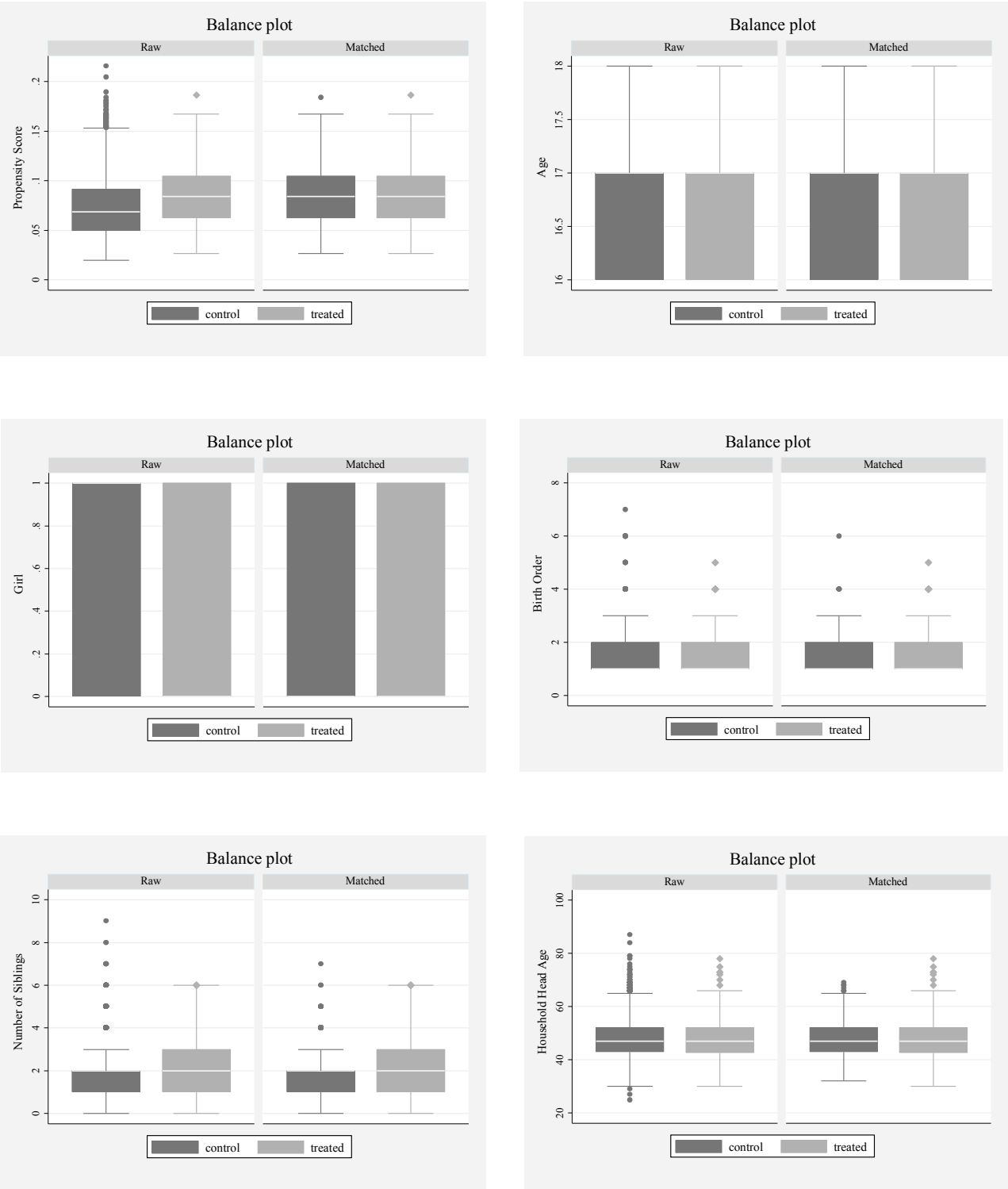
Source: Created by the author using Susenas 2015.

