THE MEASUREMENT OF TERTIARY EDUCATION QUALITY IN INDONESIA THROUGH THE EDUCATION PRODUCTION FUNCTION MODEL AND POLICY RECOMMENDATIONS FOR QUALITY IMPROVEMENT

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This study is designed to answer one main research question: How could tertiary education quality be redefined and measured through the education production function model in developing countries. The study will use Indonesia as the target country to carry out research activities. Quality of tertiary education has been one of the most frequently discussed topics in relevant fields in academia and human development. As enrollment continuously increases and education systems expand in many developing countries, quality becomes their biggest concern. The purpose of this dissertation is to provide stakeholders a different and more practical approach to reevaluate tertiary education quality through quantifiable variables and to measure quality through educational input, equity and equality, labor market relevance, and system assurance factors.

Human capital theory serves as the guiding theoretical framework for this dissertation. The education production function model is the foundation for quality redefinition. Within the four quantifiable variables, benefit incidence analysis is used to measure equity and equality, economic rate of return is used to measure labor market relevance of the tertiary education

system, and returns to investment is used to evaluate how education outputs yield from inputs. The study is designed to have an umbrella structure, with tertiary education quality being at the top of the skeleton and educational input, equity and equality, labor market relevance, and system assurance being the four supporting pillars.

With the redefinition of tertiary education quality, four main research questions will be answered respectively. Educational input in Indonesia has been improving in the past decade; however, it is still behind compared to peer ASEAN countries and countries with similar economic profiles. Indonesia's tertiary education access inequality is mainly caused by socioeconomic differences. The labor market absorbs a majority of tertiary graduates and yields much higher returns at the tertiary level, and it has been responding very positively toward the continuously expanding graduating class. The quality assurance system suffers from short-staffing, low financial support, low capacity, and weak government support. At its current accrediting pace, Indonesia's tertiary education institutions will not be able to improve as fast as they are willing to.

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DEDICATION

Dedication: To Hua Li—my mother, inspirer, mentor, friend and my strongest supporter.

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1.0   INTRODUCTION

This study intends to build a quality measurement model based on human capital theory and the education production function model. Knowledge and development institutions often struggle with the fact that quality of education—tertiary education[1] to be specific—is a subjective, broad, and vague term and is difficult to measure. Developing countries have also expressed their concerns about methods to economically improve education quality, as they realize that quality will be the next public policy focus after their success in education expansion and governance restructuring. Ample econometric and multivariate linear regression models are built to quantify and assess returns to education, student performance, public expenditure (or education financing), and so on with the goal of studying improvement in quality. Despite the various mathematical models that measure education improvements, quality of education and tertiary education remain problematic to define.

Tertiary education quality (TEQ), in the context of developing countries—especially those stepping into mid-income level—has a unique definition. It is not merely reflected through

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[1] This dissertation uses a more comprehensive definition of "tertiary education" instead of "higher education". It broadly refers to all post-secondary education, including but not limited to universities. Universities are clearly a key part of all tertiary systems, but the diverse and growing set of public and private tertiary institutions in every country—colleges, technical training institutes, community colleges, teacher training schools, nursing schools, research laboratories, centers of excellence, distance learning centers, and many more— forms a network of institutions that support the production of the higher-order capacity necessary for development.

coverage (accessibility and affordability); rather, it has a broader definition through measurements on equity, relevance, and assurance. These three sub-categories of quality also intersect with education input and output. Education input includes human capital and material inputs. Examples are quality of incoming students, monetary and facility inputs, and quality/credential of teaching force. Examples of education output are R&D capability, domestic and international publication and citations, and university ranking.

In addition to the complexity of defining TEQ in any geographic region, the term "quality" in developing countries has very different meanings than in developed countries. This is due to the fact that many developing countries, which are usually sub-divided into those moving toward mid-income level and those that are not, often face constraints. Capacity and readiness of senior secondary graduates, rigid financing and governance mechanisms, blurred distinction between different types of Tertiary Education Institutions (TEIs), and disconnect between TEI outputs and labor market demands, are some issues that developing countries struggle with. It does not mean that the above issues do not exist in developed countries—these issues exist and affect TE development to a different extent compared to developing countries.

How to measure and assess TEQ in developing countries becomes complex due to the above reasons. It is a multi-dimensional definition, which contains tangible and intangible indicators that reflect the quality of TEIs and the quality of a TE system's production. Some of the indicators are used to rank TEIs around the world, some are considered by parents to make investment decisions for their children—for instance, which country to choose and which institution to go to. This dissertation attempts to redefine the meaning of TEQ with reference to empirical studies on education production functions and test the model through realistic

evidence—research findings through the examination of Indonesia's national household and labor survey data.

Indonesia has drawn the world's attention to its speedy economic development, transitions of its major industries, rising science and technology capacity, and other aspects. It is inevitable to evaluate and analyze a country's progress by looking into its macroeconomic growth during the past decades. However, development is also associated with human development, such as education, health, and social protection. The accumulation of human capital usually comes after and gets less attention than the accumulation of national wealth. Yet, it is important as it determines whether the vigorous economic growth of a country will continue, and if a country can smoothly transition from low income to mid-income and beyond. As one of the most diverse countries in the world, Indonesia has difficulties in bringing people up to the same speed across the country. While Indonesia is accumulating its human capital and moving toward the ultimate goal of alleviating poverty, it faces many obstacles such as difficulty shifting main industries, productivity constrained by labor quality, and political instability. TEQ is a key factor because it interacts with the obstacles above. With a better-educated and higher-skilled labor force, shifting industry focus and increasing national productivity would be a matter of time.

It has been the Government of Indonesia's strategic plan to expand the current tertiary education system by providing greater access and better affordability, without diluting the quality, to empower its labor market. Donor agencies had sought to assist this process with technical assistance and co-financing. In light of this strategic focus, the Australian Agency for International Development (now merged into "Department of Foreign Affairs and Trade") commissioned some analytical papers on key issues of Indonesian tertiary education. The

analytical papers also served as the main reference source for this dissertation. In addition, the World Bank Policy Research Paper Tertiary Education in Indonesia: Directions for Policy (Crawford 2014) consolidated the findings and recommendations from the previously mentioned analytical papers, and also served as another main reference source for this dissertation.

This dissertation will redefine TEQ in the country context of Indonesia, and construct a TEQ measurement model. It will also present research findings through the examination of two sets of national household survey data from Indonesia. Those data will help to present quality issues of Indonesia's tertiary education through equity, relevance, labor market outcomes, and assurance.

Using the TEQ modeling and the education production function model, this study examines the following four sets of research questions:

1. What are the main forces that drive TEQ in terms of equity and equality?

2. How can TEQ be measured by inputs—the selectivity of the tertiary education system for students and the competence of the teaching force?

3. How can TEQ be measured by relevance—labor market analysis and economic returns to tertiary education?

4. How can TEQ be assured by the accreditation system—the assessment of quality assurance mechanism?

These research questions will help to answer the main research question—how to redefine and quantify TEQ. In addition, research activities carried out under the lead of these four questions will help to show the extent to which these four factors could influence TEQ.

1.1   EDUCATION DEVELOPMENT IN INDONESIA

Indonesia is the world's largest archipelago country, consisting of 17,504 islands. It has a population of 246.9 million (2012), a GDP of 878.0 billion USD (2012, by constant 2005 USD, or 2,618 billion by constant IDR) (World Bank 2009). It is one of the 20 largest economies in the world, and has had a steady annual GDP growth rate of 5 percent to 6 percent for the past 6 to 7 years. Indonesia shares commonalities with neighboring countries, such as valuing the pursuit of education as one of the most important and surest paths towards continued prosperity. Yet it has unique characteristics in its ethnic diversity, national religion, and its unique landscape.

Indonesia seeks to reach high-income status within 25 years (Ministry of National Education--Indonesia 2010). With sustained economic growth, the country is moving closer to that goal each year, yet faster progress is needed to end poverty, and better social inclusion is necessary to stabilize growth. Indonesia's economic output has relied heavily on low wage labor-intensive and natural resource based industries for the past decades (V. a. Alatas 2010). Given the country's growing middle-class, rapid urbanization, and vigorous business environment, Indonesia will be on the fast track to develop a skilled labor force. The skills and knowledge of the labor force are likely to be a key determinant of economic growth rates; failure to sufficiently increase human capital may choke growth. Through the analysis of issues on access and equity, and quality assurance, the connection between the TE system in Indonesia and the labor market outcome/education return will be very clear.

Indonesia has a young population, with 44 percent aged 25 or younger (World Bank 2012). The government has made the policy agenda very clear to strengthen TE system to provide a better technological base for a growing economy. According to the Coordinating

Minister for Economic Affairs Hatta Rajasa, there were 500,000 jobs created each year in Indonesia. Though this number is half of what Vietnam and the Philippines have created for the past few years, the amount of jobs created/available in Indonesia is sufficient in reference to the increase of college or vocational school graduates each year. The problem now is how Indonesia could restructure its labor force to become more skill-intense through providing opportunities for TE.

The country has made progress on getting children enrolled in school and achieved universal primary education by 2002, with a Net Enrollment Rate (NER) of 94 percent. Indonesia has made a clear commitment to education—passing a constitutional mandate to allocate at least 20 percent of the total government budget to education (the "20 percent rule") (World Bank 2013). This new constitutional amendment, passed in 2002, and the "20 percent rule" was realized in year 2009. Indonesia's public expenditure on education as a share of total government expenditure is among the top spenders by all international measures. The share is higher than Vietnam, Malaysia, Brazil, Germany, and Singapore. However, Indonesia's public expenditure on education as a share of GDP remains low. It is below middle-income countries both in East Asia, such as Thailand, Vietnam, and Malaysia; and below countries in other regions, such as Norway, Brazil, and Colombia.

Despite the notable achievements during the past decades, challenges remain. Senior secondary still has a very low Gross Enrollment Ratio GER[2] and completion rate. The Government recently unveiled its plan to roll out 12-year compulsory education nationwide by 2014. This will be the third extension of compulsory education in the past 30 years. As the

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[2] Gross Enrollment Ratio is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown

number of basic education graduates increases at a speedy pace, the soaring demand for places in senior secondary education has refocused attention on higher-level education. This is also echoing the increasing demand for a better-equipped and trained labor force to be created.

1.2   TERTIARY EDUCATION DEVELOPMENT IN INDONESIA

This section is intended to glance through the TE system in Indonesia: how many students are inside the tertiary system, where they come from, and the pattern of currently enrolled students. Indonesia shares some similarities with neighboring Southeast Asian countries, and developing countries elsewhere, in that a majority of the tertiary students come from wealthier families. Gender and ethnicity disparities exist, but are minimal and do not significantly influence student demographics (Hanushek 2014). Students usually spend more than four years completing a four-year undergraduate degree program due to various reasons. There is currently no government policy against students taking longer than required to graduate. It is very common for students to switch from majors in which they are currently failing. In doing so to start over from a different major which seems easier and more likely to graduate. The supply of senior secondary school graduates is increasing and that has led to an increase of first year enrollment at the tertiary level. Aside from the number of students, the most recent PISA score reports show that Indonesian teenagers might be much less prepared to enter tertiary level institutions.

The GER, including formal and informal education[3], of age group 7 to 12 exceeds 110 percent[4] at the primary school level; junior secondary school level GER reached 81 percent of

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[3] Please refer to the section on "Degree Progression" for more details.

age group 13 to 15; senior secondary school level GER reached 68 percent of age 16 to 18. However, TE level GER is still at 20 percent of age group 19 to 24. As the figure below depicts, the GER of TE was fluctuating around 15 percent before 2007 (by SUSENAS data). Enrollment increased notably from 2007 to 2010 as Indonesia's GDP started growing faster. In 2011, total gross enrollment for TEIs stood at roughly 4.1 million, which comprised 20 percent of age group 19 to 23. Demographic change within the 19 to 23 age group does not have a negative impact on student enrollment. Factors that influence tertiary enrollment rate, attainment, retention and dropout rates vary, and they will be discussed in the following sections on access and equity.
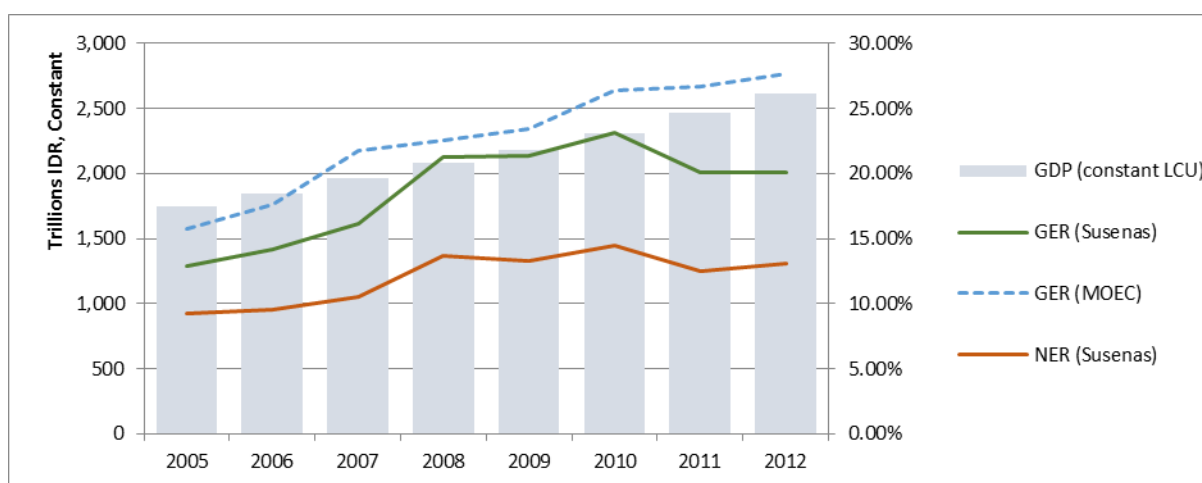
Figure 1.1. Gross enrollment rate, net enrollment rate and GPD growth, Indonesia[5]

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[4] Gross Enrollment Rate is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown. GER can be greater than 100 percent as a result of grade repetition and entry at ages younger or older than the typical age at that grade level.
[5] Source: Created by the author with data from the World Bank, SUSENAS, and MOEC.

Table 1.1. Indonesia's age cohort and tertiary enrollment—by SUSENAS, 2005 to 2012[6]

Year	2005	2006	2007	2008	2009	2010	2011
Population	19,068,168	17,370,663	16,761,164	17,541,354	16,926,508	16,587,004	20,120,318
(age 19-23)	2,468,964	2,470,912	2,708,052	3,730,605	3,620,594	3,835,632	4,149,305
Tertiary Enrollment (absolute number)	12.95%	14.22%	16.16%	21.27%	21.39%	23.12%	20.06%
GER (SUSENAS)	9.29%	9.55%	10.53%	13.69%	13.34%	14.48%	12.53%
NER (SUSENAS)	15.76%	17.60%	21.75%	22.52%	23.46%	26.38%	26.70%

There is inconsistency in the gross enrollment numbers due to data and information management issues in Indonesia[7]. The following two figures have student enrollment data inconsistent with the figure above because data come from various sources. This dissertation will insist on using SUSENAS (Indonesian Household Survey) data, which are managed by the Indonesian BPS (National Bureau for Statistics)[8]. The following two figures are of reference value with regard to the proportion of student enrollment by institution type.

Table 1.2. Number of tertiary education institutions, and enrolled students[9]

	Number of Institutions			Number of enrolled students		
Population	Public	Private	All	Public	Private	All
University	60	434	494	1,664,737	1,964,378	3,629,115
Institute	23	74	97	74,587	153,850	228,437
Specialized College	33	2,141	2,174	1,034	1,238,224	1,239,258
Academy	1	1,191	1,192	0	360,713	360,713
Polytechnic	76	142	218	76,033	83,114	159,147
Total	193	3,982	4,175	1,816,391	3,800,279	5,616,670

[6] Source: Created by the author with data from the World Bank, SUSENAS, and MOEC.

[7] The inconsistency issue will be intensively discussed in the final dissertation on data and information issues.

[8] Please refer to Annex I regarding methodology of data collection and management within BPS for SUSENAS and SAKERNAS.

[9] Source: Created by the author with data from MOEC.

There are five types of TEIs in Indonesia: University, Institute, Specialized College, Academy and Polytechnic.

Academy and Specialized Colleges (or Schools of Higher Learning by a different translation) are very similar in terms of academic and administrative structures. Academy Colleges only offer vocational and technical degrees in various fields, such as military, nursing, and the hospitality industry. Specialized Colleges offer technical vocational degrees that are similar to those of Academy. However, Specialized Colleges are larger than Academy in size and richer in terms of degree programs, because they offer a combination of technical vocational and theoretical/academic degree programs. Both types of TEI have very simple academic structures where the study program is directly managed by the institution without any department of faculty unit and the administrative structure constitutes only offices or divisions.

There are 1 public Academy, 1,191 private Academies, 33 public Specialized Colleges, and 2,141 private Specialized Colleges in Indonesia.

Polytechnic TEIs are similar in terms of technical and vocational degree program offerings. The difference between Polytechnic and Academy/Specialized Colleges is that Polytechnic offers only science and technological science related vocational and technical degrees, whereas Academy offers all types of technical vocational degrees, and Specialized Colleges offer all types of technical vocational degrees plus some academic programs.

There are 76 public Polytechnic and 142 private polytechnic TEIs in Indonesia. Technical and vocational degrees, DI to DIV for instance, are all offered within technical and vocational TEIs, namely Academy, Specialized Colleges and Polytechnics. Specialized Colleges, as previous stated, offer both technical vocational (D track) and academic (S track) degree programs.

TEIs that offer a combination of technical and vocational (D track) and academic degrees (S track) are Specialized Colleges, Institutes and Universities. The difference between the three types of TEIs (Specialized Colleges, Institutes, and Universities) is that Institutes and Universities have a much heavier academic focus than Specialized Colleges. Institutes and Universities have more complex internal academic and administrative structures, and they offer a wide range of academic degree programs. Institutes focus on academic degree programs such as technological science. Among different types of Institutes, some specialize in research and community services. There are also teaching hospitals and research centers within Institutes. Universities are more comprehensive and larger in size than Institutes. Most of the S track (SI, SII and SIII) are offered within Universities. In academic year 2011-2012, Institutes' overall enrollment was 228,437, whereas Universities enrolled 3.6 million students total. Institute enrollment is about 6 percent of total enrollment in Universities. There are 23 public Institutes and 60 public Universities, 74 private Institutes and 434 private Universities.

The largest TEI (University) is Universitas Gadjah Mada with enrollment of 51,796. The smallest TEIs have roughly 1,000 students or less enrolled. Most public universities are established with a legal charter approved by the Director General of Higher Education regulation. The oldest public tertiary-level educational institution is Universitas Indonesia, established in 1947. The newest public institution was established in 2011, Politeknik Negeri Batam. Most public institutions are less than 60 years old.

Less than half of enrolled TE students went to Public TEIs, and the majority attended Private TEIs. Among the 4.2 million tertiary students enrolled, more than half are from the richest families (families that are within the richest consumption quintile). The bottom two quintiles comprise less than 13 percent of the entire student population.

Secondary school graduates enter the tertiary level through different channels. In Indonesia, a majority of the TEIs are managed by the MOEC, another large number are under the supervision of MORA, and others are scattered across different ministries. Among the five categories of TEIs in Indonesia, Religious Institutions (under management of MORA) are the only kind that experienced a slight shrink in student GER. The student-teacher Ratio is 14:1 in public TEIs, while only 46:1 in private TEIs. Despite the growth of GER since 2005, TE GER is still considered low compared to some comparator countries in the Association of Southeast Asian Nations (ASEAN). For example, Malaysia had 40 percent GER in 2009 and Thailand had 48 percent GER in 2011. The Indonesian Ministry of National Education's Strategic Plan set the target for the 5-year development plan specifically so that the Rough Participation Number of Universities and Religious Universities in the 19 to 23 age group reaches 30 percent. In line with the strategic plan, the new Higher Education Law stipulates that 20 percent of students come from the poorest families.

1.3   DEGREE PROGRESSION ROUTES IN INDONESIA

Tertiary degree progression channels vary by country. Most TE systems differentiate students between academic and technical/vocational routes. In Germany, students need to make a choice at an early age of which path to follow and proceed until they complete undergraduate level study (Joseph 1987). In some cases, students can switch between the two main tracks.

In Indonesia, besides the two formal approaches—academic (Sarjana, or S) and technical (Diploma, or D) tracks—students can also follow the informal approach of study, which is not as common. S track students are expected to be more academically focused, whereas D track
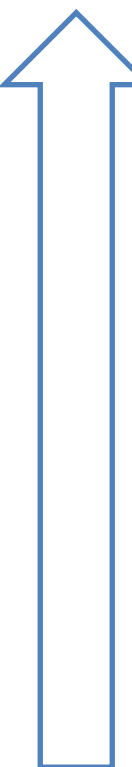
students are more technical skills focused. SI, which takes students 4 years (in general) to complete, is equivalent to a bachelor's degree program in English-speaking countries. SI usually takes more than 4 years to complete for Indonesia's average tertiary level students, due to financial difficulties and the high failure rate during the 4 years of study. Students have the option of leaving the D track training at any time once they complete a certain level of D programs. For instance, a student can choose to obtain a certificate/diploma of DI or DII level and enter the labor market (Chen 2009).

Table 1.3. Degree names in Indonesia and the equivalent in English-speaking countries[10]

Type of degree	Indonesian term	Equivalent in English-speaking countries
Diploma I (DI)	Profesional ahli pratama	Associate degree
Diploma II (DII)	Profesional ahli muda	Associate degree
Diploma III (DIII)	Profesional ahli madya	Associate degree
Diploma IV (DIV)	Sarjana sains terapan	Bachelor's degree
Sarjana I (SI)	Sarjana	Bachelor's degree
Sarjana II (SII)	Magister	Master's degree
Sarjana III (SIII)	Doktor	Doctoral degree

The next figure gives an overall picture of all degree options from primary to tertiary level for Indonesian students. With universalization of primary and junior secondary, the number of students completing senior secondary and entering tertiary is dramatically increasing. Students are expected to develop certain types of skills at each level of tertiary study. For example, students at different levels of D programs are expected to obtain certain levels of competence and the ability to apply skills in vocational areas.

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[10] Source: Created by the author with data from the World Bank.