Figure A-15: Covariate Balance Plots, School Continuation (Children Aged 13-15) (continued)



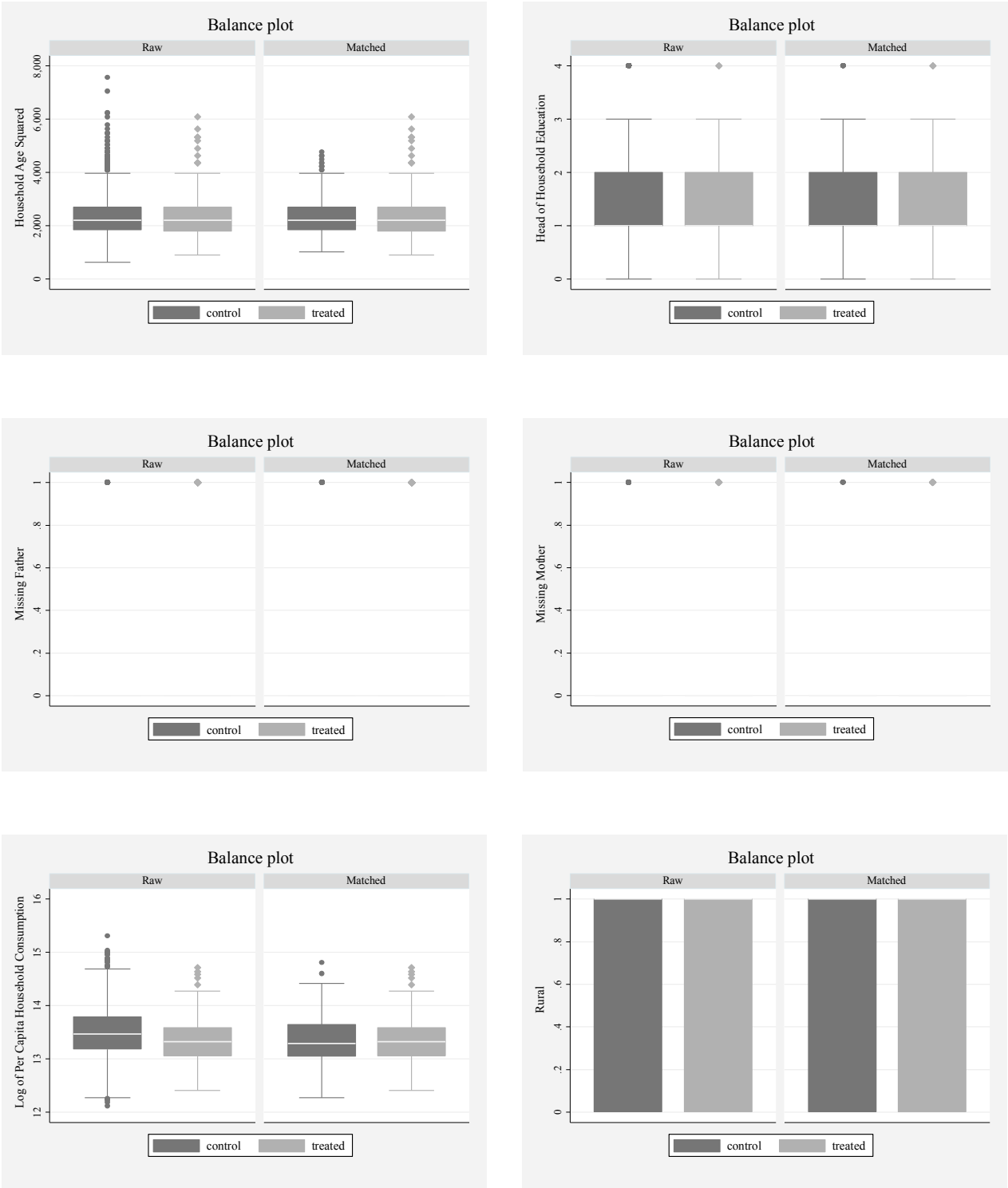
Source: Created by the author using Susenas 2015.

Figure A-16: Covariate Balance Plots, School Continuation (Children Aged 16-18)



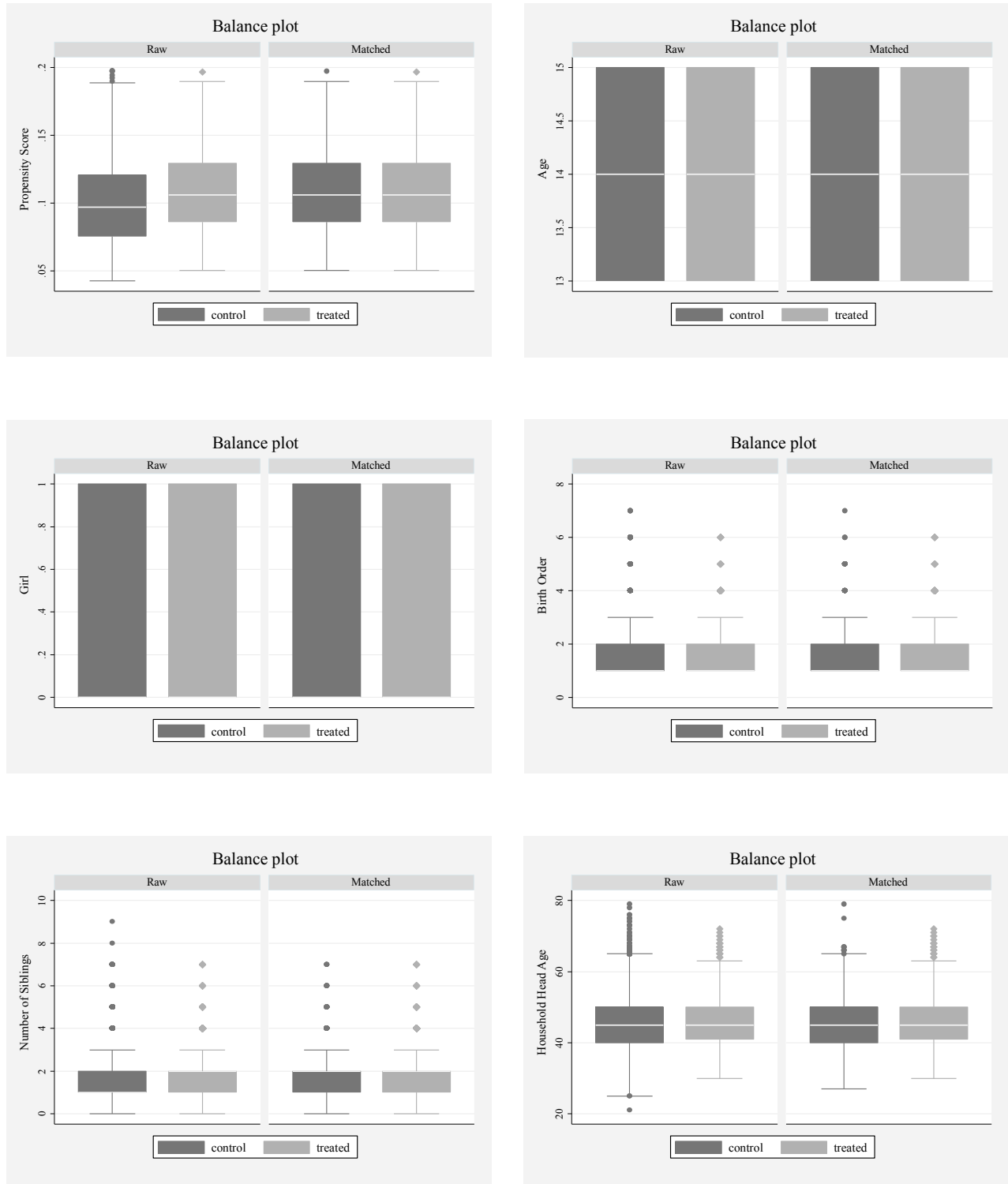
Source: Created by the author using Susenas 2015.

Figure A-16: Covariate Balance Plots, School Continuation (Children Aged 16-18) (continued)