Possible Age	School Year	Formal		Non-formal	Informal
		Programs	Level		
27	21	Doctorate (SIII)	Tertiary (Higher) Education	Open University	
26	20				
25	19				
24	18	Master (SII)			
~ 23	17				
~ 22[11]	16	Undergraduate (DI, DII, DIII, DIV, SI)			
21	15				
20	14				
19	13				
18	12	General Senior Secondary; Vocational Senior Secondary	Senior Secondary	Package C Equivalency Program	
17	11				
16	10				
15	9	Junior Secondary	Basic Education	Package B Equivalency Program	
14	8				
13	7				
12	6	Primary Education		Package A Equivalency Program	
11	5				
10	4				
9	3				
8	2				
7	1				

(Non-formal rightmost sub-column spanning vertically: Training Institutions and Community Learning Centers)
(Informal column spanning vertically: Home Schooling, Other Independent Learning Activities)

Figure 1.2. Indonesia's degree progression from primary to tertiary level[12]

When a tertiary system has a clear distinction of students' skillset development and is able to provide different options of tracks to those with particular interest in academic or technical/vocational studies, the next question is whether the system has the ability to provide students with the right educational inputs and whether students coming out of such a system can fit in the labor market. This all comes down to quality. Quality has different meanings in defining certain levels of education. In the case of Indonesia's tertiary system, quality is more

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[11] "~" mark is used in this chart because age cohort of 19-23 year old is more appropriate to be enrolled in tertiary education. Technically, SI or DI-DIV takes 4 years to complete. However, in the case of Indonesia students generally take longer than 4 years to graduate because students re-enroll in a different program when face drop-out situations. Students can take up to 7 years to graduate a 4-year degree program.
[12] Source: Created by the author with referece to (World Bank 2013).

connected with relevance, has two parts—relevance of knowledge and training provided to students' needs, and relevance of such training to the labor market.

1.4 MODERN CONCEPT AND REDEFINITION OF TERTIARY EDUCATION QUALITY

Quality in tertiary education is one of the major concerns for researchers and policymakers in many countries, including Indonesia. Measuring and managing TEQ in such a multi-religion and multicultural population is a challenging and uphill task. The term "tertiary education quality" means different things to different stakeholders. This definition is also strongly associated with how countries define their tertiary education—its social function and mission. In 1992, Ronald Barnett tried to summarize the concept of "higher education"[13] by its different functions and purposes within academic institutions and society as a whole:

1. Higher education as the production of qualified human resources: In this view, higher education is seen as a process in which the students are counted as "products" absorbed in the labor market. Thus, higher education becomes an input to the growth and development of business and industry

2. Higher education as training for a research career: In this view, higher education is preparation for qualified scientists and researchers who would continuously develop the

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[13] Author used term "higher education" instead of "tertiary education in this subsection in order to be consistent with the quoted content from empirical studies. In other parts of this dissertation, the term "tertiary education" will be used instead of "higher education" coherently.

frontiers of knowledge. Quality within this view point is more about research

publications and transmission of academic rigor to quality research

3. Higher education as the efficient management of teaching provision: Many strongly

    believe that teaching is the core of educational institutions. Thus, higher education

    institutions focus on the efficient management of teaching-learning provisions by

    improving the quality of teaching, enabling a higher completion rate among the students.

4. Higher education as a matter of extending life changes: In this view, higher education is

    seen as an opportunity to practice the development process of individuals through a

    flexible, continuing education mode (NAAC 2003).

It would be helpful to look into the leading type among all TEIs—the university. What is

the definition of university? What are the major functions of a university? Among all TEIs,

academic universities are accountable for knowledge production and innovation, as well as

producing R&D outputs. In 1966, the Kothari Commission defined the purpose of universities.

This is one of the more comprehensive and traditional definitions of a university[14]:

1. To seek and cultivate new knowledge, to engage vigorously and fearlessly in the pursuit

    of truth, and to interpret old knowledge and beliefs in the light of new needs and

    discoveries;

2. To provide the right kind of leadership in all walks of life, to identify gifted youth and

    help them develop their potential to the full by cultivating physical fitness, developing the

    powers of the mind and cultivating right interests, attitudes and moral and intellectual

    values;

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[14] Here author used the term "university" for the particular purpose of this section. University is
consider as one type of TEIs.

3. To provide the society with competent men and women trained in agriculture, arts, medicine, science and technology and various other professions, who will also be cultivated individuals, imbibed with a sense of social purpose;

4. To strive to promote quality and social justice, and to reduce social and cultural differences through diffusion of education;

5. To foster in the teachers and students, and through them in the society generally, the attitudes and values needed for developing the "good life" in individuals and society (GOI 1966).

In addition, the UNESCO International Commission on Education in the 21st Century titled "Learning: The Treasure Within" (also known as the Delors Commission) emphasized four pillars of education: learning to know, learning to do, learning to live together, and learning to be. The report highlighted the following specific functions of higher education (NAAC 2003):

1. To prepare students for research and teaching;

2. To provide highly specialized training courses adapted to the needs of economic and social life;

3. To be open to all, so as to cater to the many aspects of lifelong education in the widest sense;

4. To promote international cooperation through internationalization of research, technology, networking, and free movement of persons and scientific ideas (UNESCO 1996).

In sum, "higher education" traditionally exists as the frontier of science and technology innovation, knowledge generation and dissemination, and producing teaching force to regenerate knowledge. Its mission is to generate knowledge of all kinds. This traditional definition of

"higher education" has a strong influence on the modern definition of "tertiary education" due to the fact that "higher education"—universities, for instance—remain the main force among "tertiary education" institutions in most countries. There is still a university or elitism bias when talking about tertiary education.

TEIs shall be seen as the knowledge generator, as well as home to practitioners of various kinds. In developing countries, TEIs ideally should be serving students of various academic backgrounds and cognitive abilities. Fitness for purpose will need to be strengthened more than other aspects. Indonesia has a labor force that is transitioning low-skilled to high-skilled workers. This requires a strong push from technical and vocational graduates who could bring practical skills that are needed in the labor force. However, the fact that only 8.9 percent of its labor force has some sort of tertiary training works against the development agenda. Unlike the cases in rising economies in Africa, policy makers in Indonesia have already noticed that the country had grown out of the status where high degree (tertiary level) holders have difficulties securing jobs. Over-educating the youth is also not one of the problems Indonesia faces, by the author's findings.

To this particular purpose, "tertiary education quality" in countries such as Indonesia has a different set of meanings that go beyond coverage, affordability, and gender balance. It also means equity, relevance (returns to TE), and, more importantly, an accreditation/assurance mechanism that keeps quality on par. To measure the quality of tertiary education, one would look into the educational inputs from students and faculty members, social demographics of tertiary students, the quality assurance framework and system, as well as tertiary education and labor market skill matching. These input, equity and relevance variables are easier to measure

than those of the assurance system. In this dissertation, the author attempts to quantify input, equity, and relevance, but will also include assurance system analyses.

TEIs exist for the purpose of absorbing human talents and capital input and producing skills, knowledge, and many other outputs at different levels for the labor market and society. Empirical studies attempt to define the term quality, and the debates continue. It cannot be defined without subjectivity and relevance to a particular context. This could be a particular country context, a university context, or the context of a life choice of a person. Pirsig is one of the most cited authors, who provides his insight on the difficulty and subjectivity of defining what quality is.

Quality… you know what it is, yet you do not know what it is. But that is self-contradictory. But some things are better than others, that is, they have more quality. But when you try to say what the quality is, apart from the things that have it, it all goes poof! There is nothing to talk about it. But if you can't say what Quality is, how do you know what it is, or how do you know that it even exists? If no one knows what it is then for all practical purposes, it doesn't exist at all. But for all practical purposes it really does exist… so round and round you go, spinning mental wheels and nowhere finding anyplace to get traction. What the hell is Quality? What is it? (Pirsig 1974)

Confusion of the definition is not going to end, and is not going to help researchers and policymakers in any sense. Trying to define TEQ is still a challenge, yet a manageable challenge with possible solutions. First of all, it is helpful to look into literature that attempts to define quality. Framing the definition in the context of developing countries, taking Indonesia as an example, will then eventually provide some insights and measurable elements to quantify quality and further improve it.

Among the different opinions, the British Standard Institution defines quality as "the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs." Green and Harvey 1993 identified five different approaches to defining quality (NAAC 2004). Their definition is also cited in many works that help countries to define TEQ.

1. Quality as exceptional (exceeding high standards and passing a required standard)

2. Quality as consistency (exhibited through "zero defects" and "getting right the first time", making quality a culture)

3. Quality as fitness for purpose (meaning the product or service meets the stated purpose, customer specifications and satisfaction)

4. Quality as value for money (through efficiency and effectiveness)

5. Quality as transformative (in terms of qualitative change) (NAAC 2003).

In developing countries, the definition of TEQ has its own priorities, which also change over time. At different phases of development (in terms of economic, human, and other aspects), developing countries always have a particular priority focus at a particular time. The unit of this time period is usually 5 to 10 years, when the country's National Strategic Plan is updated. For instance, when China first decided to develop its education system and accumulate human capital 20 years ago, the first priority was to expand the tertiary enrollment to create a better-educated labor force. TEQ had more to do with access and equity back then. 10 years after the expansion, degree inflation became an issue because the supply of tertiary graduates exceeded the labor market demand. TEQ then became a measure of relevance. The ability of providing training that helps students gain practical skills to match labor market demand, and how modern and advanced the programs are, became strong indicators of TEQ. Indonesia is experiencing similar

timing as many mid-income countries have experienced the same—shifting national income away from natural resource based industries and empowering the labor force by transitioning from low-skilled to high-skilled labor.

With the many different definitions of "quality", Garvin 1988 tried to classify them into five major groups:

1. Transcendent definitions. These definitions are subjective and personal. They are eternal but go beyond measurement and logical description. They are related to concepts such as beauty and love.

2. Product-based definitions. Quality is seen as a measurable variable. The basis for measurement is objective attributes of the product.

3. User-based definitions. Quality is a means for customer satisfaction. This makes these definitions individual and partly subjective.

4. Manufacturing-based definitions. Quality is seen as conformance to requirements and specifications.

5. Value-based definitions. These definitions define quality in relation to costs. Quality is seen as providing good value of costs (NAAC 2004).

In sum, quality is seen as absolute, relative, as a process, and as a culture. The concept of quality is amorphous and contextual; it ranges from meaning "standard" to "excellence". The modern concepts of tertiary/higher education and quality combine to form a new definition of TEQ.

As the conceptual framework on the next page presents, the modern concept of TEQ includes both the function and meaning of tertiary education in developing countries. The concept map attempts to depict tertiary education system through a human capital production

approach: what it is for the society, how are education inputs and outputs defined, and what TEIs do to transform inputs to outputs.

In the later part of this dissertation, TEQ will be defined through an empirical production function. The concept map helps to provide a basis of explaining why and how TEQ is redefined.

1.5   RESEARCH DESIGN

Led by the human capital theoretical framework and the concept of the education production function, this study will use the education production function method to measure TEQ, a benefit incidence method to analyze equity, and economic rate of return for the labor market relevance discussion. The education production function is an appropriate tool and method to measure the TEQ and form a new definition of quality. How productive an education system is signifies how good system quality is. The education production function method is commonly used in Economics of Education studies. This method looks at human beings as one of the factors that contribute to the overall productivity of a society, and education as a tool to enhance such productivity. The production function is an application derived from the basic theory of human capital.

Within the education production function, there are four main variables that determine the productivity of a tertiary education system. They are educational inputs, equity, relevance, and assurance. Arguably, there could be many more variables that are causing or correlating with TEQ. However, the study will not include all factors for several reasons:

1. The case of developing countries is very different from developed countries, where Economics of Education studies began. The tertiary system functions as the practical entity to produce skills and knowledge. Practicality is the key to maintain tertiary education development to go further. Relevance stands out among other factors that influence TEQ.

2. Most of developing countries struggle with the equity issue along with a continuously expanding system. Wealth distribution distortion strongly and negatively affects underprivileged people who should be benefiting from government subsidy and in-kind transfers. A good method to evaluate the quality of a tertiary system is to look at the equality and equity side of it.

3. The study will not allow an absolutely compressive methodology to include all of the important factors that determine the quality of a tertiary education system. It is therefore recommended for future research to further explore other factors. As the economy grows and the dynamic shifts, the definition of TEQ will also change. This will depend on the development agenda and priorities of a specific country.

The study is designed to have one leading methodology for the redefinition of TEQ, followed by two minor methodologies to quantify and evaluate equity and relevance. The dissertation will be led by four main research questions. Each of them will be presented with data analysis, research findings, and discussions. In addition, in light of the practical approach to enhance tertiary education, this dissertation also makes policy recommendations as an immediate strategy to enhance TEQ.

1.6   SIGNIFICANCE OF THE STUDY

Indonesia has an ambitious goal to first achieve universalization of primary education; then move toward massive provision for junior and senior secondary education; and eventually greatly enlarge the enrollment and completion rates of TE.   The national goal on primary education was met with a GER of 100 percent in year 2002, with junior secondary GER reaching 94 percent.   Senior secondary level enrollment rates are catching up quickly. However, the tertiary level is in great need of expansion compared to other levels of education.   Many constraints have shaped TE in Indonesia, including weakness of access and equity.   Returns to TE and quality assurance are also critical topics in the policy dialogue.   The three issues together form a good measurement of Indonesia's tertiary education quality, which is the main focus of study in this dissertation.

Quality is an important aspect in tertiary education due to increasing competition, stronger desire for more autonomy, and pressure for prestige.   In addition, the Government of Indonesia (GOI) realizes the importance of focusing on tertiary education quality.   However, local capacity is preventing the country from moving faster.   The lack of understanding of the term TEQ and instruments for policymaking hinder the further development of the system despite the incoming investment for donor agencies.

When quality is subjective and complicated to measure, a practical approach would be breaking quality down into smaller parts.   This idea is in line with the education production function, which looks into a complex variable through the change of other correlated variables. In this dissertation, TEQ is broken down into four main parts: input, equity, relevance, and assurance.   By evaluating the progress and change of each variable, one could obtain a better

picture of how the quality has been changing through time and how policy change could intervene to improve quality.

The significance of this dissertation lies with the possibility of providing stakeholders with a critical, comprehensive, yet clear analysis of TE issues in Indonesia. It also attempts to provide national policy as solutions in dealing with the quality concerns of Indonesia's tertiary education system such as the expanding tertiary graduating class and its growing labor force.

1.7   LIMITATIONS OF THE STUDY'S SCOPE AND FOCUS

Although this study uses evidence and empirically based methods to redefine TEQ, there are many aspects that this study simply could not cover in the scope of quality definition. Because of the specific country profile, TEQ has a unique meaning in the case of Indonesia. There are a good amount of studies done that are only focusing on QA systems and frameworks. These studies are useful to many developing countries in their efforts to improve and assess governance and financing issues within the tertiary education system. In addition, TEQ is a subjective and complex term. The term "quality" has different meanings in different settings and industries. Indonesia is a unique case in the practice of assessing the tertiary system quality. Unlike basic/general education, the country sees tertiary education as investment that is expected to yield fast and profitable results. In order to keep the momentum of tertiary education development and investment, quality guarantee is essential. Among all the different meanings and definitions of TEQ, equity, relevance, and assurance are the most important.

A limitation of main methodology—the education production function model—is that although the number of variables is narrowed down to four, it does not reduce the complexity of

measuring the quality education. The four main variables could be interacting with each other and therefore influencing the quality endogenous variable in the end. It is difficult to claim which variable has the strongest influence on the quality unless the other three variables are held constant as an assumption. This is realistically very difficult to do. On the other hand, one could use the education production function to see each individual variable and its change over time. There are minor methodologies used to measure equity and relevance of the tertiary education system. As a result, it will be difficult to claim that a well performing tertiary education system is a result of the combination of its equity, relevance, educational input, and assurance improvement over time.

Despite the limitations of the concept, redefinition, and research methodology, this study provides a different perspective to assess a system's TEQ and attempts to quantify the subjective variables that are usually difficult to measure. The purpose of this study is to frame TEQ as a productivity matter. The productivity of such a system indicates the level of quality. Quality is a subjective term and is difficult to measure. However, productivity has been testified for by many economists through empirical studies in various industries, including. Benefit incidence analysis and economic rate of return are common methods used by economists but rarely cited or used in education specialized work. The progressiveness and regressiveness of government subsidies is a strong indicator of social inequality, and thus serves as a good measurement of Indonesia's tertiary education equity. Despite the shortcomings and limitations of using economic rate of return, the method is also a strong tool in measuring the responsiveness of a country's labor market to the enlarging cohort of tertiary graduates. Therefore, the limitations of concepts and methodology do not hinder the significance of the study.

1.8   ORGANIZATION OF THE STUDY

A literature review of empirical studies on the Economics of Education will follow this chapter as the beginning of the literature review section. In the same chapter, the education production function model, benefit incidence analysis, and economic rate of return methodology and a theoretical framework will be presented. They are for the purpose of justifying the selection of research methodology to the research questions that will be answered in chapter three. At the end of chapter two, there will be a brief discussion of policy instruments to improve tertiary education quality, inspired by a recent published briefing by the World Bank Group. Chapter three focuses on the specifics of research design and each methodology. The research approach by each methodology, together with constraints and limitations, will be discussed in that chapter. Chapter four will be led by the four main research questions. There will be data analysis on each research question and findings will be presented along with data analysis. Chapter five serves as the concluding and discussion chapter of this dissertation. Through the findings of the four research questions, the dissertation will examine possible takeaway messages and effective education policy for decision makers to consider.

1.9   SUMMARY

This is the first chapter of this dissertation. It starts with a background introduction on education development in the most recent decade in Indonesia. The education development snapshot includes three levels of education—primary, secondary and tertiary, in which tertiary education will be the focus of this research. Indonesia has achieved high attainment in basic education. Its

secondary education system expansion is also on the fast track. Tertiary education enrollment remains low compared to other peer countries. High dropout rates, long degree completion cycles, and classification by family income are some of the main factors that hinders the development of Indonesia's tertiary education system.

Tertiary education degree progression and the diversification of program design, on one hand, serve the purpose of providing ample choices for aspirants with different learning abilities coming from senior secondary school. On the other hand, institutions lacking autonomy and governing capacity lead to another issue that goes along with the various degree programs. Students tend to take the easiest approach to pursue tertiary education. Short and low capacity degrees programs, DI and DII for instance, will not generate positive returns.

The purpose of this general introduction is to provide information to uninformed readers about the country context. Through some preliminary analysis and snapshots, researchers will naturally connect to the substance of this dissertation and the importance of the research question for Indonesia. The government of Indonesia is recognizes the issue embedded within its tertiary education system.   This study intends to provide a new framework to evaluate TEQ and eventually provide practical policy approaches to the government for consideration.

2.0   REVIEW OF THE LITERATURE

Following the new definition of tertiary education quality in the context of developing countries, this chapter will present the empirical studies on the Economics of Education and review the literature that are relevant to this dissertation topic. A broader definition of TEQ will be framed into three main categories/main variables: equity, relevance, and assurance/accreditation. This chapter will begin with the origin of the Economics of Education —human capital theory— followed by a presentation of the education production function model. This gives a unique methodology/tool to measure TEQ in a practical way for developing countries, using Indonesia as an example.

In order to fundamentally understand and quantify the main variables, the dissertation will construct separate measurements of each main variable—the equity variable will be framed and measured through benefit incidence analysis (BIA) and relevance/labor market observation will be quantified through economic rate of return (ERR) in tertiary education. The literature review begins with the historical origins of human capital theory and its recent applications in the field of education. Human capital theory emerged in the 1960s. Leading economists successfully associated continuous economic growth with the accumulation of human capital. Schultz and Becker, among all scholars, formed the fundamental theoretical framework for the Economics of Education.

The effectiveness and quality of schooling is not a new concept. Efforts to measure the relationship between inputs and outputs began in late 1950s. The initial large-scale input-output studies were conducted by (Melville 1965) using a national sample for the Educational Testing Service; by (Gillespie 1965) for the New York Quality Measurement Project; by (V. Tanzi 1974) using a national sample from Project Talent; and by (Benson 1978) for the State of California. These studies helped to compose the further development of education production studies, a method researchers now use as the education production function model. Education Quality, TEQ in particular, highly rely on such a model to signal the effectiveness, efficiency, and productivity of an education system. This is also essential for policymakers and stakeholders to review previous education input, such as government expenditure, and forecast results in the coming school cycles in order to achieve efficiency in government spending.

2.1   ORIGINS OF HUMAN CAPITAL THEORY AND ECONOMIC GROWTH

Emerging markets seek steady and vigorous economic growth through the continuous increase in total productivity. Human capital theory suggests the tangible and intangible gains through education yield higher productivity in human society. Economic growth is measured through various approaches, such as the growth function. The Cobb-Douglas production function, for instance, explains that total production (the real value of all goods produced in a year's time by a nation) is a function of labor input, capital input, and total factor productivity. Looking at economic growth through this theory of production (Pirsig 1974), education plays a key role in making the difference for almost all three of them, regardless of time.

Equation 2.1.

$$Y = AK^{\alpha}N^{1-}$$

Y stands for the Real GDP in this production model. A is the total factor productivity which covers factors such as Human Capital, technology, institutions, social capital, weather, misallocation distortions, and other resources. K is Capital—Goods and Services. N is employment/labor. α is an index that ranges from zero to one $(0 < \alpha < 1)$. This function shows that Real GDP is an increasing function of total factor (A), Capital (K) and Employment/Labor (N). In this production model, A, K and α are exogenous variables (they are given), N, Y, w (real wage) and r (real rental cost of capital) are endogenous variables (they change constantly, and influence the changes of exogenous variables).

In traditional production functions, human capital is more likely to be categorized and measured within the employment/labor part. Capital (K) usually stands for the merchandise capacity of a nation. By default, the Capital (K) of developing economies differs greatly from that of developed economies. Total productivity factor changes very gradually through time. Therefore, lots of research and study are done through labor economics to measure the productivity change of a nation through human capital change. Economic growth and dynamics change drastically over a short period of time. A traditional method of measuring economic growth entailing the factor of human capital change will not be sufficient, especially for countries that realize the importance of accumulating human capital. Human capital change makes the largest difference in a country's economic growth when setting aside natural resources and state fragility.

Human capital theory is based on the central assumption that investments are made in people—their knowledge, skills, and abilities. When such investments are made, their

productivity, which is associated with the amount of knowledge, skills, and capabilities accumulation, will increase. This can be seen in the Cobb Douglas function model, or the most commonly used production model of calculating real GDP growth. Along with the production through continuous investments on human, the economy accrues to individual and the entire society.

Historically, the first attempt to estimate the value of human beings was (Petty, 1699). His procedure was based on two critical assumptions: 1. Total earnings of labor are the residual of total national expenditures after the profits from land and other resources are subtracted; 2. The value of mankind is worth twenty times the present annual earnings of labor. Some other scholars then pointed out that these two assumptions are difficult to accept. A better understanding of human capital comes from (Kiker 1971)where he classified the valuation of human capital into: 1. The cost of production approach, and 2. The capitalized earning approach. (Kiker 1971) then summarized multiple reasons for which societies have attempted to treat humans as capital throughout history.

Adam Smith, Heinrich Von Thünen, Alfred Marshall et al are the forerunners of human capital theory. The Wealth of Nations divided a nation's stock into three parts: capital produced for consumption, fixed capital, and circulating capital. Smith categorized human capital as part of fixed capita, and it consists of acquired and useful abilities. In addition to traditional capital inputs such as machinery, facility, and land, a nation's productivity could also be measured by education and training of citizens (Smith 1937). Thünen accepted the notion of human capital wholeheartedly: "There is no doubt about the answer to the very controversial question of whether the immaterial goods (services) of mankind form a part of national wealth or not. Since the more highly schooled nation, equipped with the same material goods, creates a much larger

income than an uneducated people, and since this higher schooling can only be obtained through an educational process which requires a larger consumption of material goods, the more educated nation also possesses a larger capital, the returns of which are expressed in the larger product of its labor." (Thünen 1968) Alfred Marshall excluded human capital from his definition of wealth and capital, but still accepted the notion of human capital for various reasons. He discussed the capitalized earnings approach to the estimation of human capital. "He accepts Smithian position that an educated man maybe compared to an expensive machine" (Thünen 1968).

In *The Economic Value of Education*, Theodore W. Schultz (1963) focused on this field of inquiry, which later on formed the field of Economics of Education. He was one of the pioneers to theorize the importance of the relationship among investment in education, human capital formation, and the economic development and well-being of nations. In Schultz and Nelson-Phelps' view, human capital is mostly the capacity to adapt. This view of human capital is especially useful in dealing with "disequilibrium" situations, or situations in which there is a changing environment, and workers need to adapt to this. Schultz explained the "residuals" in previous economists' views (Bowen 1977) and (Schultz 1963) as gains in knowledge, skills, and productivity of members of a population who had invested in education and training.

Labor economists view human capital as a set of skills/characteristics that increase workers' productivity. In (Becker 1964)'s Human Capital—A Theoretical and Empirical Analysis with Special Reference to Education, he evaluated the economic value of individuals. This book gives a comprehensive analysis from difference angles of Economics of Education— effects on earnings, rates of return to different education levels, division of labor, coordination costs and knowledge, etc. He set the foundation of the later trend of Economics of Education analysis. (Becker 1964)'s view insists that human capital is directly useful in the production

process—it increases the productivity of labor in all tasks with differentiation on tasks, organizations, and situations. This view represents human capital as a unidimensional object, such as stock of knowledge and skills. This stock is directly part of the production function.

Some economists' views differentiate human capital from a unidimensional object. They believe there are various dimensions and types of skills within. A simple variation of this approach is by the distinction of mental and physical abilities. This later on formed the multiple-intelligence theory, which emphasizes how some geniuses are not skilled in other dimensions of tasks.

Despite the differences in opinions, human capital is valued in the market because it increases profits and productivity, and eventually the economic growth of a country. Firms would pay higher wages to educated and skilled workers because they potentially produce more value in terms of product or efficiency. It also leads to another stream of theories in the Economics of Education, which emphasizes the analysis of schooling on job training (general and specific) in labor economics. In the labor market relevance section of this dissertation, economic rate of return will be the link and focus of the Economics of Education part of the analysis, and will further help to define what TEQ means through the lens of relevance.

2.2   THE EDUCATION PRODUCTION FUNCTION MODEL AND ITS APPLICATION ON QUALITY MEASUREMENT

The education production function is similar to any production function. A production function is a mathematical relationship that describes how resources (inputs) can be transformed into outputs (Dominic J. Brewer 2010). The education production function therefore is a

mathematical form to describe the relationship between education resources (inputs) and education outcomes (outputs). Traditionally, the education production function has student characteristics, school-related factors, and other community influences on the "input" side. Economists are more in favor of tangible inputs such as school characteristics. These inputs are more easily measurable and manipulated by school administrators or policymakers. The control over school characteristics will eventually have an influence on resource allocation in education.

The outputs of an education system are not singular, meaning not merely literacy and numeracy skills. Tertiary education production outputs are even more complex than that of primary and secondary education. The definition and measurement of outputs also includes the provision of leadership in basic and applied research and public services, serving as the center of "excellence", and producing practical skills to prepare students to enter the labor force. It has been challenging in the field of Economics of Education to trace the effect of each input on the output of individual students. More aggregative studies need to be conducted for this particular purpose.

Because of the complexity of developing a tertiary education production function, very few studies have been conducted, with most focusing on higher education production measurement rather than a broader range of tertiary education. Inevitably, higher education production function studies focus more on the academic side with a university bias. Among the selective amount of studies done on the production function of higher education, (Atkinson 2000) conducted a study of higher education production by measuring the output with Graduate Record Examination (GRE). Among the explanatory variables, student's inputs were estimated by: score of the National Merit Scholarship Qualifying Test; Senior secondary school grades; nonacademic achievement; highest degree planned; intended field of study in college; and career

choice. Other variables such as socioeconomic status, parents' education, gender, and parents' occupation were also taken into consideration.

The definition and significance of the education production function is the main inspiration and theoretical base for developing the measurement for TEQ.

In author's interpretation in previous chapter, TEQ has a very subjective and complex meaning. In the case of Indonesia, quality is measured by how equitable the system is, how relevant it is to the labor market, how well are the educational inputs, and how the TEIs are assured. These variables definitely will not cover all aspects to measure the quality of a tertiary system, but they the most measurable and available in the case of Indonesia. They will therefore serve as the main source of measurement for TEQ in this dissertation.

2.3 BENEFIT INCIDENCE ANALYSIS FOR INEQUALITY

Implementing and designing fiscal policies in developing countries can be challenging as many developing countries do not have de facto progressive tax policies or effective tax administrations to alter the post-tax distribution of income (Alesina 1998; Zee 1999; Atkinson 2000; Chu 2000; V. a. Tanzi 2000). With limited resources and government capacity, developing countries use in-kind transfers to balance the disparity of resource accessibility to the maximum amount. Traditional in-kind transfers include social services such as health care, social safety net programs, and education. Those in-kind transfers are carried out with the goal of enhancing long-run earning potential of the population and the poor in particular.

Due to limited public resources, government expenditure for instance, policymakers strive to increase the effectiveness and efficiency of such spending to optimize the quality of

fiscal adjustment while pursing macroeconomic stability. Ideally, the share across different income/consumption quintiles and deciles shall be the same in a perfectly equalized society. However, the reality in most developing countries is that national wealth is concentrated at the richest 10 or 20 percent of the population. Developing countries, low-income especially, attempt to make government spending and budgets pro-poor by increasing the share of social spending, as well as by increasing benefits for the lowest income quintile more than for wealthier quintiles.

The poor will always have limited access to services that benefit them and help them to alleviate poverty. Government is usually expected to have a good target in providing subsidies in in-kind transfer programs. BIA serves as a practical tool in measuring the effectiveness of government spending across income/consumption quintiles and deciles. A perfectly equitably country will have a 20 percent share of public/government subsidies across five income/consumption quintiles. Given the natural disparity caused by human capital, the richest quintile will possess more resources and therefore will receive the least government subsidy in in-kind transfers. This usually is the opposite of actual cases in most developing countries. Researchers often find that the least wealthy quintile receives the least amount of public resources and government subsidies. In this case, government policy is no longer pro-poor but highly regressive.

BIA is a very commonly used method among macroeconomists to assess the effectiveness of public subsidies and evaluate if such effort is progressive or regressive. The method itself brings together elements of supply and demand for public services and information on inefficiencies and inequalities in government allocation of resources for social services and on the public utilization of these services (V. Tanzi 1974). BIA has been used in many middle-

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income and low-income countries, as well as some advanced economies. In the methodology part of this dissertation, the limitations of BIA will be elaborated.

Given the availability of data and information in Indonesia, BIA could be utilized to measure the inequality of tertiary education. As stated in the previous section, Indonesia has made great progress in increasing the coverage of tertiary education. BIA will then help to assess the next-in-line issue—equity. In the chapter on research findings, a comparison of BIA change over time will be presented by comparing the baseline year 2000 with 2010. This is for the purpose of examining the equity change or improvement, if any, over a10 year's period. Through this effort, TEQ will be further defined from the equity perspective along with an overall expanding tertiary system.

2.4   THE ECONOMIC RATE OF RETURN FOR LABOR MARKET RELEVANCE

Aside from the Cobb Douglas function and many other ways to compute the economic growth of a country, a Real GDP equation is another way to demonstrate what specific forces are driving the economic growth. Real GDP could be measured by an Aggregate Demand (AD) curve, as the sum of domestic household consumption of goods and services, domestic real investments, government spending on goods and services, and net exports (by subtracting the foreign purchase of exports from a country's purchase of imports), as depicted in the equation below.

Equation 2.2.

$$Y = C + G + I + (X - M)$$

Y stands for the level of national income; C is the domestic household consumption of goods and services; I is the domestic real investment in buildings, equipment, software, and inventories, G is government spending on goods and services; X is foreign purchase of the country's exports of goods and services; and M will be the country's purchase of goods and services from other countries (imports).

Similar to the Cobb Douglas function, Real GDP highly depends on the productivity of its labor force. The Real GDP AD curve is another way to measure how much a country's economy would be influenced by a change in its domestic consumption, real investment, and government spending. Human capital change has a strong influence on almost all of the variables within this function. The accumulation and development of human capital has a direct influence on labor market outcomes, which drives consumption and investment. Government spending on education also plays an important role in determining both G and the financial input of TEIs in developing countries.

Human capital corresponds to any stock of knowledge or characteristics that workers have. This stock of knowledge interacts with several variables, for instance, years of schooling, skills, innate ability, and quality of schooling and non-school investments (Bowman 1968). Education can be seen as one of the in-kind transfers from government/public subsidy. Other examples are healthcare, pension, and other social protection activities. The costs and benefits of education investments can be analyzed in the same way as other types of social benefits. In tertiary education, expenditure occurs during campus construction while students are still in school. Benefits are expected to accrue over the life-cycle of graduates (Dominic J. Brewer 2010). Within the expenditure, the net present value or the internal rates of return of the prospective operation can be computed.

Within the concept of returns to education, there are private rate of return, social rate of return, direct return, and indirect return. The purpose of this dissertation is to look into how TEIs are connected with the labor market directly. To do this, the study will start with an examination of economic growth by different sector, for instance, manufacturing, agriculture, service industry, and so on. As the main industry, agriculture has shrunk in recent decades, while other industries showed vigorous increase. The skill level that is required by those demand-increasing sectors is also increasing. The number of skilled workers with qualified program training at school determines how skilled the labor market is, and thus signals the connection between TEIs and labor market demand. Direct wage return to different degree holders in the labor market will therefore be used as a measurement of economic rate of return to tertiary education. Government spending will be analyzed in the financing section of this dissertation, which belongs to the input part of tertiary education.

2.5 CRITIQUES AND LIMITATIONS OF HUMAN CAPITAL THEORY AND ITS APPLICATION

Despite the long history and popularity of human capital theory in the field of Economics of Education research, there are various critiques that have been brought into discussion by scholars regarding the limitations of the theory. (Dominic J. Brewer 2010) formed the early stream of criticism against human capital theory. "Education changes the nature of our leisure activities … this effect is simply outside the scope of economics and for this reason the use of concept of human capital is justifiably criticized for the narrowness of its criteria" (Dominic J. Brewer

2010). On the other hand, another stream of thoughts argues that the omission of some consumption, external, or indirect effects does not warrant abandoning efforts in this area.

Regarding the econometric methods used to derive income differentials (Dominic J. Brewer 2010) believes that even after the correction is made to include other relevant variables the method is still inadequate. This is due to two reasons: 1. the assumption that all variables are addible is pushing for the recognition that there is no interaction among different variables; 2. qualitative variables such as intelligence are very difficult to measure, but these variables affect the measurement to a very large extent; the error caused by excluding these variables are very likely to occur.

(Benson 1978; DeYoung 1989; and Dreijmanis 1991) also cited limitations associated with the human capital theoretical perspective. Their main critique centers on the fact that human capital theory is based on the causal assumption that investments in education lead to increases in a human being's knowledge, skills, and productivity. And this leads to increased earnings over the individual's lifetime. Their criticism of the narrowness of this theory echoes Merrett's argument that human capital is purely drawing a causal relationship without taking other variables into consideration. And those variables are usually difficult to measure. An alternative hypothesis to explain the complex set of relationship is known as "screening" and "credentialism". This hypothesis states that higher earnings are not directly caused by increased worker production, but rather due to the desire of employers to attract and retain workers with higher skills and training (Benson 1978). The alternative hypothesis does not discount human capital as the theoretical foundation of Economics of Education studies, but it does raise concerns about the underlying logic and application issues associated with such studies.

Another main set of critiques of human capital theory comes from Dreijmanis and focuses on its sociological, educational, and economic perspectives. Dreijmanis pointed out that the demand for education expands as an increasing number of people pursue additional educational opportunities. The economic returns to higher levels of education actually decrease according to his finding. This is one of the main debates among scholars in recent years, as is the notion that an "over-educated" labor market will no longer yield higher returns based on simple supply and demand theory in economics. An overqualified workforce may decrease salaries and wages, and create more internal competition among workers. However, in most of cases of developing countries, this concern does not hold. Labor markets usually experience a transition from low-skill to skilled and a labor supply with sufficient education and training is usually in deficit compared to developed countries. On top of this, brain drain is another issue that causes the decrease of highly skilled labor to seek better career opportunities overseas.

Human capital theory forms the basis for most of the empirical work in the Economics of Education. Despite the critiques and limitations, it serves as the framework for studying a wide range of educational issues and policies and it conceptualizes how individuals make educational choices and how the implications of those choices are measured. The theoretical framework helps to understand education's value, impact, and role in developing countries.

2.6   INSTRUMENTS TO IMPROVE TERTIARY EDUCATION QUALITY

In the most recent World Bank working policy note, the policy framework proposed the Top 10 Do's for Tertiary Education: (Marmolejo n.d.)

1. Diversify options, but level the playing field

2. Assure good quality institutions

3. Increase the efficiency of institutions and the system as a whole

4. Make post-compulsory education and training equitable and affordable

5. Use innovative approaches to make sure that students stay, learn and graduate

6. Target public resources towards programs that yield high social returns

7. Arm students with information so they make smart choices

8. Improve secondary education—the roots of good-quality tertiary education go deep

9. Embrace competition—national and global

10. Expand institutional autonomy in exchange for accountability

The above 10 are the top areas of focus for TE in developing countries, and a majority of them apply to the case of Indonesia. Previous sessions in this dissertation demonstrated research findings on current TE issues and showed why these 10 practices should be of reference value to the Government of Indonesia for policy directions. The 10 practices also serve as the theoretical framework for the policy recommendations in the following part of this dissertation. In this dissertation, the author recommends four out of these 10 to be the short-term strategy for TE development in Indonesia (Marmolejo n.d.).

2.6.1 Diversify options, but level the playing field

There is university bias in most TEIs in emerging markets. People deem TE as education to be received in colleges or universities, and refer to traditional universities when speaking of enhancing quality. In the United States, about 45 percent of all undergraduate students attend community colleges. Canada, Germany, and Finland place strong value on providing practical and vocational training for young people. For countries like Indonesia, which possess a large

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number of secondary graduates with mediocre literacy, numeracy, and science knowledge foundations, it is most efficient to provide a spectrum of different degree programs by substance of training and length of study. Only by doing so will Indonesia build a better-skilled labor force.

2.6.2   Assure good quality institutions

Along with the expansion of tertiary enrollment and types of degree programs, quality is a key component. Independent quality assurance systems and mechanisms could greatly help the TE system evaluate current school quality and ensure minimum quality for new entrants (institutions) at the same time. Global best practices, including New Zealand, Colombia, and Ireland, have proven that an independent quality assurance system, separated from direct supervision and bureaucratic management by the central government, works much more effectively. In Austria, the Council for Accreditation of Universities of Applied Science has rejected 40 percent of applications for new institutions since 1994. Indonesia is a perfect example of why institutional and program accreditation should be separated to ensure better accreditation. This needs government stewardship and practice to be effective. A regulatory framework needs to be in place that provides a platform, which combines national qualification standards with a robust independent accreditation system for all types of providers and academic programs. Stakeholders will then benefit from an expanding tertiary system with reasonable quality.

2.6.3 Increase the efficiency of institutions and the system as a whole

Common knowledge of the rising cost of TE is widely recognized. This has to do with the increasing overall consumption level, global economic growth, the opportunity cost of establishing or maintaining good quality tertiary programs, and the rising demand worldwide for a higher degree. Some countries focus on investment in infrastructure and financial inputs to science, technology, and innovation to strengthen R&D outputs in order to be more competitively globally. The share of government spending on TE is increasing. Without a cost-effective mechanism to support this, governments could easily lose interest in further spending because the returns are not apparent. Some TEIs seek rigorous private partnerships in order to subsidize expenses. In countries with better PPP frameworks, TEIs have much more latitude in attracting external investment. This of course requires a flexible fund channeling system that gives autonomy to capable institutions and allows them to generate and effectively spend revenue. Indonesia is far from this stage given the rigidity presented in the financing section.

2.6.4 Make post-compulsory education and training equitable and affordable

The case of tertiary enrollment inequality exists in many countries, such as Mexico and francophone sub-Saharan African countries. Most enrolled students come from the top two income/consumption quintiles. Income disparity plays a very important role in determining the affordability of TE. Some other barriers such as gender, ethnicity, language, and religion also influence education attainment, although not as severely as socioeconomic status in the case of Indonesia. Inequality of TE is indeed an extension of inequality at lower levels of education, reflecting structural and systematic barriers. Other countries have tried to combine financial aid

with measures to overcome non-financial obstacles and address the comprehensive equity environment rather than taking a single-track approach to overcome barriers to entry. With good information and data, students generally pay through loans and other forms of financial aid and allowing them to pay back their debts later, while providing selected subsidies to some. This effectively enhances efficiency and incentives for secondary graduates to continue at the tertiary level, and stimulate financing by income contingent loans, while providing some free finance for equity reasons. TE is not free in most of countries, but is financed differently on the student's side to encourage pursuit of TE. Indonesia does not have this financial aid system. Its scholarship, Bidik Misi, is aimed at covering an expanding scope of tertiary students. However, this financial aid mechanism is not effective as the coverage is still low and very costly as a proportion of the entire public expenditure on TE.

2.6.5 Use innovative approaches to make sure that students stay, learn and graduate

TE is usually associated with high dropout rates and delays in completion. The highest drop-out rates happen during the first year of study in many countries. This happens in African countries, but in developed economies as well, such as Italy and the United States. Italy has a 36 percent TE drop-out rate, while in the US half of TE students do not officially graduate. There is definitely a disconnect between academic work and practical demands in the labor market due to how the tertiary system is usually set up and the stereotypes and traditions of TE. Many of the most in-demand occupations did not exist one or two decades ago. Curriculum and TE training, on the other hand, is not updated as fast as changes in the job market. Universities have been practicing co-op programs, career services, and practicums to maintain connections with industry. Indonesia falls behind on supplying sufficient information to the tertiary system and

providing appropriate practical training to students. It falls back many steps than a lot of countries in the world, even among ASEAN countries.

2.6.6 Target public resources that yield high social returns

When resources and public funding are scarce, countries need to optimize spending on education and focus investment on programs that yield high social returns. In the section on labor market in this dissertation, economic return to TE clearly tops all returns to other education levels. This is publicly recognized worldwide but neglected in countries like Indonesia because of the government's low capacity to effectively optimize public expenditure on TE. Public resources should be spent in areas where there is market failure or where social returns are highest. The Government of Indonesia has had several public sector interventions in terms of priority areas for development, such as polytechnic institutes and greater input on R&D. Indonesia is cooperating with donor countries to provide more resources for its human development. Scholars and students were provided funding to study domestically or overseas. However, those cooperating projects are highly competitive and are at too early of a stage to meet the demands from the broader population. Stronger government stewardship is needed to clearly define short-term, medium, and long-term development goals for the country. Granting more flexibility in exchange for better accountability and a rigorous academic environment is also necessary.

2.6.7 Arm students with information so they make smart choices

Information systems and data management are key for policy assessment, evaluation, and adjustments. Weaknesses and low capacity in terms of data and information are very common in

developing countries, including Indonesia. In the age of information technology, stakeholders depend on reliable sources to make decisions. TEIs are surprisingly behind in the use of information to inform students, parents, employers, and policymakers. This creates inefficiency on a large scale. Global practices showed clear evidence that with sufficient and more accurate information, regarding degree programs and labor markets for instance, industry could effectively work with schools to create a nurturing environment for students to acquire skills that are needed in the job market. This will, in turn, reduce skill mismatches and generate better returns to education.

2.6.8 Improve secondary education — the roots of good-quality Tertiary Education

Standardized test scores, namely, PISA, TIMSS, and PIRLS, provide valuable tools to assess literacy, numeracy, and other basic skills of teenagers around the world (OECD, 2014). Unfortunately, Indonesia's 15 year olds are not competitive among peers in other countries. In fact, they are significantly behind. Indonesia scored last but one in the most recent PISA, and its performance is actually declining compared to the 2006-2009 period. This highlights students' inability to pursue traditional academic TE, as well as their inability to handle job tasks that requires generic skills. Low capacity possibly leads to low performance in higher learning and therefore disincentivizes secondary graduates to attend TEIs. A push for better TE begins with a push for good secondary education, or even earlier. Korea provides a great example for connecting secondary education to TE.

2.6.9 Embrace competition—national and global

Ideally, rigorous institutional completion creates efficiency, enhances quality, and reduces cost. The commitment to embrace competition comes from domestic and international tertiary education market. This includes players from private for-profit and non-profit sectors. The goal is to create more relevant programs and effective quality assurance systems. When speaking of labor demand and supply, people no longer stay within the domestic market. Developed countries face challenges such as high skill inflow, which leads to a more competitive labor market with the option of cheaper high skilled labor. Emerging markets face the issue of brain drain due to low domestic capacity in skill provision and low social return to human capital investment. It will be impossible to completely free emerging markets of such a threat. However, a robust regulatory framework in response to the wider boundaries of TE is one of the solutions looking ahead. OECD countries set great examples of such success.

2.6.10 Expand institutional autonomy in exchange for accountability

Many TE systems in developing countries recognize the importance of strengthening the autonomy and flexibility of governance, state ownership, financing, staffing, student recruitment, and academic freedom. The key issue is how to grant more autonomy to the TEIs without losing control and diluting quality. Most TEIs in emerging markets lack autonomy and independent operating systems. This starts with the issue that TEIs are lacking an appropriate and accurate assessment of their strengths and weaknesses, and a practical and clear mission and vision. Making TEIs more accountable for the use of public funds, for instance, is one of the new concepts among TEIs in Indonesia. Policymakers gradually realize that there is an alternative to

effectively enhance accountability, especially when public resources are more limited than other countries: Empowering institutions with more freedom. The government needs to allow more institutional autonomy while promoting accountability by establishing adequate monitoring indicators and incentives. This is a long-term development strategy and requires stable government regulation and frameworks to back it up.

2.7   SUMMARY

This chapter begins with a review of the origins of human capital theory and continues with an introduction of the education production function model and its connection to the measurement of TEQ. Human capital theory is the foundation of Economics of Education studies. Among the economists who try to view human capital as the main approach for increasing productivity, Schultz and Becker are the most influential. Becker's work on "Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education" serves as the main reference for the composition of this chapter.

Along the lines of redefinition of TEQ, equity and relevance become two of the main variables to be measured in the following chapter. Benefit incidence analysis and economic rate of return are introduced in this chapter. BIA is one of the most commonly used and cited methods in measuring the inequality of in-kind transfers—social benefits such as health care and education. It provides a strong tool in examining the distribution of social benefits by socioeconomic class or quintile. The economic rate of return calculation includes the private and social rates of return. ERR is also one of the most-used methods in calculating the different return to education by educational level. It makes a clear distinction between monetary and social returns to certain investments, and

helps to evaluate the incentives for pursuing higher level education, as well as the labor market response to certain shocks of supply and demand.