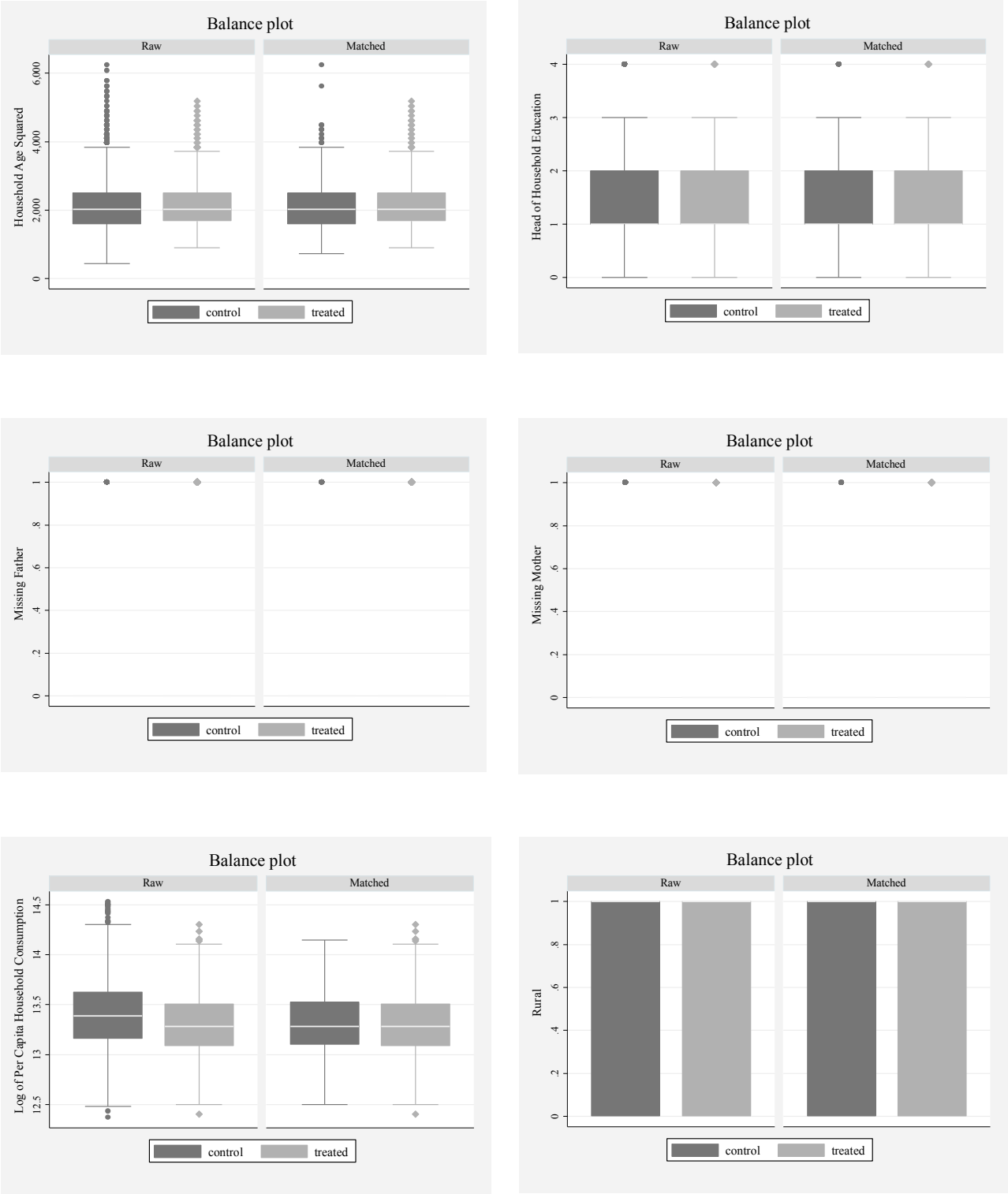
Source: Created by the author using Susenas 2015.

Figure A-17: Covariate Balance Plots, Child Labor (Children Aged 13-15)