In the final part of this chapter, policy instruments are discussed. The 10 policies are borrowed from a recently published briefing from the World Bank Group on the most effective ways to enhance tertiary education quality at the country level. The policy briefing serves as the platform for the later policy recommendations for instruments to improve TEQ. These top 10 things to do for tertiary education come from a very practical perspective and are tailored to fit the purpose of tertiary education development in developing countries in particular. Therefore, they are considered as the guiding principles for developing effective instruments for quality improvement.

3.0   RESEARCH DESIGN AND METHODOLOGY

This study is designed based on the theoretical framework of human capital and the original education production function model. The measurement of TEQ through the education production function model is built based on Cohn and Gillespie's model, and the linear function is based on (Dominic J. Brewer 2010)'s "Education production functions: evidence from developing countries". In chapter one of this dissertation, TEQ is redefined through the assessment of four main aspects: inputs, equity, relevance, and assurance. There are constraints and limitations with the redefinition. In this chapter of the dissertation, the author will explain in detail the rationale for the selection of the education production function. Through the overview of specific research methodology, applications of each model (benefit incidence analysis and economic rate of return) and their limitations will be discussed.

The variables this dissertation looked into are far from sufficient to address the TEQ issue. However, it serves as a different approach and attempts to quantify the elements that are usually considered difficult and subjective. TEQ's definition goes beyond what could be measured, such as educational inputs, and includes human and capital, program design, number of graduates and dropouts, duration of program, and retaining rate. This new way of examining the quality of a tertiary system allows researchers to utilize national data—household and labor—and conduct evidence-based analyses. In this case, questions such as "how relevant a tertiary education system is to the country's labor market" will no longer be a subjective matter.

3.1   DATA

In this dissertation, education input and system assurance analyses are conducted with the help of administrative data that from the Ministry of Education/Finance of Indonesia and international organizations. Equity and relevance analyses are carried out using data directly pulled from a national household survey that is managed by the Central Bureau of Statistics in Indonesia. Quality of data and methodology of the household survey is much higher. Similar to other developing countries, data and information are one of the challenges for evidence collection. Decisions on data usage and resource utilization are based on availability, accessibility, validity, and relativity considerations.

Administrative data are solicited from multiple layers of government agencies, such as the Department of Education and Bureau of Education. They are managed by the central government and relevant ministries. Household surveys in Indonesia are longitudinal. This dissertation used both administrative data from the most recent year available (2012), and household data from February 2012. Household survey data are collected quarterly. Each quarter, field workers use the same questionnaires to collect information from households. Household surveys were conducted and managed by the Central Bureau of Statistics at the GOI since 2001.

Household surveys include SUSENAS and SAKERNAS, and are used for the analysis in BIA and ERR sections respectively. Both datasets come from the same data source and survey questionnaire. SUSENAS focuses on household information, such as education, household income, and consumption. SAKERNAS is more focused on the labor market reservation, job type, job sector, and employment status. Both SUSENAS and SAKERNAS data come from

same sample in the population. This dissertation used the general module and education module in SUSENAS and SAKERNAS survey.

At each round of household survey, all households are divided into four portions equally. Three portions of households are surveyed by SUSENAS questionnaires, and one portion of the household survey is on the labor side (SAKERNAS).

Prior to 2002, BPS undertook a SUSENAS Survey once a year and in particular for 2001, BPS was conducting SUSENAS's household enumeration in February 2001. Since 2002-2010, SUSENAS was conducted twice a year, where in periods between 2002 and 2006 the survey had two rounds, in February and July. From 2007-2010, SUSENAS rounds changed to March and July. Starting from 2011, SUSENAS was made quarterly, collected in March, June, September, and December.

However, there were some differences between biannual SUSENAS (February/March and July rounds) in terms of geographical coverage, sample size, level of representativeness, type of data collected, and the weight calculation.

Table 3.1. SUSENAS survey information[15]

	2001	2002-2006	2007-2012*
Period	Annual	Biannual	Biannual (2007-2010) Quarterly (2011-2012)
Coverage	Except for NAD and Maluku all districts were sampled	Not some of districts were sampled	All districts usually were sampled
Level of Representativeness	Representative at the national, provincial, and district level	Representative at the national and urban rural level	Representative at the national, provincial and urban-rural level
Number of samples (Households-core dataset)	218,568	around 10,000	65,000 (2007-2010) 71,000 (2011-2012)
Average Weight	227	+/- 5,000	around 700-800

In 2007, all districts were sampled but after checking SUSENAS data, there are only 438 unique values while by end of January 2007, the number of districts in Indonesia was 456.

Based on the above information, for the February round of SUSENAS data, there are two things to carefully interpret any findings of SUSENAS: 1. Since the coverage of each SUSENAS data is different, especially before 2002, 2002-2006 and 2007 onwards, then it may also provide different results among those three periods. There might be variations of the results even within the same round, in this case in the February/March period since in one period all districts were sampled and the others are not. The information captured from those surveys covering the whole districts would be much richer to some extent in comparison with the ones with some of districts only. 2. As seen in the table above, the average weights among those three periodic years are different from one to another. This is understandable since the numbers of households surveyed are also different. This means, for instance in 2001, that one individual will represent

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[15] Source: Indonesian National Bureau of Statistics (BPS).

approximately 227 people with the same individual characteristics like that individual. The same rule of thumb follows for the remaining years. Hence, in case there is one observation in that sample dataset that behaves differently, i.e. outliers, then we can assume in the period 2002-2006, such "a particular condition" will drive the results differently from the "normal" case in which the average weight is not large. These kinds of weight differences will add some variations of information gathered from the February round of SUSENAS data.

This dissertation used administrative data, which are managed and collected by the GoI, and household survey data, which are carried out and managed by the Central Bureau of Statistics in Indonesia. All data used are collected through third parties and therefore are second hand data. The University of Pittsburgh Institutional Review Board (IRB) does not request approval for research studies that use existing data that are managed by third parties. IRB approval is exempted for this study.

3.2   RATIONALE FOR THE SELECTION OF THE EDUCATION PRODUCTION FUNCTION

As human capital theory argues, the level of education and training directly and indirectly impact human productivity, and thus influence social productivity and economic growth. It is publicly recognized that some of the gap in living standards between developed and developing countries could be due to the wide gaps in education. If education—as one of the approaches to providing non-pecuniary benefits—is so influential, an important question emerges for policymakers in developing countries: What are the most effective education policies and how to

enhance the quality of the existing education system? The measurement of tertiary education quality could be through different approaches.

Empirical studies in the US have tried to measure the quality of tertiary education by looking into: index of selectivity; per student expenditure; number of books in the library; number of books in the library per student; faculty-student ratio; percentage of faculty with a Ph.D. degree; total affluence, based on items number 2 through 6 mentioned; degree of competition for grades; type of control; type of institution; geographic region; type of college town; total undergraduate enrollment; percentage of men in the student body; curricular emphasis (for example, liberal arts versus science of business); and measures of college environment derived from the inventory of college activities.

In the case of developing countries, TEQ entails a set of different meanings: input, equity, relevance, and assurance. Raising enrollment and expanding the system has always been the first approach in developing countries to have a better-educated population. Ideally, with an absolute number increase in the tertiary system, students of all socioeconomic statuses should benefit, and sometimes with a preference for poorer students. However, developing countries usually operate in the opposite way: social benefit favors the richest quintile, and government subsidies are far from being pro-poor. Therefore, if one talks about TEQ in a developing country, equity and equality should be the first items to be assessed.

Along with the success of system expansion, quality deterioration and oversupply of labor market are the next biggest concern. Expanding the system causes oversupply of labor with homogenous skill sets. The labor market will stop responding to the increase of skilled labor as soon as it reaches its peak absorption capacity. Having a tertiary system that is highly relevant will be the key. A relevant system requires TEIs to offer differentiated degree programs

and training. There are two reasons behind this: 1. The under-prepared teenager graduating from senior secondary school will require the system to have diversified options; 2. TEIs need to provide fitness-to-purpose training to students in order to prevent the inner competition caused by the increasing supply of tertiary graduates. Therefore, TEQ determines relevance and vice versa. How relevant the system is will be a strong indicator of tertiary education development and system quality.

Together with the success in system expansion and the effort of creating a more relevant tertiary system, assurance is the third area that a country should focus on. More than often, countries establish accreditation units under the supervision of the Ministry of Education. The functionality of such a system remains questionable. The lack of capacity in understanding mission, vision and purpose of the quality assurance system, under-staffing, and low financial support from the government are some of the main issues that countries face. In the case of Indonesia, there are a large amount of TEIs with differentiated program design. They are unable to be accredited due to financial and personnel constraints. Despite the strong support and stewardship from government in developing its tertiary education system and enhancing quality, TEQ will not significantly improve without a good assurance system. QA systems in developing countries are therefore the third most important aspect when assessing quality.

The indicators above cannot and should not cover all aspects that determine the productivity and quality of an education system, but they serve as an innovative platform for policymakers to re-evaluate current tertiary education systems and form public policies in the most practical way. Through this dissertation, the author will seek to quantify the main variables and to further define TEQ through the education production function model.

3.3 OVERVIEW OF RESEARCH METHODOLOGY

TEQ is difficult to measure, and the meaning of quality is subjective and constantly changing with time. How to measure TEQ within the context of a developing country is the main research question in this dissertation. There will be one leading research methodology used to measure the overall quality, and another two minor methodologies used to measure equity and relevance.

3.3.1 The Education Production Function Model

Education increases individuals' productivity through their acquisition of cognitive and non-cognitive skills. Cognitive skills include literary, numeracy, and science; non-cognitive skills include social, critical thinking, and creativity. In order to craft effective education policy, an understanding of the process of how education produces these skills is crucial. This process, as categorized by economists, is the education production function. As studies have enriched research findings, economists have developed a comprehensive framework to think about the production process.

Through mathematical methods, the vector of educational outputs could be denoted as *Q: q_1, q_2, q_3 ... q_n;* the vector of school related inputs will be *S: s_1, s_2, s_3...s_n,* non-school inputs will be *X: x_1, x_2, x_3... x_n.* There is a total of *n* inputs and *(l+m)* outputs. The generalized education production function will be as follows:

Equation 3.1.

$$f(Q, S/X) = 0$$

This original model of the education production function indicates that if the level of non-school inputs is given, the determination of the expected levels of outputs will depend on both the levels of the school inputs and the functional operator, f. f specifies the shape of the production function. A linear relationship can be drawn from this production model, which is the same pattern as "production frontier".
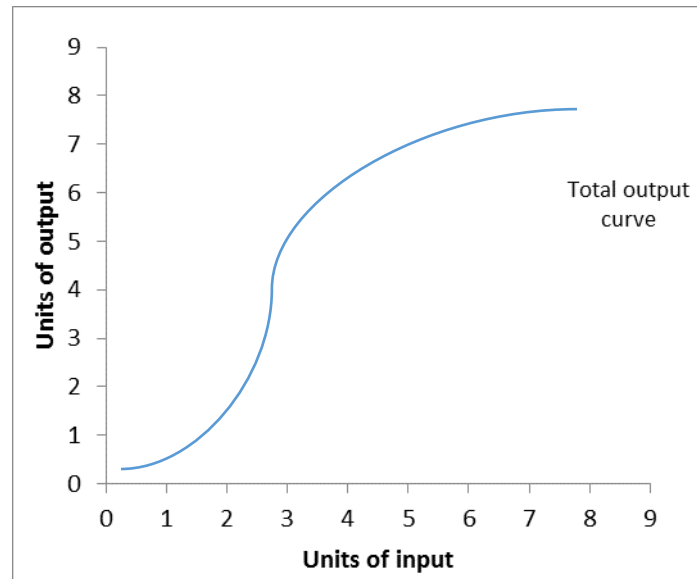
Figure 3.1. Total Production Curve and Linear Approximation [16]

Inspired by the traditional model of the education production function, TEQ in this dissertation is defined as:

Equation 3.2.

$$f(Q, (E, R, A)/I)) = 0 \qquad OR$$

Equation 3.3.

$$Q = f(E, R, A, I)$$

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[16] Source: (Psacharopoulos 1995).

Where function (4), Q will be the TEQ outcome, and E is the equity factor, R is the relevance factor, A will be the assurance factor, and I is the input factor. This function depicts that, if educational input stays the same, the TEQ will be determined by the changes of equity, relevance, and assurance. However, the determining factors E, R, and A should not be simply added to become one main determining factor as these three interact with each other as well. TEQ (Q) should be approached as a function of E holding all others constant to reduce the complexity of the application of this model.

Function (5) is the same idea but in a different format of the education production function. To avoid confusion, this model is simplified with a linear relationship between TEQ and four variables. The quality of tertiary education is defined as how productive the system is. Productivity depends on: the educational inputs, such as quality and selectivity of aspirants, and quality of teaching force; how equitable the system is; how relevant the study programs are; and how is the system assured. Sometimes the four variables interact with each other. For instance, the inequality of incoming students will have an effect on the educational output, which is the skills of tertiary graduates, and eventually influence the relevance factor in this model.

Due to the complexity of each variable, it is a better idea to quantify them through individual methodologies. In this dissertation, equity is assessed through the BIA method, and relevance is assessed through the economic rate of return. Each variable in this function could determine the quality of the tertiary education system of a country if the purpose is to assess the development of a particular perspective. For example, one might be very keen on learning about the assurance system. S/he will therefore look into specific numbers of assured institutions, QA frameworks, staffing, financing, etc. Looking at QA itself gives policymakers a good reference to evaluate the current tertiary education system. In this dissertation, however, the author intends

to look at the entire tertiary system in Indonesia. The dissertation will therefore focus on a broader perspective on productivity. Four research questions will lead discussion to assess the overall quality of Indonesia's tertiary system step by step.

3.3.2 Benefit Incidence Analysis and Gini Coefficients

As early as 1964, (Gillespie 1965) had attempted to use BIA to evaluate inequalities in social spending in Canada and the US. The methodology and its present form were then introduced through two developing countries' cases—Colombia and Malaysia (Selowsky 1979). Soon after these two classic studies, scholars and researchers started to replicate the model in many countries at different income levels. Other outstanding research activities carried out through BIA methodology include surveys done by (McClure 1974) and recent cases by (Demery 2000). BIA requires three kinds of information/data in order to conduct the calculation (Dominic J. Brewer 2010).

1. **Government spending on tertiary education** (net of any cost recovery fees, out of pocket expenses by users of education, or user fees). This set of data is generally obtained through the Ministry of Finance, or other relevant ministries at the country level, on budget execution. The dataset is needed because BIA is typically reported on an aggregate basis. The analyses do not reflect the variation in the quality of services provided to different groups of beneficiaries. This is also one of the limitations of BIA in that it forces one to maintain the hypothesis that quality is invariant by geographic and socioeconomic classifications. In addition, given that large numbers of countries report spending data based on a cash rather than commitment basis, there could be a gap

between the two sets of reported data. BIA studies usually rely on cash data, but could be based on commitment data as well if they are proved to be reliable.

2. **Public utilization of tertiary education**. Government spending data should be comprehensive, meaning that it should cover all levels of government, both recurrent and capital spending. Spending are often underreported due to the unavailability of subnational data. BIA usually will use recurrent spending if capital investment yields benefits that extend over a much longer horizon. The issues and examples of service that flows over existing capital were discussed in (Demery 2000)'s dissertation.

3. **The socioeconomic characteristics of the population in TEIs**. This is the key of BIA analysis as the methodology itself studies the inequality of public subsidy distribution across social classes. The measurement issue serves as the treatment of out-of-pocket expenses, cost recovery fees, and other "user fees". The information above is usually difficult to obtain if a country does not have a household survey with good coverage and survey methodology. Indonesia, however, is a perfect case to study as the BPS is a capable government agency that is responsible for this activity. SUSENAS and SAKERNAS provide even more reliable data and information than administrative data coming from ministries. In the cases of other countries that do not have household survey, studies used government reported data regardless of sources of financing or if financing is supplemented by user fees. Information on user fees is needed by income/consumption group so that net benefit can be calculated.

In the economics of education methodology, BIA consists of five steps. The following content demonstrates how BIA is calculated according to those steps:

1. Obtain the average unit cost of providing tertiary education by dividing government spending on tertiary education by the total number of users in the system.

In this step, users of public a service—tertiary education—are regarded as the ultimate beneficiaries of the service. The number of beneficiaries is usually the absolute enrollment number. In cases like Indonesia, researchers are recommended to use Gross Enrollment rather than Net Enrollment, as students of all age cohorts benefit from this in-kind public service, and the number of repeating and older students are high. Teaching faculty members are not considered direct beneficiaries as much as students even though their wages and benefits are subsidized by the government. Enrollment numbers come from household surveys. Household surveys should represent the population, with good coverage. Overall government spending should come from national level data. Indonesia has accurate data on government spending in this case.

2. Define the average benefit from government spending on tertiary education as the average unit cost of providing tertiary education, which is derived from the previous step.

The assumption made in this step is a strong one as it imputes benefits from government in-kind transfers to individuals' welfare as measured by their income or consumption. The alternative to this would be more complicated to tackle, which entails estimating a demand curve for tertiary education and deriving benefits from students' willingness to pay as summarized in the demand curve.

3. Rank the population of users from poorest to richest using a welfare measure and aggregate them into groups with equal numbers of users.

Step three is simpler. The unit of analysis will be by household rather than individual. Welfare is measured either by income or consumption. In the household survey this dissertation

is using, the household is weighted and consumption information is more comprehensive and accurate. Therefore this dissertation will use consumption level rather than income, and argue against the concern that using household unit than individual unit possibly distort the proportion of government expenditure per consumption level. For reasons listed in the section on disparities by different factors, socioeconomic status is the main factor for inequality. Therefore, other classifications, such as geography, gender, and ethnicity, will not be taken into account in BIA in this dissertation.

4. Fourth, derive the distribution of benefits by multiplying the average benefit derived from the previous step by the number of users of the service in each consumption group.

This step assumes that the average benefit from tertiary education does not vary within consumption level, even though the quantity of benefits may vary across users within each quintile and the value that users place on tertiary education may vary across households. However, in order to answer the research question in this dissertation, the variation of the household level within each consumption quintile ought to be ignored. This dissertation tries to answer a more general policy question: how much difference there is among households from various consumption levels (Psacharopoulos 1995).

The first four steps could be illustrated by simple algebra as follows. Total benefits from government spending on all tertiary education accrued to group j is estimated as:

Equation 3.4.

$$Y_j = \sum_{t=3}^{3} E_{tj} \frac{S_t}{E_t} = \sum_{t=3}^{3} \frac{E_{tj}}{E_t} S_t \qquad j = 1,2,3,4,5$$

Y_j is the benefit incidence in constant USD accrued to consumption group j from net government spending on tertiary education denoted as S_t, in constant USD. This formula could

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be used to measure BIA in all three levels of education with a simple adjustment by setting t with 1 or 2 to represent primary and secondary. E_{tj} represents number of enrolled students at tertiary level from group j, where each group is a consumption quintile. S_t/E_t is the unit cost of providing tertiary education. Groups are usually ordered from lowest to highest with respect to the classifying variable. If desired, the groups in the middle of the distribution can be aggregated to define a "middle class" (V. a. Tanzi 2000); (Alesina 1998); and (V. Tanzi 1974).

Let us divide both sides of the expression 6 above by total net government tertiary education spending, S, to obtain the share of benefits accrued to quintile j from total government spending on tertiary education:

Equation 3.5.

$$y_j = \sum_{t=3}^{3} \left(\frac{E_{tj}}{E_t}\right) * \left(\frac{S_t}{S}\right) = \sum_{t=3}^{3} e_{tj} s_t \qquad j = 1,2,3,4,5$$

$y_j = Y_j/S$; e_{tj} is the quintile j share of total students enrolled at tertiary level. s_t is the share of government spending for tertiary level in total education spending, and $S = \sum_{t=3}^{3} S_t$. By construction, estimates of x_j across quintiles would add up to one.

5. Compare the resulting distribution of benefits with a number of benchmark distributions.

This step serves as the most informative and important one for policymakers. A good government spending policy on tertiary education should be targeted. In a more comprehensive analysis of government spending across education level, this step will further inform the comparison of incidence of primary, secondary, and tertiary, and how the resulting benefit incidence stacks up against the past incidence of spending in the same country. In this dissertation, the author focuses on government spending on tertiary education only, whether this spending is progressive or regressive, and how the regressiveness has changed over time.

The Gini Coefficient/Gini Index is often used in measuring inequality in terms of consumption and income. The Education Gini Index is used to measure the inequitable concentration of government subsidy through social benefit—education.

Direct method of calculating Gini coefficient is:

Equation 3.6.

$$GINI = \frac{1}{\mu N(N-1)} \Sigma_{i>j} \Sigma_j |y_i - y_j| \quad [17]$$

In the book "Public Policy Analysis: An Introduction", Professor William N. Dunn further developed the calculation of Gini coefficients in a more practical and straightforward method, which is what this dissertation intends to use in later chapters' calculations. The formula for calculating Gini Index in Professor Dunn's book is as follows:

Equation 3.7.

$$GI = \frac{[(\Sigma X_i Y_{i+1}) - (\Sigma X_{i+1} Y_i)]}{\Sigma X_i X_{i+1}} \quad [18]$$

3.3.3 Economic Rate of Return to Tertiary Education

The rate of return could be calculated through multiple approaches. Economic rate of return to tertiary education can be separated into two main parts: private rate of return and social rate of return. The costs incur by students at their foregone earnings while studying, and also include the education fees incur while students study at school. In the case of primary education, school

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[17] Source: (Thomas 2000).
[18] Source: (Dunn 2012).

fees are mostly subsidized by the government. However, in the case of tertiary education, fees and expenses make a big difference in determining the affordability of tertiary education for students because government subsidies in tertiary education are only partial. Private benefits entail the ratio of a more educated individual over the individual who has less education. In the figure below, examples are drawn by showing the difference between tertiary graduates and secondary graduates (Psacharopoulos 1995).
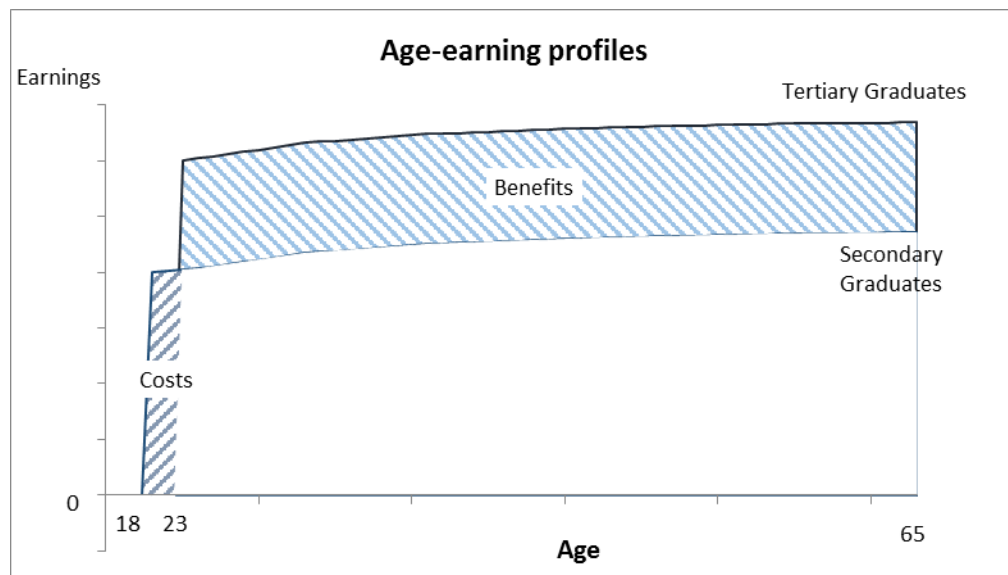
Figure 3.2. Stylized Age-earning Profiles[19]

Private rate of return to an investment in tertiary education can be estimated by finding the rate of discount *r* that equalizes the stream of discounted benefits to the stream of costs at a given point in time. The formula is as follows:

Equation 3.8.

$$\sum_{i=1}^{65-23} \frac{(W_U - W_S)_t}{(1+r)^t} = \sum_{i=1}^{23-18} (W_s + C_U)_t * (1+r)^t$$

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[19] Source: (Psacharopoulos 1995).

Where W_U stands for the wage of an individual with a tertiary/university degree, W_S is the wage of an individual with a secondary degree. C_U is the direct cost of attending TEI/university. Sub t symbolized this equation is measuring the rates of return at a certain time. $W_U - W_S$ is the earning difference between a tertiary and secondary graduate, W_S is the student's forgone earnings or indirect costs. This model is also assuming that earning starts at age 23 if one graduates from tertiary school, at age 18 if one graduates from senior secondary school; and 65 will be the last year of earnings. Age setting could easily be adjusted depending on a country's profile.

Compared to private return to education, social return to education adds another layer of public and private spending onto education. Therefore, C_U would include the sunk costs of building a school, professorial salaries, and so on. In the case of calculating social returns, gross earnings (not excluding salary deductions of any kind) should be used in the calculation. One of the key assumptions in the social return to education is that wages obtained through household surveys are a good proxy for the marginal product of labor. Civil service pay scales can be taken into account in private return to education but not social rate of return.

Both direct cost and foregone earnings are taken into account in the social rate of return calculation. This is considered the social attribute of the estimated rate of return (Psacharopoulos 1995). Social benefits should also include non-monetary or external effects of education. However, these data are very difficult to obtain, and if they cannot be obtained, validity of data will be another concern. Social rate of return estimates therefore are usually based on directly observable monetary income—salary and direct and indirect costs of education.

A simplified model for calculating both private and social returns to education will be discussed in this subsection. This method is sufficient in approximating returns to education and

easier to comprehend. According to the age-earning figure in previous pages, one can approximate the earning-curve to be flat (figure below).
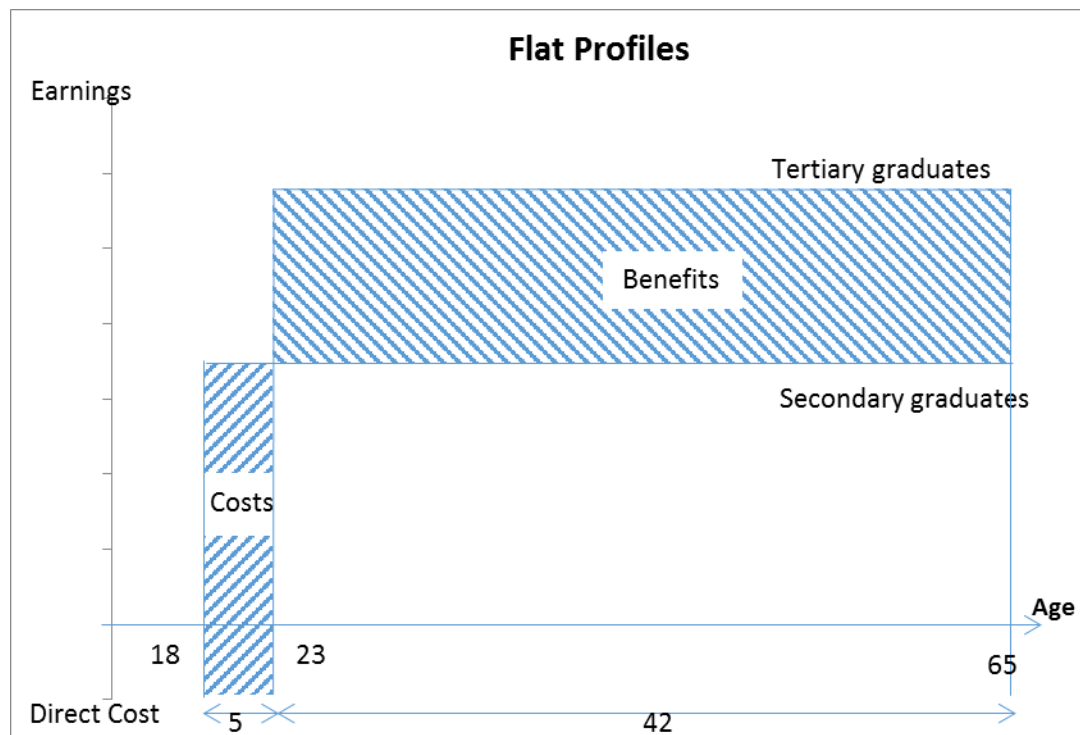
Figure 3.3. Simplified Age-earning Profiles[20]

The simplified formula (or "short-cut") of the methodology to compute the private rate of return is:

Equation 3.9.

$$Private \; r = \frac{\bar{W}_U - \bar{W}_S}{5(\bar{W}_U)}$$

W bar is the mean earning of an individual with the each education level. 5 is assumed to the length of tertiary cycle. In the case of Indonesia, if a student is enrolled in D track rather than S track, number 1,2,3,4 could also be used to indicate the length of study at TEIs.

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[20] Source: (Psacharopoulos 1995).

The simplified formula (or "short-cut") of the methodology to compute social rate of return is:

Equation 3.10.

$$Social\ r = \frac{\overline{W}_U - \overline{W}_S}{5(\overline{W}_U + C_U)}$$

Cu is the annual direct cost of attending TEIs. In this dissertation, economic return to tertiary education is a calculated as combination of private and social return (Psacharopoulos 1995).

One of the main concerns using this model to estimate private return is that the private return does not take household spending into consideration. On top of that, social rate of return does not take public investment, or government spending, into consideration. The methodology of computing both social and private rate of return improved a great deal in recent years. They all come from the "Mincerian model"—the education earning function method, including the method in George Psacharopoulos's early works. The Mincerian model came from Miner's publication in 1974. This method could estimate both private and social returns to different levels of education.

The Mincerian model contains several variables: W_0 stands for the wage of an individual with zero schooling; W_s is the wage of Secondary School graduates (this could be changed to primary graduates if one wants to compare earning difference between tertiary and primary students). S is the years of schooling, S_p is the number of years of schooling at primary level; S_s is the number of years of schooling at secondary level; S_u is the number of years of schooling at university level. r is the rate of discount, which is the stream of discounted benefit to the stream

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of costs; p represents primary level of education, s represents secondary, and u represents university.[21]

Based on the "short-cut" method of ROR, the coefficient of years of schooling could be interpreted as the average private rate of return to one additional year of schooling, regardless of the educational level this year of schooling refers to:

Equation 3.11.

$$\beta = \frac{\partial \ln W}{\partial S} = \frac{Relative\ earnings\ differential}{Education\ differential} = \left[\frac{W_S - W_0}{W_0}\right]\frac{1}{\Delta S} = \frac{W_S - W_0}{\Delta S * W_0} = r$$

The above function is used to estimate the returns to education at different levels by converting the continuous years of schooling variable S into a series of dummy variables D_p, D_s and D_u, indicating if an individual went to primary, secondary, or university.

Private rate of return to different levels of education can be derived from the following, in which S_p is the number of years of schooling at primary level; S_s = the number of years of schooling at secondary level; and S_t = the number of years of schooling at university level:

Equation 3.12.

$$r_p = \frac{\beta_p}{S_p}$$

Equation 3.13.

$$r_s = \frac{\beta_s - \beta_p}{S_s - S_p}$$

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[21] In the early phase of this model, tertiary students are only viewed as University students back then. Author uses u here instead of t to keep coherency with the original methodology in Mincerian model. In later sessions of this dissertation, t (tertiary graduates) will be used in the application of this methodology.

Equation 3.14.

$$r_u = \frac{\beta_u - \beta_s}{S_u - S_s} \qquad \text{OR}$$

Equation 3.15.

$$r_t = \frac{\beta_u - \beta_s}{S_t - S_s}$$

Where r_t stands for return to tertiary level students, and r_u stands for return to university

level students.

In the linear regression model, earnings/wage return to education could be denoted as:

Equation 3.16.

[22]

$$Ln(w_i) = \alpha + \beta_1 S_i + \beta_2 X_i + \beta_3 X_i^2 + \mu_i$$

The natural log of (hourly or annual) earnings for the i_{th} individual depends on years of

schooling S_i (as a continuous variable); labor market potential experience X_i (estimated as age –

years of schooling – 6); potential experience-squared X_i^2 and the random disturbance term as

miu. When the schooling factor is dissolved into dummy variables to measure each level of

education, the model becomes:

Equation 3.17.

[23]

$$Ln(w_i) = \alpha + \beta_p Dp_i + \beta_s Ds_i + \beta_t Dt_i + \beta_1 X_i + \beta_2 X_i^2 + \mu_i$$

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[22] Source: World Bank 2013

This is estimating different returns to different levels of schooling by converting years of schooling S into a series of dummy variables D_p, D_s and D_t to denote the fact that a person has achieved that level of schooling. (p=primary, s=secondary, t=tertiary). Natural log of (hourly or annual) earnings for the i_{th} individual depends on years of schooling (as a series of dummy variable); labor market potential experience X_i (estimated as age − years of schooling − 6); potential experience-squared $X_i{}^2$ and the random disturbance term as *miu*.

In the application of Mincerian model, and in the context of developing countries, there are concerns such as data availability, validity and so on. The better and more practical way to calculate earnings or wage return to education is by using the following method:

Equation 3.18.

[24]

$$Social\ r = \frac{additional\ expected\ income}{social\ cost\ of\ certain\ education}$$

Equation 3.19.

[25]

$$Private\ r = \frac{additional\ expected\ income}{private\ cost\ of\ certain\ education}$$

In the above model, education input is appropriately contained in both social and private return to education. In model (18), education input includes public input (government expenditure on education) and private input (household expenditure). Private return only concerns household expenditure and therefore the education input only includes input coming from household. Additional expected income could be calculated.

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[23] Source: World Bank 2013
24 Source: World Bank 2010
25 Source: World Bank 2010

Therefore, in the above model, the social cost of certain types of education equals forgone earning (difference in average number of years of schooling) plus the additional cost of schooling (public investment plus private investment/household spending); private cost of certain education equals forgone earnings (difference in average number of years of schooling) plus the additional cost of schooling (only private investment/household spending). In countries where household survey data are available, all of the variables in this model can be obtained through the dataset. Social and private rate of return could therefore be relatively accurately computed or estimated. In the case of Indonesia, this dissertation is using the last two functions to calculate earnings and wage return to different levels of education.

3.4   RESEARCH QUESTIONS

There are four leading research questions in this dissertation. The first question focuses on the equity issue of the tertiary system in Indonesia. In this question, several factors will be looked into, such as socioeconomic status of students' family, gender, ethnicity and linguistic ability, geographic origin, and learning abilities. The first question also intends to address the commonly recognized concern: does system expansion deteriorate the quality of tertiary education? The analysis starts with a description of current expansion trends—the rate of growth of enrollment and who are currently in the system. It then uses the indicator on labor market response to the expansion of tertiary system to address whether expansion should continue or not.

The second research question examines the status quo of Indonesia's tertiary education system: what kinds of students are admitted into TEIs and who are teaching the tertiary students.

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The second research question uses data coming from university and college entrance exam figures to identify the selectivity of aspirants. The teaching force part will be answered by analysis of data coming from Ministry of Education.

The third research question intends to address the relevance issue. Labor market observation is always one of the most common areas to study for the relevance of a country's tertiary system. Data are coming from the household—labor survey (SAKERNAS). The current labor force composition gives an idea of how skilled and well-educated the labor force is. Forecasting of skill shortfalls will provide a sense of the future trend of labor market demand, and the skill levels needed for the next 20 years in Indonesia.

The fourth question is designed to evaluate the QA system in Indonesia. As stated before, the capacity of a country's QA system directly influences the TEQ of that country. Despite the extent of autonomy granted to the TE system and the strength of the government's dedication to developing a diversified tertiary system, QA will serve as the main force to ensure TEIs are timely, accredited, and monitored for quality. Issues associated with the QA system will also be discussed in the last chapter. There is a strong demand for education policy to strengthen Indonesia's QA system.

In summary, the four research questions are as follows. They serve as indicators to measure TEQ in Indonesia.

1. What are the main forces that drive tertiary education quality in terms of equity and equality?

2. How can tertiary education quality be measured by inputs—the selectivity of the tertiary education system for students and the competence of the teaching force?

3. How can be tertiary education quality be measured by relevance—labor market analysis and economic returns to tertiary education?

4. How can tertiary education quality be assured by the accreditation system—the assessment of quality assurance mechanism?

These research questions cover the four main areas that explain TEQ in this dissertation—TE equity, returns to investments, labor market relevance, and assurance mechanism. In the later chapters of this dissertation, research findings will be presented with respect to the four main sub-research questions. The measurement and redefinition of TEQ is not a perfect model. However, it includes the critical elements for TEQ in developing countries.

3.5 METHODOLOGICAL LIMITATIONS

In this section, methodological constraints, errors, and limitation will be discussed. The overall method to measure TEQ is the education production function. This session will start by examining the limitations of this general methodology, and further present weakness of the other two minor methodologies used in this dissertation: BIA and economic rate of return. These two minor methodologies are used to measure the equity and relevance variables in the general production function.

3.5.1 The Education Production Function Model

The education production function model uses linear regression to assess the productivity of education. Linear regression entails omitted variable bias. Omitted variables could be cognitive

and non-cognitive. The omitted variable exists sometimes because the variables are difficult to obtain and measure. Omitting one or more of them may cause estimation bias and impact remaining variables in the productivity function model.

Selection and attrition bias is another common bias in linear regression analysis in the education production function. Biased estimates will appear when the impact of a variable influences the observations. For instance, a good performing tertiary education system might attract more academically and technically talented students. This will result in a better return to tertiary education because of the enhanced quality of student input. It will then be difficult to also include the labor market return factor in the assessment of TEQ. We cannot conclude that such a tertiary system has good quality because it has both a well-performing education system and very relevant program design. The quality of labor market inputs coming from tertiary graduates might be less relevant to a tertiary degree program itself, but more influenced by the increased quality of students entering the tertiary system.

Similar cases occur in endogenous program placement bias and measurement error bias. Those biases will potentially lead to an underestimation or overestimation of the variables' impact on TEQ. Methodologically, there is no perfect way to measure this, which is why the author recommends holding all variables constant to examine the degree of influence of one variable on the overall TEQ as an alternative when using the production function model. Admittedly, this will not eliminate all the weaknesses within this methodology, but it will serve as a remedy to minimize bias and measurement error.

3.5.2   Benefit Incidence Analysis

While BIA methodology is widely used in developing countries to assess inequality of government subsidies, it has multiple limitations. BIA represents an "equilibrium" outcome of government and household decisions, without specifying a model underlying the behavior of either government or households (Zee 1999). It thus has a weaker conceptual framework. On the other hand, the demand function for public services studies is sufficient to take the above shortcoming into consideration. However, these studies are rather rare.

In addition, BIA uses the cost of providing tertiary education as a measure of value attributed to tertiary education, and this entails a strong assumption that the costs of provisions are a good approximation of the benefit that users attach to government services—in this case, tertiary education (Zee 1999). BIA does not cover the entire cost of tertiary education, which could be pecuniary and non-pecuniary costs. The methodology therefore holds a strong assumption in the analysis of costs versus benefits.

BIA is rather static as it captures government spending at a point, and at its best benefit incidence. In order to obtain a more dynamic presentation of the incidence over time, study needs to be conducted at different time units, years, for instance. Behavioral models can capture this dynamic gain from government spending much better than BIA models. The model also averages out the spending within certain income/consumption quintiles. It does not provide information on who benefits from an expansion in government spending, which could also be an important issue to look at for policy makers.

3.5.3 Economic Rate of Return

The simplified version of the ERR model is easy to use and comprehend. However, by definition, they are inferior relative to the other methods previously discussed. The weakness of the simplified method mainly lies in the abstraction that the age-earning profile is concave, and the discounting process is very sensitive to the values of the early working ages entering the calculation (Psacharopoulos 1995).

ERR is not sufficient to measure the relevance of an education system just by its private and social rates of return mechanism. Relevance has a broader meaning in the definition of TEQ. ERR gives a measurement on how responsive the labor market is to the expansion of a tertiary system, and signifies whether the expansion should continue. In addition, ERR is also easy to interpret when returns to different levels of education are compared. For instance, if one argues that pursuing a higher level of education will be beneficial in the short and long run, s/he could use the measurement of ERR to show the wage/salary difference of each level of education in a given period of time or through the entire length of working life (18 to 65 for example). Therefore, ERR has its own limitations in reflecting the real worth of pursuing education, and that further education produces positive social externalities in the long run.

3.6   SUMMARY

Following the methodologies proposed in the previous chapter, chapter three focuses on discussing each method in detail. The chapter starts with a general description of the research design—measuring TEQ through the education production function model by four main

variables—followed by an overview of each methodology. Four main research questions are also introduced in the middle part of this chapter. They center on the education input, equity, relevance, and assurance issues within the tertiary system in Indonesia. Methodological limitations are also discussed in the final part of this chapter.

The education production function model is a powerful and practical tool in drawing causality and correlations between the endogenous and exogenous variables. Enlightened by empirical models, this dissertation attempts to construct the TEQ production model as a function of educational input, equity, relevance, and assurance. The constraint of this main model is that, when drawing causality between the two variables, the other three variables must be held constant in order to see the extent of impact. Four main variables are interacting with each other, meaning the change in one exogenous variable leads to the change in another exogenous variable and thus has an overall impact on the endogenous variable.

Benefit incidence analysis is used to analyze the inequality of public benefits of people across socioeconomic quintiles. As percentage of population receiving benefits accumulates, the progressiveness and regressiveness of certain public benefits can be observed as the overall level of benefits increases. Indonesia is similar to a lot of developing countries. The BIA will show in the results that the majority of public subsidies aimed at expanding enrollment in tertiary education will only benefit those who are financially better off—the richest quintile.

The economic rate of return is used to connect the labor market response to tertiary graduates. ERR uses both an individual's monetary return change over time and its social return as well. ERR will not be able to include all the factors that make a difference in a particular person's life time, for instance the given intelligence, the earnings over training on the job, family background and social connections and etc. What ERR could clearly indicate is the

differentiation of rates of return by different education level in the labor market. For instance, the return of tertiary degree holders in Indonesia has 1.5 as much as the return of a secondary degree holder, and twice as much as a primary degree holder. Return to education throughout the years stayed constant as well. This signifies the room to absorb the enlarging amount of tertiary graduates in the labor market.

Despite the methodological limitations of the above, the education production function model, BIA and ERR serve the purpose of redefining and quantifying TEQ. Data analysis, research findings, and discussions will be in the following chapters of this dissertation. Policy recommendations and instruments to improve quality will also be presented in the latter part of this dissertation.

Table 3.2. Summary of research question, data, unit of analysis, indicators, and methodology

Main research question	Data Source	Unit of Analysis	Indicators	Methodology/analytical procedures
How could tertiary education quality be redefined and measured through the education production function model in developing countries?	Combined	Combined	Combined	The education production function model
Sub-Research questions	**Data Source**	**Unit of Analysis**	**Indicators**	**Methodology/analytical procedures**
1. **What are the main forces that drive tertiary education quality in terms of equity and equality?**	National Household Survey data–SUSENAS (Central Bureau of Statistics, Indonesia)	Individual	Education attainment of 19-23 year-olds; Enrollment ratios: Gross and Net; Percentage of students benefiting from public subsidies in education	Benefit Incidence Analysis Gini Coefficient/Index
		Household	Household annual consumption	
2. **How can be tertiary education quality measured by inputs versus outputs?**	National Household Survey data–SUSENAS (Central Bureau of Statistics, Indonesia) Administrative data (Ministry of Education, Ministry of Finance, Indonesia)	Individual	Matriculation; Percentage of advance degree holders	Returns to Investment
		National	Annual education budget from government—expenditure on capital, goods, salary, and social services; R&D output; Publication per 1,000 residents—Domestic and International	
3. **How can be tertiary education quality measured by relevance—labor market analysis and economic returns to tertiary education?**	National Household Survey data–labor/SAKERNAS (Central Bureau of Statistics, Indonesia)	Individual	Earning of primary education degree holders; Earning of secondary education degree holders; Earning of tertiary education degree holders	Economic Rate of Return Earrings Function Method (Private return)
4. **How can tertiary education quality be assured by the accreditation system—the assessment of quality assurance mechanism?**	Administrative data (Ministry of Education, Ministry of Finance, Indonesia)	Institution Degree programs	Percentage of accredited TEIs per year at different grade level	Descriptive

4.0   TERTIARY EDUCATION QUALITY MEASUREMENT THROUGH EQUITY—UNEQUAL DISTRIBUTION OF EDUCATION OPPORTUNITIES

This chapter intends to answer the first sub-research question—the measurement of TEQ through the assessment of equity. Data are largely pulled from Indonesian national household survey and government administrative data when household survey data are not available. There are three parts within this chapter:

- The main force that drives the inequality in Indonesia's tertiary education system—socioeconomic status of families—through benefit incidence analysis and education Gini coefficient assessment;

- Aside from the SES factor that is proven to be the most influential, there are other factors that affect the inequitable distribution of education opportunities in Indonesia;

- In addressing inequality, TE system expansion has been playing an important role. The extent to which the system could expand without sacrificing quality is the main concern.

There has been tremendous progress in Indonesia to provide more opportunities to aspirants for further education. However, the growing gap between different socioeconomic classes and income levels are the main obstacles along the way. Education, tertiary education in particular, is becoming less affordable to the population in poorer quintiles and more accessible and sustainable to richer quintiles. The inequality issue on educational opportunity remains large

in Indonesia, even though there is increasing government subsidy, stronger stewardship and support, and increasing amount of scholarships.