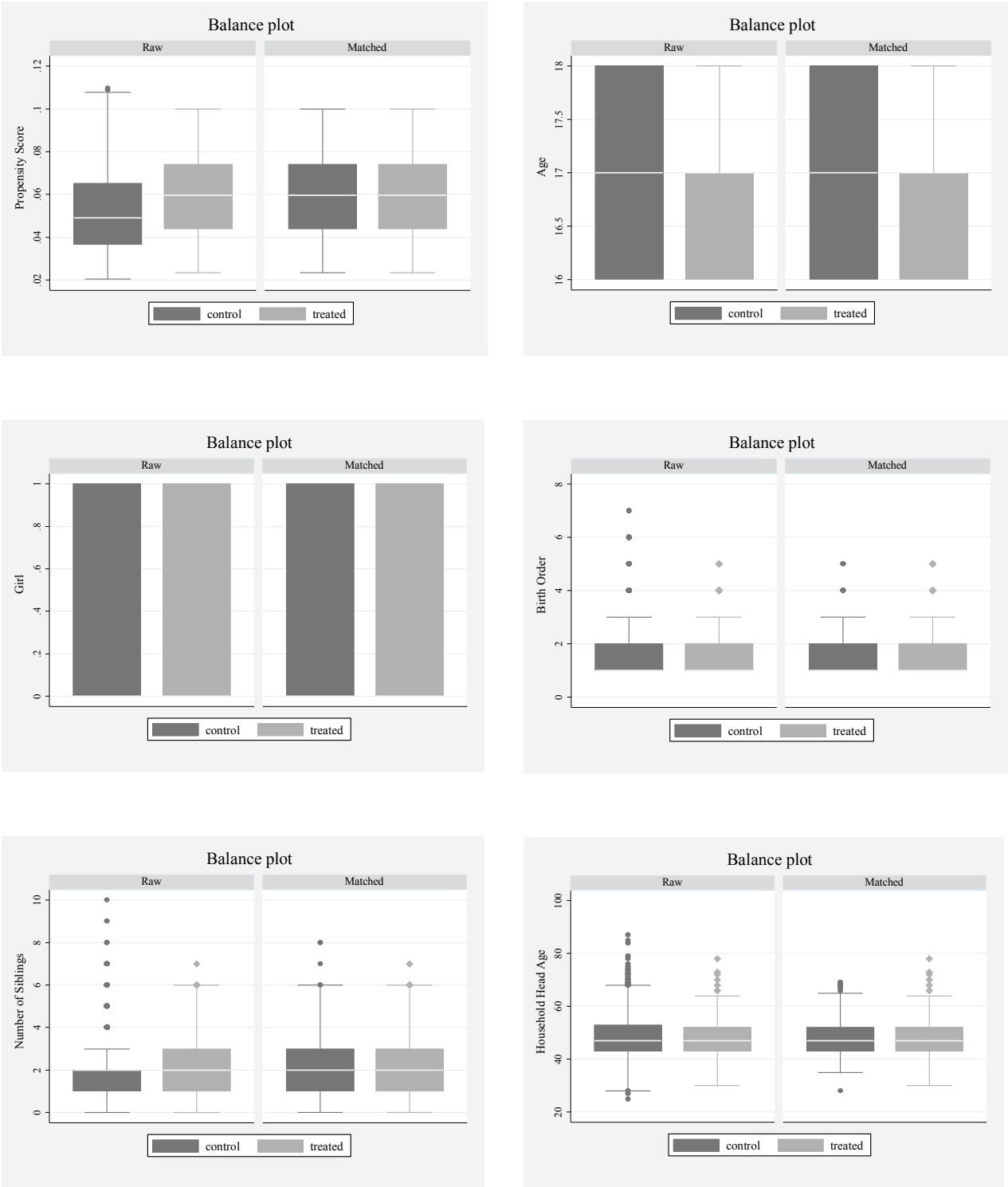
Source: Created by the author using Susenas 2015.

Figure A-17: Covariate Balance Plots, Child Labor (Children Aged 13-15) (continued)