The chapter will present a systematic review of the development of the TE system over the years: SES status of students' family, gender, ethnicity, learning abilities, and geographic disadvantages. In addition, the effectiveness of system expansion will be discussed—is expansion effectively addressing education opportunity inequality and how far should the expansion go?
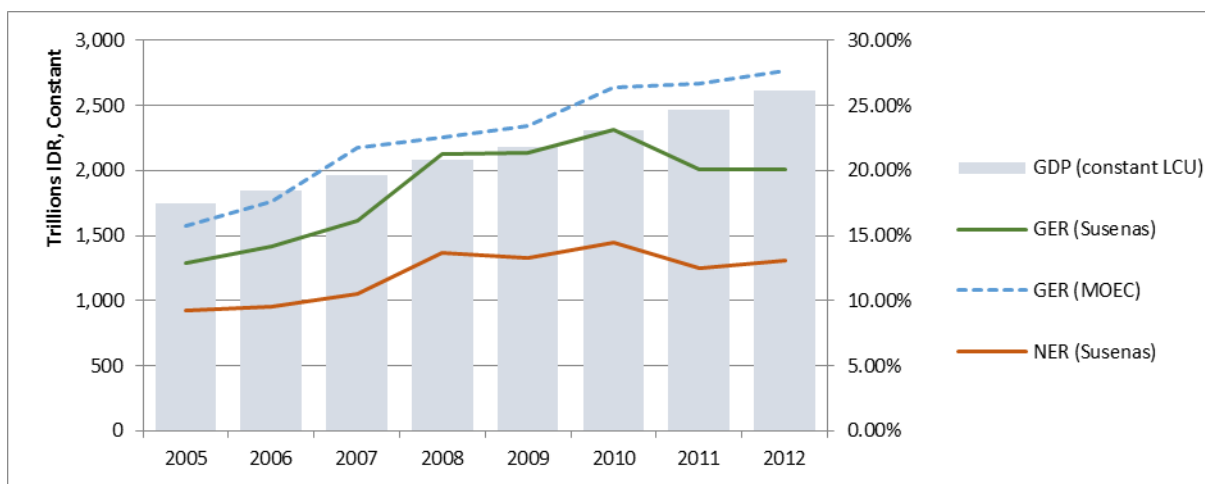
Figure 4.1. Gross Enrollment Rate, Net Enrollment Rate and GDP Growth, Indonesia [26]

4.1   SOCIOECONOMIC STATUS IS THE MAIN REASON FOR TERTIARY
EDUCATION INEQUALITY

Socioeconomic status (SES) drives student enrollment and the unequal distribution by income share. As Indonesia is currently entering the efficiency-driven phase of economic development, the issue of disparity needs to be properly addressed to avoid the risk of falling into the middle-

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[26] Source: Created by the author with data from the World Bank, SUSENAS, and MOEC

income trap—the situation when, upon reaching the middle-income level, countries lose momentum in making the transition to high-income status. These countries face rising average wages and declining cost competitiveness. They are unable to compete with advanced economies in high-skill innovations. They are also unable to compete with low income, low wage economies in the cheap production of manufactured goods (Clancy 2007).

TE enrollment growth was driven by the top two income quintiles, especially the richest group. In addition, students from the poorest quintiles opted more for Diploma I and Diploma II programs in both public and private TEIs, with a strikingly high share in private TEIs. The uneven applicant amount of the five quintiles also corresponds to the difference in terms of GER. Enrollments for the poorest two quintiles are extremely low at only 3 percent and 8 percent, respectively (2009).
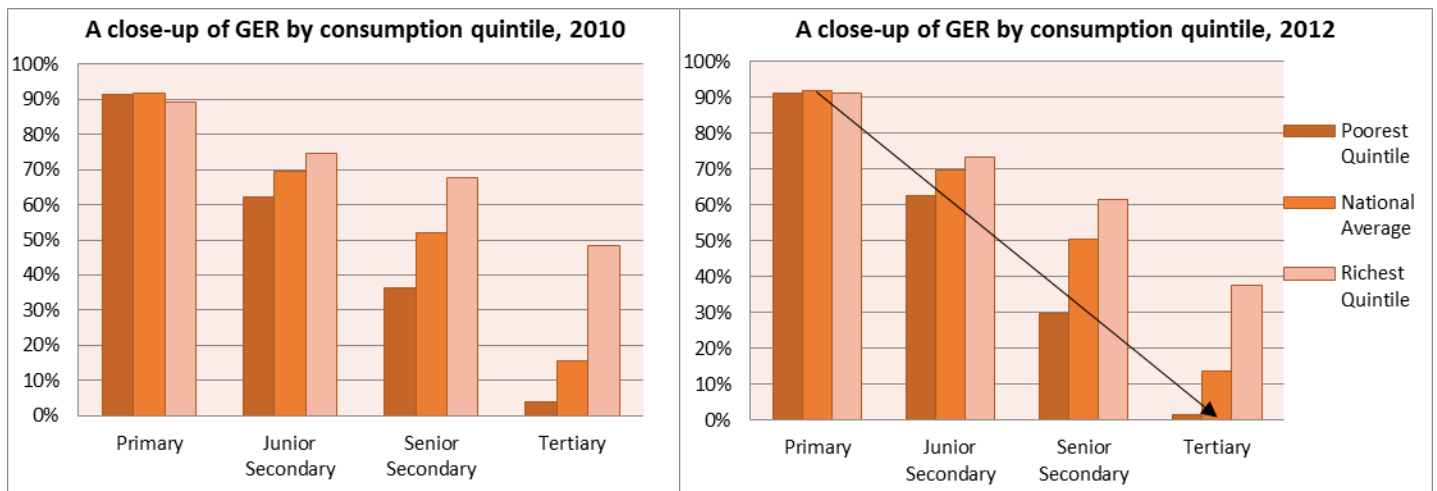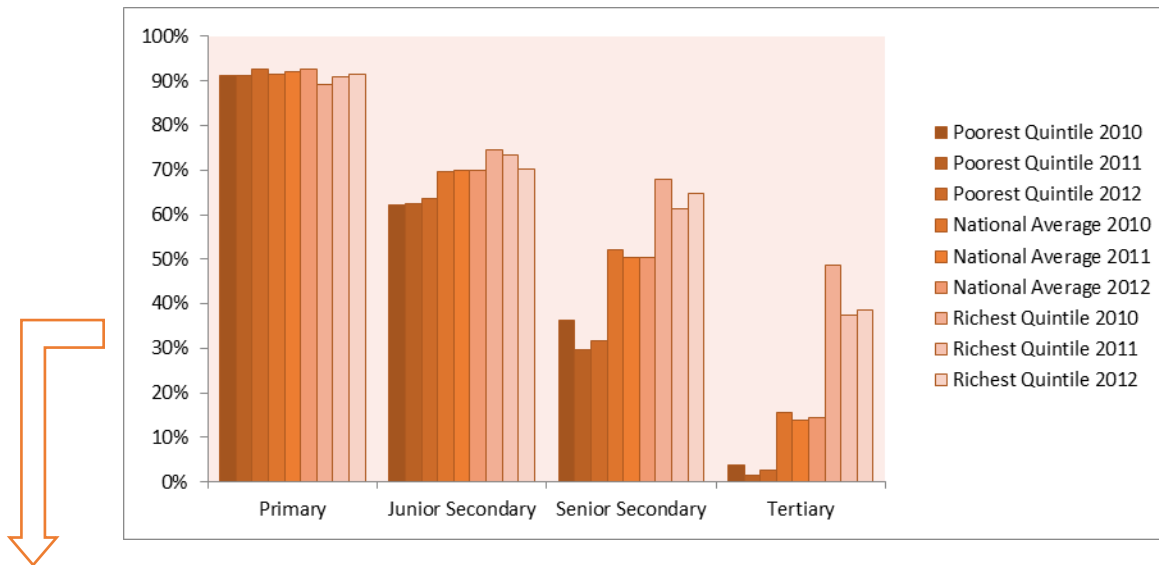
Figure 4.2.Gross Enrollment Rate by Consumption Quintile at Different School Levels, Year 2010 to 2012[27]

Less than 11 percent of TE enrollment comes from the bottom 40 percent of the population. Students' economic background played an important role in determining whether a Senior secondary school graduate will have a seat in a TEI, regardless of his/her intention of pursuing further education after Senior secondary school. A bigger share of the richest entered Diploma IV and above programs, while at Diploma III there seems to be a more balanced proportion between the different quintiles. Diploma I and Diploma II entail shorter studying time

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[27] Source: Created by the author with data from SUSENAS 2010; 2011; 2012.

(only 1 to 2 years) and focus on getting graduates to be employed in the labor market. Smaller expenditures (i.e. tuition fee, accommodation, books) as a result of shorter study time may have been the rationale for those poor households. Other factors such as gender, geographic location, and whether households are urban or rural all influence to a certain extent students' access to TE in Indonesia.
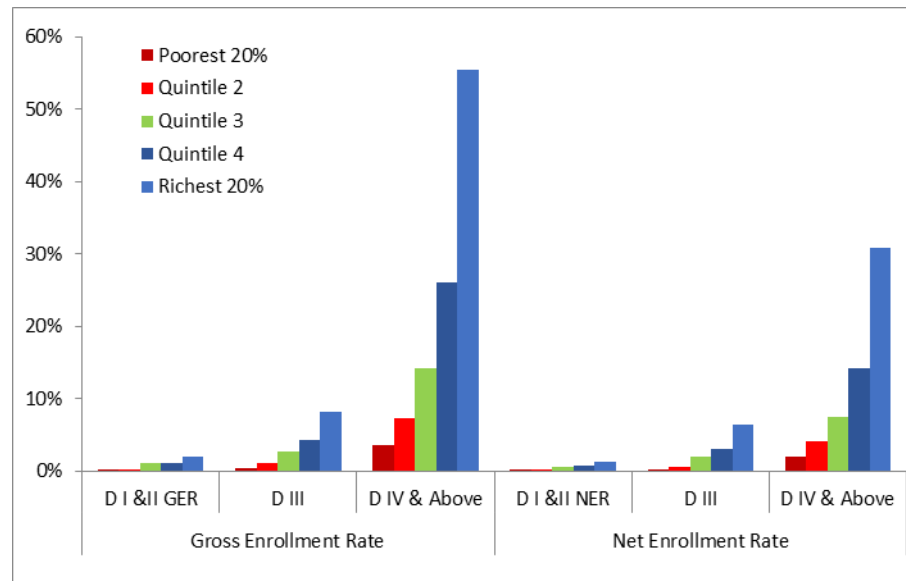
Figure 4.3. Enrollment (Gross and Net) by Degree Programs, 2012[28]

In addition to assessing inequality through enrollment by income/consumption quintile, the Lorenz curve (after Max O. Lorenz, the American economist who pioneered this graph as a young man shortly before World War I) and the Gini coefficient (after the Italian statistician, Corrado Gini, who developed the concept in his 1912 paper on "Variability and Mutability") are good tools to interpret inequality, especially inequality benefiting from government subsidies in Indonesia. The Lorenz curve/Concentration curve for tertiary education subsidies shows its relationship with the diagonal 45 degree line—Equality. The Lorenz curve captures three kinds of concentration: pro-poor, progressive and regressive curves, in addition to the Equality 45

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[28] Source: Created by the author with data from SUSENAS.

degree line. The pro-poor sepending on the education curve indicates a successful case where government public policies are benefiting socially and financially disadvantaged people. In other words, the poorer the family is, the more public resources it will benefit from. The regressiveness of the curve signals poorly targeted public policy that drives most government spending to benefit richer people in the country.
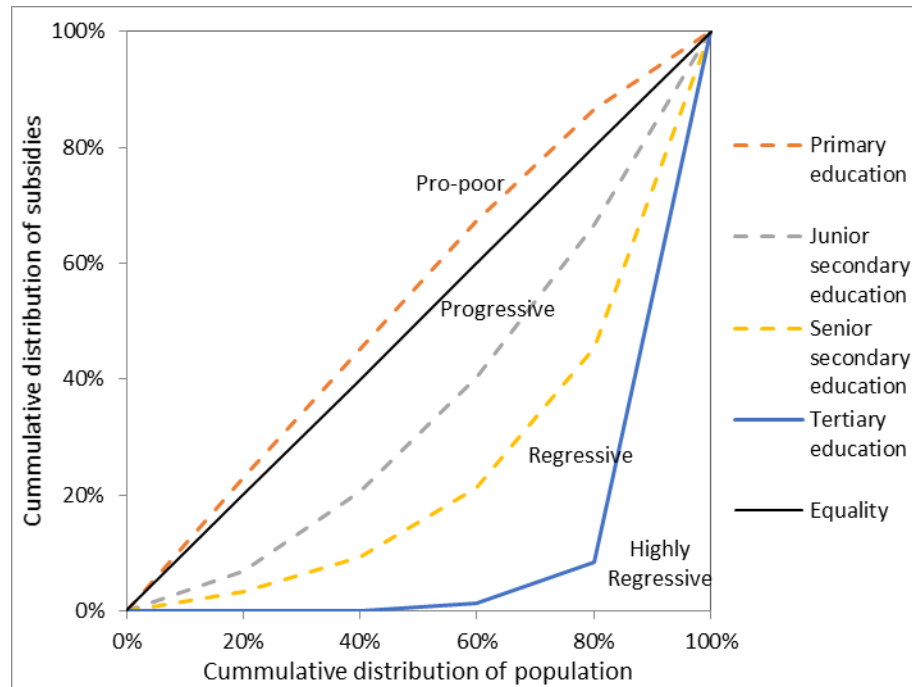
Figure 4.4. Concentration Curves for Government Subsidies on Education, Indonesia 1980s[29]
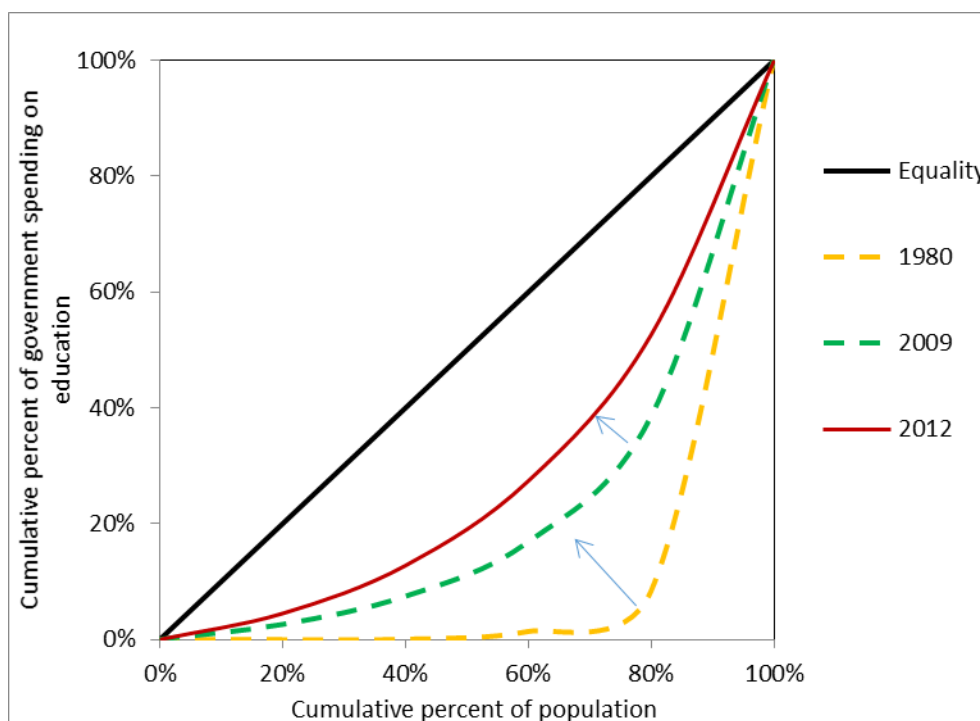
Figure 4.5. Concentration Curves for Government Subsidies Benefited by Tertiary Students over Time, Indonesia 1980, 2009 and 2012[30]

In a perfectly equalized world, a country will have its public policy leading to the equality (45 degree) line. The 45 degree equality line indicates that as the population grows, public spending is equally distributed across each quintile of the population because the cumulative percent of government spending is growing at exactly the same rate as the rate of population accumulates. However, a policy to pursue equality is very difficult to implement in reality due to many reasons and constraints. The wealth of a nation is usually accumulated in the hands of the richest 10 percent or 20 percent of the population. This means that the richest quintile or decile families do not need as much public subsidies to pursue education as poorer quintile and decile families.

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[30] Source: Created by the author with data from SUSENAS 1980; 2009; 2012, and MOEC.

Progressivity means that the lower-income group gets a larger share of the benefits from government spending than they do of either income or consumption. The progressive curve in this graph depicts the government spending on education that is benefiting the poorer population more than the natural share they could have on either their income or consumption in Indonesia. If a country could do as well as how the public subsidies are benefiting primary students in the graph above, it is already signaling a success—that the government's in-kind transfer (in this case it is education as the public benefit) is progressive.

The Lorenz curve indicates pro-poor spending as a proper subset of progressive distribution. Pro-poor spending is always the ideal target and goal for public spending of a developing country when designing public policies on in-kind transfer programs (in-kind transfers are different from cash transfer programs. They usually include education, health care, and other kinds that are not claimed through direct cash transfers from the government). Even in cash transfer programs, realizing pro-poor implementation is difficult because eventually the cash will most likely be claimed and used by richer quintiles. Pro-poor is almost impossible to achieve in reality. The best policies have a curve that is close to the equality line, and that is the progressive curve, as in the case of government spending on primary education in Indonesia. The author's data analysis and research findings show that government spending on tertiary and secondary education is highly regressive.

The information shown in a Lorenz curve could be summarized in another way. If we divide the triangle below the 45 degree line into two areas, the ratio between the area between the curve and the 45 degree line and the entire area below the 45 degree line would yield us the Gini coefficient or Gini Index.

The figure below shows the Gini coefficient/index of income distribution for some comparator countries.

Table 4.1. Gini Coefficient around the World[31]

No. 1 (most unequal): Lesotho, GC = 63.2 (1995)
No. 12: Thailand, GC = 53.6 (2009)
No. 29: China, GC = 47.4 (2012)
No. 33: Malaysia, GC = 46.2 (2009)
No. 41: United States, GC = 45.0 (2007)
No. 42: Philippines, GC = 44.8 (2009)
No. 51: South Korean, GC = 41.9 (2011)
No. 60: UK, GC = 40.0 (2009)
No. 80: Indonesia, GC = 36.8 (2009)
No. 91: Taiwan, GC = 34.2 (2011)
No. 136 (most equal): Sweden, GC = 23.0 (2005)

By the author's calculation using the Gini coefficient formula, the following education Gini Index figures result:

Table 4.2. International Education Gini Index[32]

Ghana (2013)	Tertiary G.I. = 30.07 Senior Secondary G.I.=17.69 Junior Secondary G.I. = 9.50 Primary G.I. = -3.46	Mali (2013)	Tertiary G.I. = 30.07 Senior Secondary G.I.= 34.43 Junior Secondary G.I. = 12.28 Primary G.I. = -0.5
Tanzania (2011)	Tertiary G.I. = 60.01 Secondary G.I.=20.58 Primary G.I. = 13.04	Malawi (2011)	Tertiary G.I. = 39.94 Senior Secondary G.I.= 35.28 Junior Secondary G.I. = 24.24 Primary G.I. = 0
Indonesia (1980)	Tertiary G.I. = 81.29 Senior Secondary G.I.= 35.28 Junior Secondary G.I. = 24.81 Primary G.I. = -4.17	Indonesia (1980)	Tertiary G.I. = 81.29
		Indonesia (2009)	Tertiary G.I. = 37.11
		Indonesia (2012)	Tertiary G.I. = 30.80

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[31] Source: Created by the author with data from the World Bank.
[32] Source: Created by the author.

The Lorenz curve for Indonesia indicates high regressivity of government subsidy at the tertiary level, whereas primary is pro-poor, and junior secondary is progressive. The interpretation of how regressive a government subsidy is could be subjective. There is no clear distinction between being highly unequal, good, fair, or poor. However, any policy that yields a curve that appears to be above the equality line is considered successful in benefitting the poor. A line getting closer to the equality line indicates progressivity, as the derivative increases as population grows, although at a declining rate. This means that the richer the people are, the less they are benefiting from progressive public policies and government subsidies.

Looking at both the Lorenz curve and the Gini Index for Indonesia in 1980 and now, we can see a growth in progressivity benefiting the poor. However, compared with other levels of education, tertiary education is still suffering from severe regressivity. This indicates the continuous unequal distribution of public subsidies to families and students at the tertiary level. And it indicates a need for improvement in order to enhance or maintain tertiary education quality. An inequitable tertiary system will never have high overall quality, in the author's opinion. It also indicates policy failure to a certain extent.

4.2   OTHER BARRIERS LEADING TO TERTIARY EDUCATION INEQUALITY

Indonesia is one of the most diverse countries regarding population formation, culture, climate, natural resources, and regional economic conditions. When we speak of access and equity issues in TE in Indonesia, issues such as gender, geographic/rurality, ethnicity/linguistic, and learning ability differences shall be brought into the discussion as well. Aside from education attainment,

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socioeconomic constrains, and affordability, Indonesia TE students also face the above issues, which students' access to TE.

4.2.1   Gender disparity and the intersection with other factors

Since 2001, gender disparity has been eradicated in tertiary education if we look at the general enrollment rate. Figure below shows that the differences by gender have switched: women started with a disadvantage, and now it is men who have lower enrollment. The number of female students first surpassed their male counterparts in 2008. However, there still remains a question regarding whether stereotyping is strong, whereby female students are mostly concentrated in subject fields that are identified as female (i.e. nursing, dentistry, home economics, and education). In addition, questions such as (i) whether there is a disparity in the education output; and (ii) whether there is unequal presentation in advanced levels of TE such as Masters and Doctoral degrees, still remain unanswered. Until the above questions can be answered, gender and its intersections with socio-economic status and other forms of disadvantage must remain important when planning access and equity policy solutions for TE.

Gender parity has been achieved in basic education enrollments in Indonesia across all social groups. Disadvantages, however, are generated by the intersection of gender and socioeconomic disparities, geographical location, and rurality. This produces further barriers for girls. In Indonesia, the barriers to girls' completion of senior secondary education and TE have been well documented. For some groups of girls, culture, tradition, and religion can limit their engagement with education. Their parents and communities might see the roles for females as narrower than those of males, with the expectation that girls will marry and have children. There are other barriers, including different levels of academic achievement between rural and urban

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areas as well as social barriers, including distance from home and other supportive networks that may restrict the participation of particular groups of girls in TE.
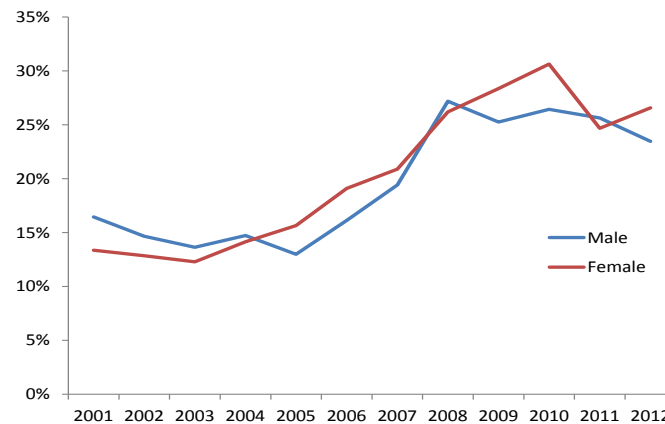
Figure 4.6. Enrollment Rate by Gender, Indonesia Year 2001 to 2012[33]

4.2.2   Geographic origin and rurality

In 2012 almost 28.6 million people (about 12 percent of Indonesia's population) were living under the poverty line. The population living under the poverty line in rural areas was much larger than poor people living in the urban area (figure below). In the context of providing access to education, the rural and urban poor have different sets of challenges. The rural poor have to face problems such as geographical isolation and disadvantage; infrastructure limitation; and resource and workforce scarcity. (Perdana 2004)

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[33] Source: Created by the author with data from SUSENAS.
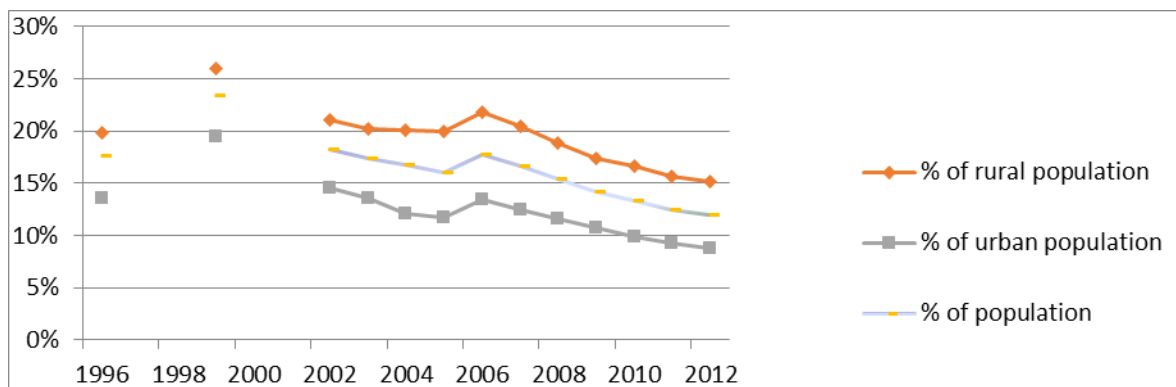
Figure 4.7. Poverty Headcount Ratio at Rural, Urban and National Poverty Line, Indonesia year 1996 to 2012[34]

Meanwhile, the urban poor have to cope with social problems, such as crime, drugs, and juvenile delinquency, and also pressure for school-age children not to go to school because of a relatively high employment opportunity for unskilled workers. Due to the diversity of the problems, it is important to develop proper and wider understanding of the problems faced by each community in designing future interventions which aim to eliminate poverty through the provision of access to TE.

4.2.3 Ethnicity and linguistic differences

Indonesia is a diverse nation with over 726 languages spoken. This cultural diversity presents difficulties for education systems, and for students. Some ethnic populations live in remote areas where educational access may be limited and of poor quality. These students may face the added disadvantage of education programs delivered in a second language.

The culture of the home may be very different from the culture of the school, and these students are likely to lack role models within their communities or people who have been

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[34] Source: Created by the author with data from the World Bank.

successful in education. Their aspirations for the future may therefore be limited by their experience. For the few who are successful in formal education, access to TE means living away from home, in what may appear to be alien cultures, competing academically with students with far greater advantages.

4.2.4 Learning ability

Indonesia's Law No 4, 1997 recognizes that people with learning disabilities have equal rights in all areas of life. Despite legal commitment, there are many children with learning difficulties in Indonesia outside of the education system. Helen Keller International estimates that only 4 percent of the estimated 1.5 million children with disabilities are presently in school. Recent research conducted in Indonesia has identified the barriers to university participation for students with learning difficulties. The key barriers are: 1. difficulty registering and being accepted by a TE institution, 2. lack of support services, 3. inaccessible teaching and learning materials, 4. inaccessible infrastructure, 5. poor inclusive institutional policies, 6. lack of acceptance by teaching staff. They reported that inclusive senior secondary schools provided the best opportunities for students with learning difficulties to progress to TE. Inclusive senior secondary schools were said to provide additional assistance, including tutorials, access to textbooks, and other resources.

In dealing with learning difficulties, financial assistance is more easily resolved than teachers' and administrators' minimal knowledge of disabilities and how to help students to be successful through strategies such as modification of materials, or providing oral explanation of material written on a board, or extra time or assistance for exams. Law No. 12/2012 provides opportunities to modify teaching and learning to meet the needs of students (Bettinger 2010).

4.3 ADDRESSING INEQUALITY: TERTIARY EDUCATION SYSTEM EXPANSION

When looking into access and equity issues within the Indonesia's TE system, one should examine current student composition in the system, as well as the appropriate age group potentially seeking TE. Enrollment in TE has grown dramatically in the past few years. Debates have tended to assume that the expansion cannot or should not continue rapidly, because the rapid expansion means an unavoidable deterioration of quality. The proliferation of small, "demand-absorbing" private institutions has made the expansion possible. Most of these institutions use the traditional university model, but with inferior inputs. Some are more interested in revenue than in providing high quality education.

Some observers assert that expanded enrollment led to such steep declines in quality that the marginal new student is now getting a useless education. However, it is best to judge using (i) empirical measures of educational quality—appropriate for the type of education being analyzed; and (ii) the best-available measure of the labor market premium for obtaining a degree. Answering questions about TE quality requires this empirical base to go beyond the observation that average and below average students cannot perform like their most academically talented peers (Nugroho 2007).

The total students enrolled in Indonesia's TEIs include the newly enrolled, repeating students, and students who transferred to a different degree program due to the delay in graduation. In Indonesia, students usually take 5.5-6.5 years to graduate from a 4 year undergraduate university/college because students re-enroll in a different program when facing drop-out situations. Students can take up to 7 years to graduate a 4-year degree program.

The best estimate of current overall tertiary enrollment is 5.6 million students in 2013 according to MOEC data, and 4.6 million students in the same year by SUSENAS data. This

figure includes all levels and all types of institutions. It is equal to 20 percent (SUSENAS) to 25 percent (MOEC) of the target age cohort of 19 to 23 year-olds. According to data from the Ministry of Education and Culture (MOEC), about one of two enrolled students is outside this age range; so net enrollment is roughly 10 percent (SUSENAS) to 13 percent (MOEC) of the age cohort[35]. This means one out of every eight students in the target age group is enrolled in TE.

Gross enrollment in 2013 almost doubled from 2000, when the system had about 3 million students (MOEC). This expansion was not driven by demographics: the size of the age cohort has been roughly stable for close to the past two decades. Rather, expansion was driven by the demand for TE among the steadily increasing number of senior secondary school graduates along with additional places resulting from the growth of private universities.

As discussed in the previous section, students' SES has one of the largest impacts on where they go and when they enter tertiary level institutions. More than often we find that students who have better grades in K-12 schools are the ones who are naturally talented academically, and come from families with more consumption ability. Students with modest family income and who do not perform as top students in senior secondary schools will then more likely choose technical and vocational tracks, or the D track.

Aside from the different tracks, the percentage of tertiary enrollment among public and private TEIs differs by consumption quintile as well. Richer students (including those who are top performers at senior secondary school and mediocre performers) are more likely to select more advanced degree programs in both public and private institutions while poorer students chose lower quality private D type degree programs to enroll. The overall enrollment in private

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[35] Susenas household survey data show a greater share of enrollment from the 19-23 age cohort: somewhere between 60% to 70%.

TEIs is larger than that of public TEIs. The most prestigious TEIs in Indonesia are mostly public. However, students from families with higher SES could still secure a spot and pay a tuition fee to pursue TE, whereas students from lower income families are unable to afford tuition.

Students from low income families tend to seek shorter degree programs, possibly due to the fact that those students come with a weaker basic education foundation and, if they intend to enroll at tertiary level schools, they tend to choose the institutions that have lower standards for new entrants to enroll. This leads to another research question, which will be discussed in the labor skills section of this dissertation: what should a country do when there are a large number of secondary graduates with low generic/cognitive skills to enter into the tertiary system?

The figures below presents another perspective of how students are allocated by degree programs coming from different SES backgrounds. More than half of the enrolled wealthy students seek a DIV degree and above, leaving the majority of the low income students to take the spots left in the DI to DIII degree programs. However, the lowest return to education comes from the DI and DII degree holders. This creates a highly inefficient cycle for students flowing in and out. The less one can afford TE, the more likely one would be enrolled in lower quality degree programs, and the less return one will have once he/she starts in the labor market. This happens to almost the three bottom quintiles, which is the majority of potential students who would enroll in TE. Even with Financial Aid in Indonesia's TE system, students from the bottom quintile, with the most potential to continue at the tertiary level, still could not afford to go to college or universities.
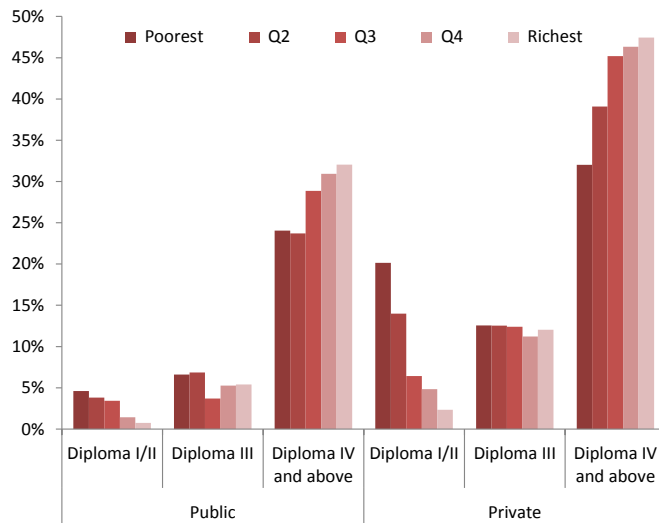
Figure 4.8. Enrollment at Tertiary Level by Income Brackets and by Degree Programs, Year 2009[36]
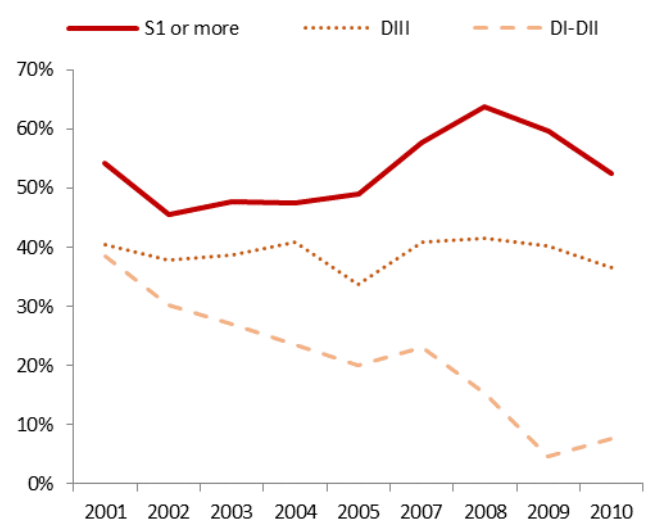
Figure 4.9. Returns to Tertiary Education DI, DII, DIII and SI or More, Year 2000 to 2010[37]

Among all of the factors that determine education attainment and continuity, income disparity seems to be the strongest. Similar to the cases of other peer ASEAN countries, Indonesia's richest quintile accounts for about 40 percent to half of the nation's overall income, and the income disparity creates a gap that leads to variability of access to resources (Neubauer 2011). It also generates incentive differences between rich and poor senior secondary school graduates to seek further education. The graph below shows education discontinuity driven by income disparities. Education attainment dramatically drops after the end of primary school (year six); the lower the income quintile, the steeper the participation drops. Children from the richest quintile mostly stay in school—almost 80 percent who start primary finish senior secondary school. For the lowest income quintile, the corresponding figure is under 10 percent.

Expansion in access did not translate into expansion in equity. Public investment in TE is justified on the grounds of its social and economic benefits. However, TE also has persistently

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[36] Source: (Cerdan-Infantes 2013), 25.
[37] Source: (Cerdan-Infantes 2013), 14.

high private benefits. A major rationale for the public provision of TE or financial assistance for TE is to ensure that all qualified aspiring students are able to attend. The gross inequities of the Indonesian school experience make the goal very difficult to attain. A major concern of policy should be ensuring a similar chance for students to attain their educational aspirations through the tertiary level, regardless of their family's economic conditions or socio-economic status.
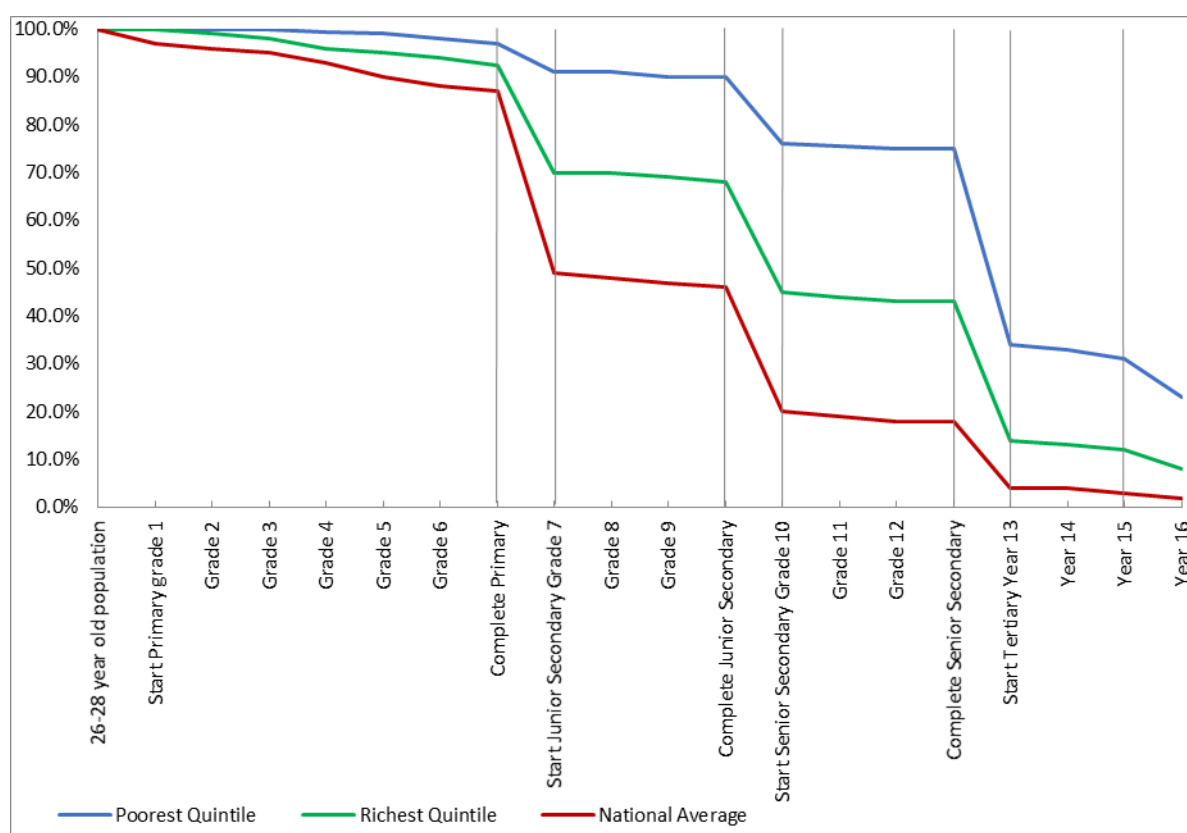
Figure 4.10. Education Attainment by Income Quintile, Estimated[38]

[38] Source: Created by the author with data from SUSENAS.

4.4   HOW FAR SHOULD THE EXPANSION GO?

Tertiary enrollment is likely to continue to expand in the future so long as: (i) the annual number of senior secondary school graduates continues to increase and (ii) the rate of tertiary attendance among senior secondary school graduates continues to increase. The number of (ii) is influenced, in turn, by two main factors: A high economic return to tertiary studies and affordable, relevant options for study. The economic return to tertiary studies will be elaborated in the second main section of this dissertation: Labor market observation—returns to TE in Indonesia. (Hanushek 2014)

For how long should the expansion continue? Ideally, one hopes Indonesia would imitate the experience of higher-income economies. These economies see the demand for tertiary skills grow as fast as or faster than the supply of new graduates, often for decades. The result is usually a tradition where more than 50 percent of senior secondary school graduates enter some form of TE, and about 50 percent end up with a tertiary degree. Such a system cannot be centered only on traditional academic degrees from universities. Leading countries like Canada surpass 50 percent of the workforce with tertiary degrees by providing high-quality, shorter, labor-market focused degrees.

A longer-term look at the acquisition of skills by young Indonesians would show most of the 4 million young people staying in senior secondary school to get their diplomas. After graduation, more than half of these—perhaps as many as two-thirds—would obtain at least some TE and 50 percent would obtain a degree. This would create a "steady state" in which about 2.5 million students enter tertiary institutions each year, and total enrollment stabilizes at about 10 million students. Each year, about 2 million students would graduate, and the share of the labor force with advanced skills would rise significantly.
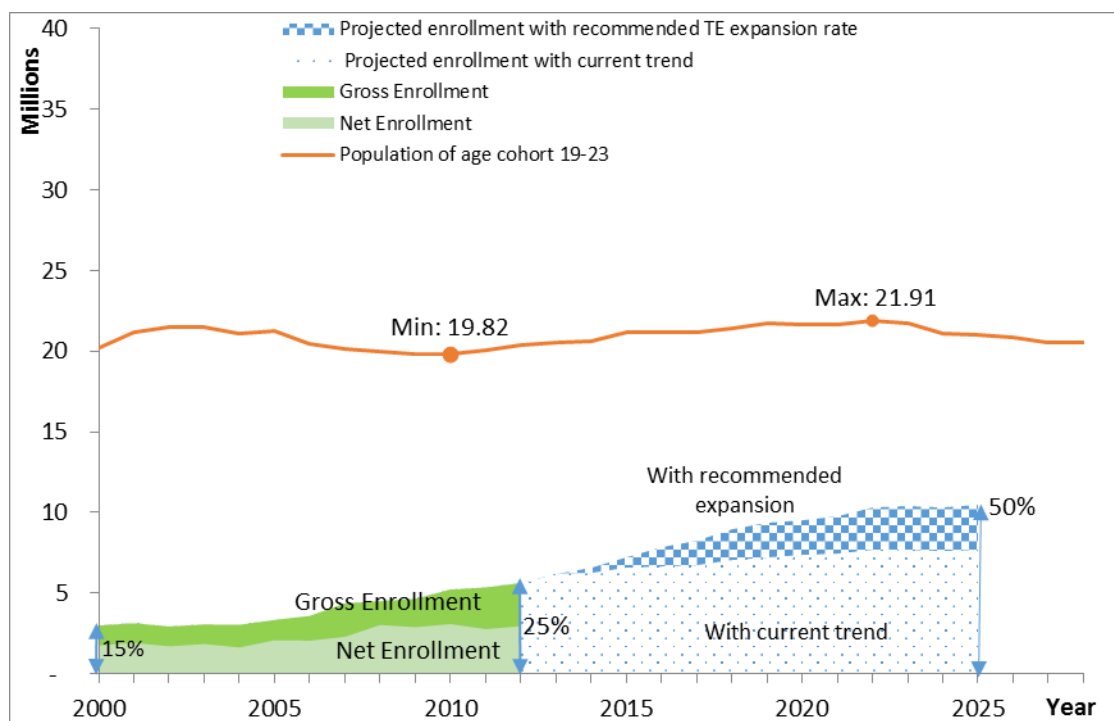
Figure 4.11. Size of the 19-23 Year-old Age Cohort with Historical and Projected Enrollment Data[3940]

The purpose of this projection is not to estimate the precise future size of the TE system. Rather, it is to emphasize that significant room for future expansion exists. At the same time, the success of this expansion depends on the creation of new, high-quality, relevant degree options. The figure below shows a path toward 50 percent coverage of the age cohort, along with other alternatives where fewer people progress. The high-enrollment path holds the greatest hope for a future in which individuals' investments in skills promotes the growing labor productivity and economic growth than Indonesia seeks to reach prosperity.

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[39] The SUSENAS (Household Survey) is not fully consistent with data obtained from Statistik Pendidikan MOEC in two aspects: 1. There is smaller Gross Enrollment Rate reflected from SUSENAS Data; 2. The Ratio of Gross Enrollment and Net Enrollment is larger than that of MOEC data. The proportion of students of age cohort 19-23 enrolled in TEIs is larger in SUSENAS data.

[40] Source: Created by the author with population data from BPS, and enrollment data from MOEC. Note: Population trend 2012 to 2028 is forecasted by birth and mortality rate by the author.
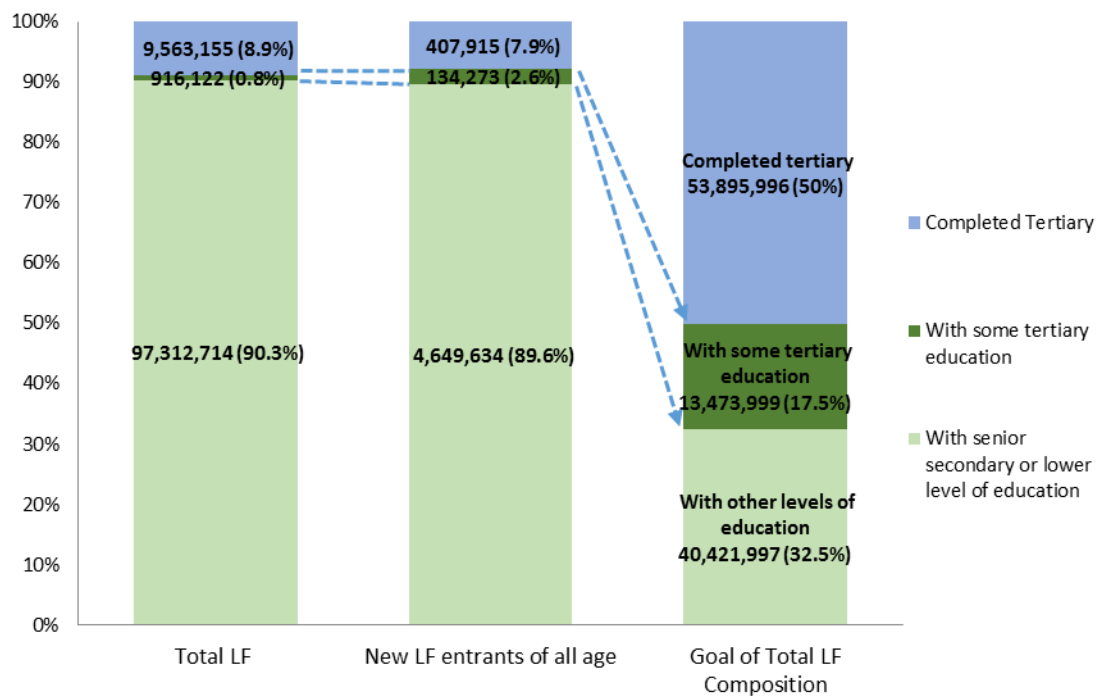
Figure 4.12. Projection of Labor Force Composition with Recommended Tertiary Education Expansion[41]

Irrespective of the size of the future expansion, all future students will succeed best if two additional measures accompany a further expansion of enrollment: (i) a myriad of new, high-quality, non-university options need to be available for new matriculates, as most will have modest academic abilities; options for new programs could come from the consolidation of private universities and a further diversification within current degrees in TEIs; and (ii) financial aid policy will need to be completely redesigned and significantly expanded beyond the *status quo.*

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[41] Source: Created by the author with data from SUSENAS and SAKERNAS.