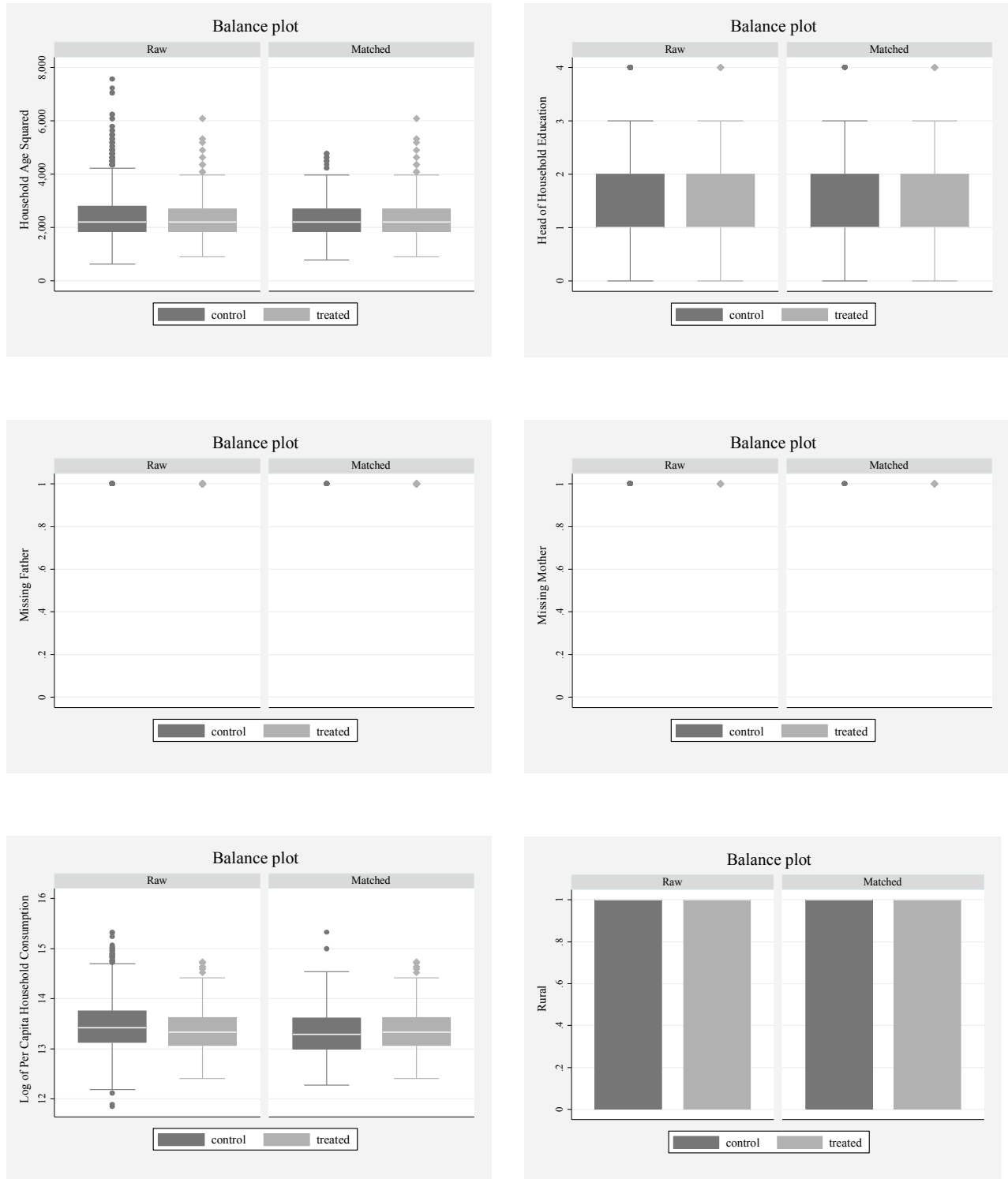
Source: Created by the author using Susenas 2015.

Figure A-18: Covariate Balance Plots, Child Labor (Children Aged 16-18)



Source: Created by the author using Susenas 2015.

Figure A-18: Covariate Balance Plots, Child Labor (Children Aged 16-18) (continued)



Source: Created by the author using Susenas 2015.

Figure A-19: School Participation of Children Aged 13-15, 2015 (using natural classification)

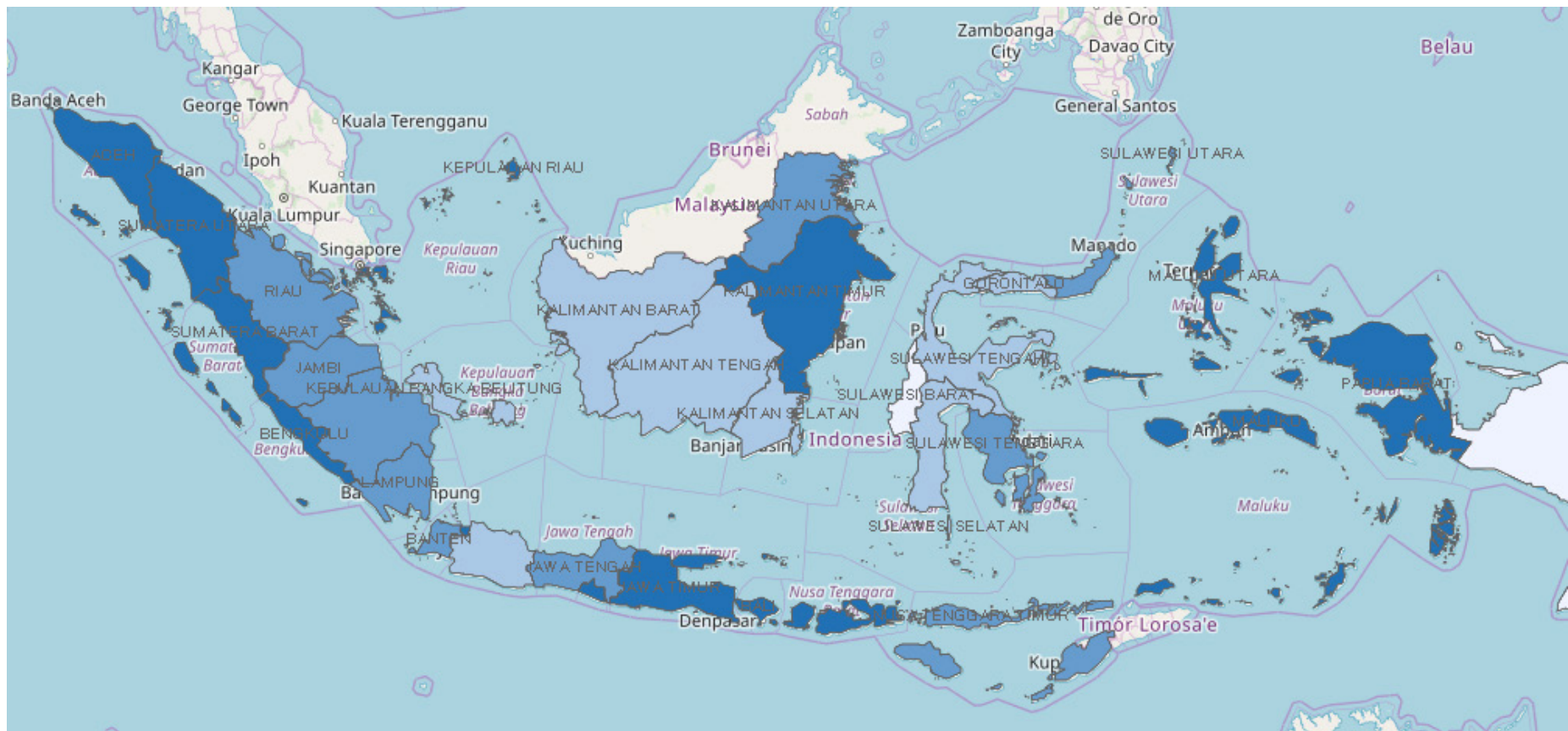


Source: Central Bureau of Statistics (<https://sig-dev.bps.go.id/>).

Note:



Figure A-20: School Participation of Children Aged 13-15, 2016 (using natural classification)



Source: Central Bureau of Statistics (<https://sig-dev.bps.go.id/>).

Note:

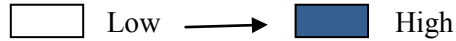


Figure A-21: School Participation of Children Aged 16-18, 2015 (using natural classification)



Source: Central Bureau of Statistics (<https://sig-dev.bps.go.id/>).

Note:

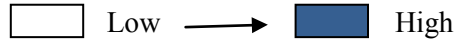
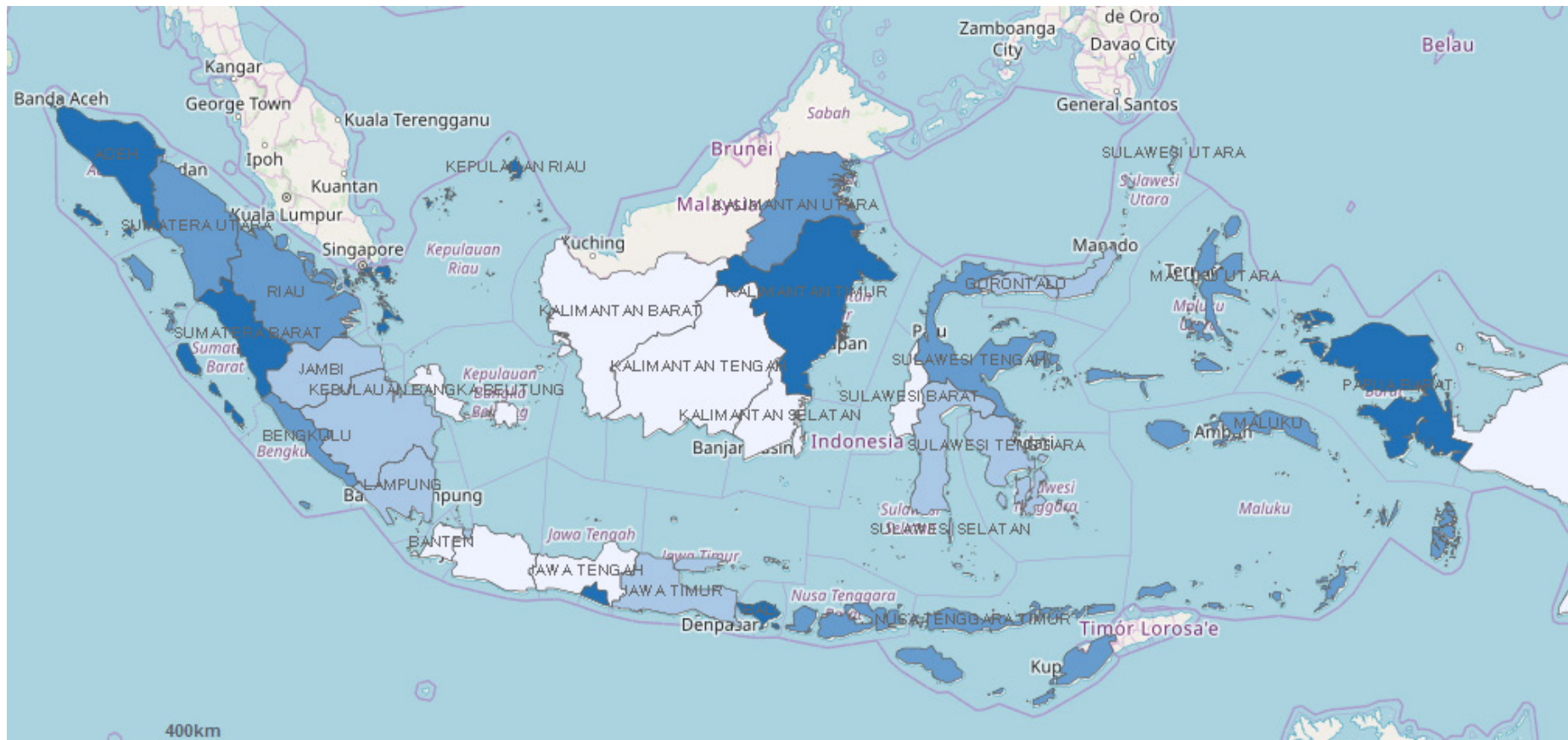


Figure A-22: School Participation of Children Aged 16-18, 2016 (using natural classification)



Source: Central Bureau of Statistics (<https://sig-dev.bps.go.id/>).

Note:

Low → High

Figure A-23: School Availability in the Region, Junior Secondary School in 2011 (using natural classification)



Source: Central Bureau of Statistics (<https://sig-dev.bps.go.id/>).

Note:

Low → High

Figure A-24: School Availability in the Region, Junior Secondary School in 2014 (using natural classification)



Source: Central Bureau of Statistics (<https://sig-dev.bps.go.id/>).

Note:

Low → High

Note:

255

Figure A-26: School Availability in the Region, Senior Secondary School in 2014 (using natural classification)



Source: Central Bureau of Statistics (<https://sig-dev.bps.go.id/>).

Note:

Low → High

Figure A-27: School Availability in the Region, Vocational Secondary School in 2011 (using natural classification)



Source: Central Bureau of Statistics (<https://sig-dev.bps.go.id/>).

Note:

Low → High

Figure A-28: School Availability in the Region, Vocational Secondary School in 2014 (using natural classification)



Source: Central Bureau of Statistics (<https://sig-dev.bps.go.id/>).

Note:

Low → High

Figure A-29: Population Density, 2015 (using natural classification)



Source: Central Bureau of Statistics (<https://sig-dev.bps.go.id/>).

Note:

Low → High