4.5   SUMMARY

This chapter gives an in-depth analysis on equity issues in TE in Indonesia. Equity and equality are major concerns in the evaluation and assessment of a country's TE system and quality. Like most of the developing countries that are at a crossroads of a major industrial transition and development, Indonesia's public subsidies largely benefit the wealthiest families. This social benefit applies to basic services such as education and health. In this particular study, the author found severe distortion in terms of students' public benefits from the government for tertiary education. Inevitably, it will take Indonesia some years to reduce inequality of public benefits, given that there has already been great improvement from the 1980s to now (Gini Index on TE reduce from 81.29 to 30.80 from 1980 to 2012).

Though other areas of disparity still exist in Indonesia—namely gender, rurality, language, and learning abilities—socioeconomic status still plays the most influential role in determining the possibility and affordability for families to send their children to TEIs. The GOI has a strong commitment to education, one example being the steady and large amount of public spending on education among all government expenditures in recent years. The tertiary system has been expanding for the past few years. A serious concern about quality deterioration has emerged along with this expansion. Whether the expanded enrollment has been reaching the poor and when it should stop are two of the main questions asked by all stakeholders. Ideally, a skilled labor force needs at least 50 percent of the population who has tertiary degrees, and another quarter with at least some sort of tertiary training before entering. Indonesia is still far from this goal. In addition, the fact that the labor market has been responding positively to the growing amount of tertiary graduates signals a further demand of tertiary degree holders in the

labor force. With a more vigorous and effective expansion, about 50 percent of Indonesia's labor market will be tertiary degree holders by 2025.

5.0   TERTIARY EDUCATION QUALITY MEASUREMENT THROUGH RETURNS TO INVESTMENT—EDUCATION INPUTS VERSUS OUTPUTS

Quality in TE systems and institutions is usually not directly measured.   New initiatives such as the College Learning Assessment in the United States seek to directly gauge whether and to what extent attending college increases knowledge and cognitive abilities.   This type of direct measurement is difficult on many levels, and expensive.   Proxy measures such as faculty qualifications, research productivity, and impact (measured by number of publications and number of citations) are easier to use and more common.   Along with surveys of perception, these proxies form the basis of international and national rankings.   Vigorous debate about these proxies has shown how they tend to favor research institutions, wealthy institutions, and selective institutions.   They also potentially confound spending or resource availability with educational value-added.   In addition, few internationally comparable tests exist at the tertiary level.   The diversity of learning goals means it prevents the development of tests for all but a narrow range of abilities that TE often seeks to improve: written expression, reasoning ability, and a few other generic cognitive capabilities.   The OECD's AHELO and PIACC programs have sought to fill this gap, but they are still incipient and do not focus principally on value-added through TE.

The definition of quality is a complex series of indicators that correctly and in a timely way reflect on education input, output, human and capital resources, etc..   Most of this kind of

information is unavailable due to confidentiality and sensitivity concerns of governments in developing countries. In Indonesia, the main available indicators to estimate TE quality are:

Input:

- System selectivity for students

- Quality of the teaching force in Indonesia's tertiary education system

- Financing of the TE system (monetary input and allocation)

Output:

- Critical mass of human capital—advanced degree production

- R&D capacity and publication

- Data and information

As mentioned in previous chapters, the definition of TE inputs and outputs are far richer than what this dissertation can include. In the context of Indonesia, education inputs can be categorized as human and monetary inputs, and outputs could be tangible and intangible. The selection of the above inputs and outputs are due to data availability, measurability, and many other considerations.

5.1 INPUT—SYSTEM SELECTIVITY FOR STUDENTS

One way to examine current TE quality is by looking at the quality of enrolled students. Like most of Asian countries, Indonesia emphasizes selecting students based on merit. In some cases, students from wealthier families with mediocre performance in senior secondary school could also go to TEIs by negotiating a higher tuition fee.

There is more than one way for Indonesian Senior secondary school graduates to pursue TE. The TE entrance selection is more or less a filtering system, which takes the best performing senior secondary school graduates and the ones that can afford TE into the most elite TEIs. Two of the main approaches are SNMPTN and SBMPTN.   From 2013, SNMPTN is by invitation only based on merit (defined as students' grades from three semesters—third, fourth, and fifth, from corresponding majors in senior secondary school, plus the score of national examinations). This admission is arranged by senior secondary schools and Universities, not by students' interests toward a particular TEI.   Only top performing students will receive this invitation. Students who are unsatisfied with this arrangement can overturn the admission and choose to take the national exam (SBMPTN) to attend a more desired TEI. SBMPTN is exam-based and is applied to those who do not earn invitations, and who are not satisfied with the SNMPTN result.   If students fail at the two above methods, they will then test to gain seats in private TEIs.   Private TEIs organize separate exams that differ by each institution.

Table 5.1. Selectivity of Public TEIs through SNMPTN and SBMPTN, Year 2013[42]

	SNMPTN	SBMPTN
Number of Senior secondary schools applied	11,680	
Number of Senior secondary school Students applied	779,102	585,789
Number of Students selected	762,690	97,000
Selection Success Rate	97.89%	16.56%
Students accepted for financial aids/scholarships[43]	133,604	109,853

[42] Source: Created by the author with data from MOEC

[43] Number of students accepted for financial aid or scholarships could be larger than students selected through a particular type of admission. Students applied for scholarships or financial aid may be granted even though they do not succeed SBMPTN selection.

Table 5.2. National Exam Takers, Passing and Failing Numbers, and TEI (Public) Spots, Available by Year[44]

	SPMB	SPMB	SPMB	SBMPTN
Year	2005	2006	2007	2013
Number of Applicants who took the exam	304,922	340,465	393,168	585,789
Spots available in public universities	90,270	93,741	96,066	97,000
Number of applicants passed exam	84,443	88,728	90,815	109,853
Number of applicants failed exam	220,479	251,737	298,264	475,936
Passing ratio	28%	26%	23%	19%
Unfilled quota in public universities	5,827	5,013	5,251	-12,853

Among all the 2.6 million senior secondary school graduates in 2012, 779,102 were invited for SNMPTN by senior secondary school's nomination, and 762,690 succeeded; 585,789 attempted for SBMPTN and 97,000 succeeded. This means half of senior secondary school graduates attempted to pursue TE through the public channels and 1/3 succeeded, earning their seats in public TEIs. Among the successful, 6 percent benefited from full scholarship Bidik Misi, and 23 percent had some sort of financial support. Though numbers of SNMPTN and SBMPTN are increasing each year, they do not shift the dynamics too much. The GER is still around 25 percent, with NER being half of GER. Adding in the students who also pursue TE through private school channels, there one out of seven are in the age cohort that is enrolled in TEIs.

5.2   INPUT—QUALITY OF THE TEACHING FORCE

The figure below provides the best-available estimates of teaching force credentials. The significant year-to-year fluctuation per category indicates overall poor data quality and major methodological shortcomings in data collection; these data must be considered in that light.

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[44] Source: Created by the author with data from MOEC

Nonetheless, they point to a lack of a critical mass of qualified professors, which is a serious problem in Indonesia. Only about 1 in 10 teachers in TE has a Ph.D. More than one-third of the teaching force has a Bachelor's degree or less. It is difficult to produce high quality TE when the teaching force does not have the required credentials. The low incidence of advanced degrees among faculty will make accreditation both harder and less effective. Standards will need to be lowered to compensate for less capable faculty and the ability to place a meaningful floor on acceptable quality becomes strained.

One of the most effective ways to improve TE quality is to increase the quantity and quality of advanced degree holders. As Ph.D.'s especially compete for academic positions, students benefit from better quality instructors. Many countries whose TE systems are attempting to mature will not manage to equal mature TE systems if holding a Ph.D. becomes a de facto pre-requisite for employment in a university.
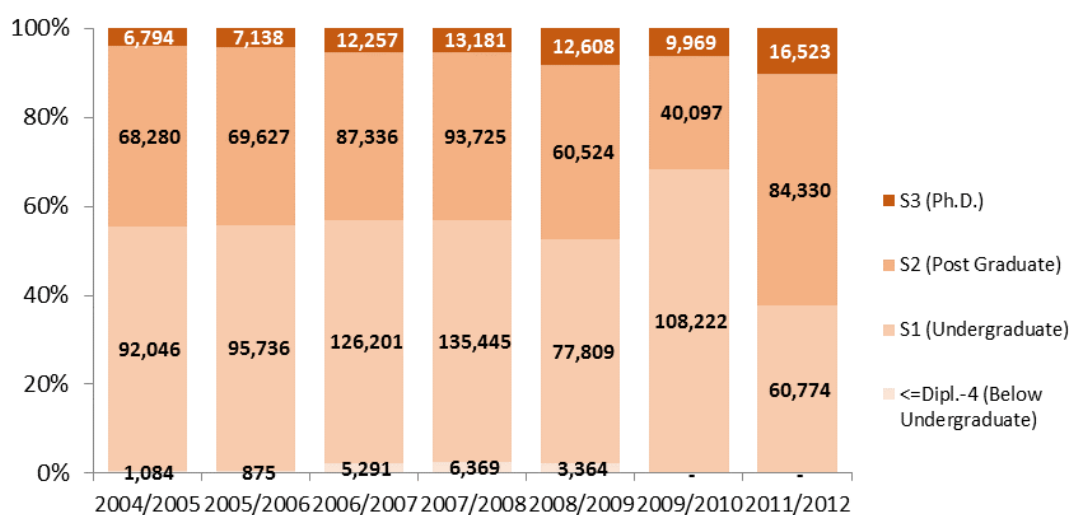
Figure 5.1. Highest Degree of the Tertiary Education Institution Teaching Force, Year 2004 to 2010[45] [46]

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[45] Data present the numbers of full-time lecturers only and for both private and public institutions. There is dramatic fluctuation of advance degree holders in the teaching force year 2009 to 2011. The reason is, before year 2008, MOEC did not differentiate part-time and full-time lecturers in data collection, but did so from year 2010 on. From year 2008 to 2012, there is a

5.3   THE UNMET DEMAND FROM ASPIRANTS TO ENTER TERTIARY

EDUCATION INSTITUTIONS

Indonesia achieved near universal coverage in primary school several years ago and continues to increase the number of students who finish the basic education cycle. Current data show more than 2.5 million students receiving senior secondary school diplomas each year. In the academic year 2000 to 2001, 1.6 million students graduated from senior secondary school. The data make clear that what may appear at first glance to be a massive expansion is in fact slower growth of TE when compared to increases in senior secondary school graduation rates. A smaller share of senior secondary school graduates continued on to TE in 2012 than did in 1999.
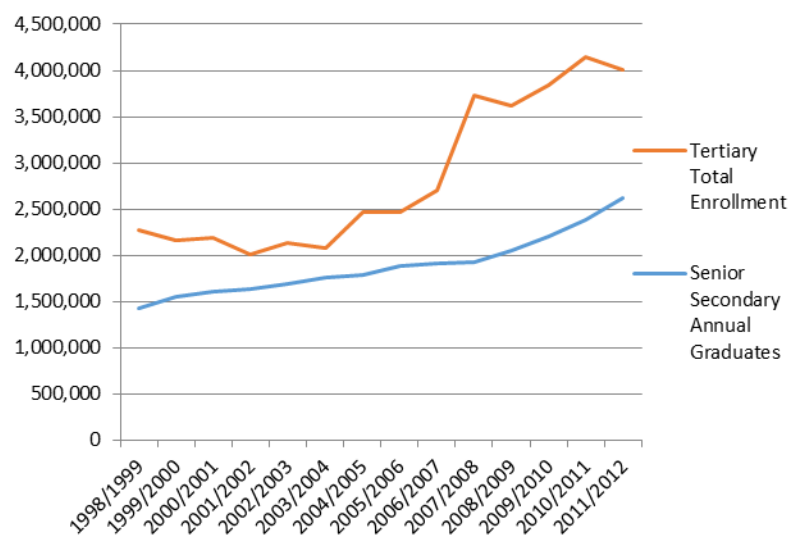
Figure 5.2. Senior Secondary Annual Graduates and Tertiary Total Enrollment, Year 1998 to 2012

large number increase in part-time instructors, reflecting in the graph in blue, and it is driving the fluctuation dramatically from 2008-2012. Quality of these data are not the best but could serve the purpose of seeing a general trend.

[46] Source: Created by the author with data from MOEC

Source: Created by the author with data from SUSENAS and MOEC

To answer the question: who has the potential to attend TE? The best available data indicate that this group of students comes from two sources:

1. The graduating classes with secondary schools. The Government of Indonesia is improving the affordability of secondary education for the masses. Senior secondary school graduates are naturally increasing year by year. The top 2 quintiles are properly represented at the tertiary level, or even over-represented. The majority of the new entrants at the tertiary level will come from the bottom three quintiles. This estimation, however, is based on the assumption that effective education policy and reliable financial aid will be provided.

2. More than 30 percent of the currently enrolled are repeating students by SUSENAS data, and almost 50 percent are repeating by MOEC data (MOEC data showed a GER of 25 percent whereas NER is 12 percent for most recent years). The system needs an effective mechanism to prevent this from happening and to provide quality assurance to the current degree programs to ensure that knowledge inputs are positively correlated with the skill outputs. Enhancing the quality and relevance of TE will be the best way to help students from frequently changing degree programs. It is understandable that the TE system contains repeating students for various reasons. However, they should not be the majority of the enrolling students at each grade of TEIs.
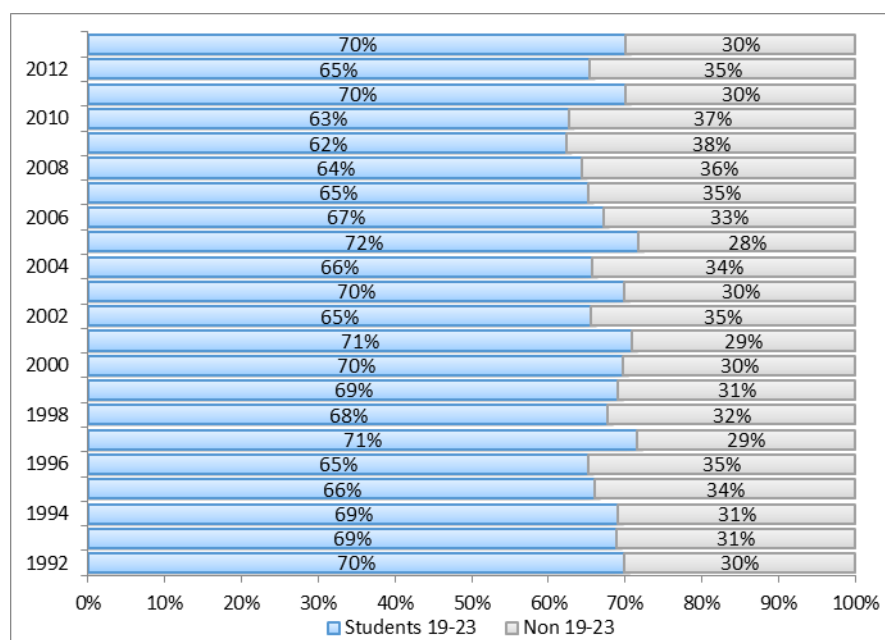
Figure 5.3. Enrollment Proportion of Students of Age 19-23 and Students outside of Proper Age Cohort, Year 1992 to 2013[47]

5.4   INPUT—SYSTEM FINANCING

Indonesia has made a clear commitment to education—passing a constitutional mandate to allocate at least 20 percent of the total government budget to education (the "20 percent rule"). This new constitutional amendment in 2002 was achieved in 2009. From 2009 on, the GOI managed to keep the goal of having Education comprise at least 20 percent of total government expenditure. The figure below shows public expenditure on tertiary and overall education, government expenditure, and country GDP.   Indonesia's public expenditure on education as a share of total government expenditure is among the top spenders by all international measures.

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[47] Source: Created by the author with data from SUSENAS.

The share is higher than Vietnam, Malaysia, Brazil, Germany, and Singapore. However, Indonesia's public expenditure on education as a share of GDP remains low. It is below middle-income countries both in East Asia, such as Thailand, Vietnam, and Malaysia; and below countries in other regions, such as Norway, Brazil, and Colombia.

Table 5.3. Specific Expenditure as Percentage: Percentage of TE to Education Expenditure, Percentage of Education Expenditure to GDP, and Percentage of TE to GDP[48]

Year	% of TE to Edu exp	% of Edu Exp to GDP	% of TE to GDP
2005	21.9%	1.2%	0.26%
2006	21.0%	1.3%	0.28%
2007	4.9%	3.6%	0.17%
2008	8.5%	3.1%	0.27%
2009	10.7%	3.7%	0.40%
2010	12.1%	3.5%	0.42%
2011	13.4%	3.6%	0.48%

In 2012, total government expenditure, with adjustments, was 1,548 trillion IDR, 159.6 billion USD. Total Education Expenditure is 310 trillion IDR, 32 billion USD. Though the share of TE spending to government spending is comparable to countries like Korea, the total actual amount spent on tertiary education, as well as a percentage of GDP, is still low because public spending on education accounts for a small portion of Indonesia's GDP. If we take into account *both* public and private funding, Indonesia spends slightly above 1 percent of GDP on tertiary education. This is far below what most developed countries spend, as well as countries in the ASEAN region such as Thailand and Malaysia.

The Indonesian government spent 3.6 percent of its total GDP on education in 2011, of which 0.48 percent was on Tertiary education. All Indonesian public universities' financing relies on government funding and subsidies. The top 4 public universities also benefit from private sector contributions for research and development. Most Indonesian private universities'

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[48] Source: Created by the author with data from MOF.

financing depends on tuition from students, while only some prestigious private universities could be financed on the side from private entities for R&D partnership purposes.

Financing from tertiary education comes principally from tuition paid by students and from government transfers to public and private institutions.   Public universities obtain about just under 40 percent of their revenues from students as tuition and just over 60 percent from the government through various transfers.   Private institutions do not report financial information to the government, but it is thought that they get the vast majority of revenues from students and the foundations; the 2012 Higher Education Law allows professors at private TEI's to qualify for the Certification Allowance paid by the government.

The following figure depicts how public expenditure is allocated by government level and by education/school level. Public tertiary institutions heavily (99 percent in 2008 and 100 percent in 2009) rely on central government funding support, whereas 26 percent of Early Childhood's funding comes from the central government, 38 percent of Primary and Secondary's funding comes from the central government, and 41 percent of Senior Secondary funding comes from the central government. In 2013, approximately two-thirds of public education spending went through provincial and district level budgets. The remainder was spent at the central level predominantly by the MOEC and the MORA. Approximately 1/3 of central level spending was devoted to tertiary education.

Table 5.4. How Public Education Expenditures are Allocated by Education Level, 2009[49]

		in Trillion IDR	In Million USD (2009)	Percentage
Total Education expenditure	TOTAL	200	19,220	100%
Public Education Expenditure by Government Level	Central	83	7,976	41%
	District	100	9,610	50%
	Province	17	1,634	8%
Share of Public Education spending by Education level	Primary	112	10,763	56%
	Secondary (Junior and Senior)	20	1,922	10%
	Tertiary	22	2,114	11%
	Other (i.e. ECE, R&D)	48	4,613	24%

Unlike primary and secondary schools in Indonesia, tertiary level public funding is 100 percent allocated from the central government, with zero coming from the provincial or district level. This comes with rigidity in terms of budget allocation and channeling. The government allocates funds for public institutions for almost all components. The support for private institutions is mainly on Salary (for faculty with civil servant status) and incentives for certified lectures. The government budget is channeled through a rigid system. The budget is pre-allocated without possibility of adjustment. Very few cases for budget amendment could be made and the process is rather long and complicated given that the changes have to be approved at various levels of the hierarchy.

Naturally, in order to answer the question of whether the Government of Indonesia is spending a sufficient amount on Tertiary Education, and whether the current public spending on Tertiary Education is cost-effective, it would be helpful to look at the breakdowns of this public spending. The MOF could provide information on total spending at the Tertiary level. However, information such as: how much public expenditure at the Tertiary level is spent on public TEIs and how much on private TEIs; and how public funding is spent on public TEIs cannot be

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[49] Source: Created by the author with data from the World Bank.

answered due to weak information management. The Government of Indonesia spends a relatively smaller amount of public funding on private institutions. However, there is no information available regarding the specific amount. Public funding for private TEIs is mainly spent on subsidizing salaries for faculty with civil servant status and roughly 10,000 students with *Bidik Misi* (in 2013, for instance). The only way to obtain the exact amount would be to add up the amount spent on each faculty member in all private TEIs and the amount of *Bidik Misi*. This information is not available from official data sources in any ministry.

The only approach to calculate private spending on TE is by looking into household (SUSENAS) survey data. Private spending, in this case, is only referring to household spending, not taking into account the private funding support coming from industry. In 2009, private spending (household) on tertiary education was roughly 30 percent of all tertiary education spending. Household spending on tertiary education comes from the core module in SUSENAS.
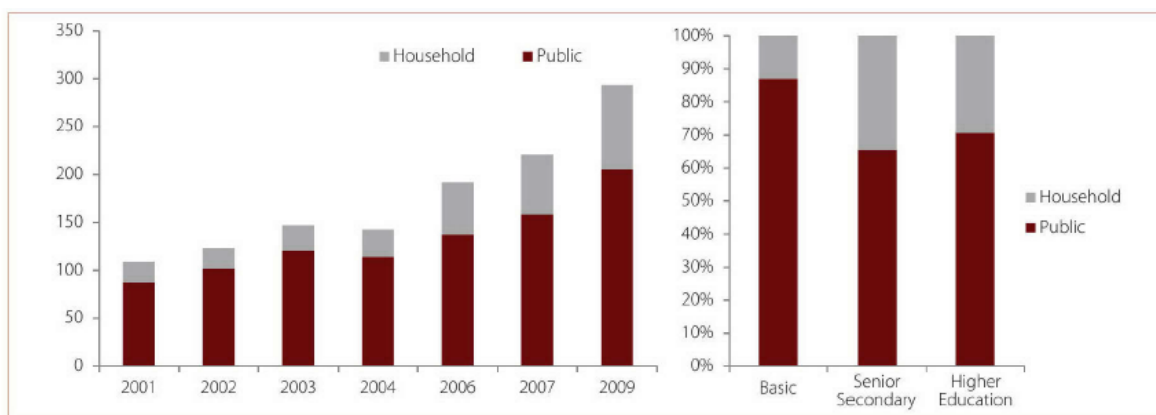
Figure 5.4. Total Public and Household Spending, and Share of Public and Private Spending by Level of Education,

(In Trillian IDR)[50]

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[50] Source: (The World Bank, 2013), 38.

With available and existing data, there were 5 million students at all TEIs in 2011, and public spending of 3.94 billion USD. We could roughly calculate that, taking into account both private and public tertiary students, the Government of Indonesia is spending 789 USD per student. 1.6 million students go to public TEIs, 32 percent of the entire tertiary student population. Assuming the majority of public funding goes to public TEIs, this makes public spending on each student who goes to public institutions over 2400 USD and makes public spending on each student who goes to private institutions 0 USD.

With the available data and information on TE financing from MOF and MOEC, we know that from 2007 to 2011, total public spending on TE increased from 6.9 trillion IDR, 762 million USD, to 35.8 trillion IDR, 3,944 million USD. All kinds of spending on TE increased by 6 times within 5 years, except for social assistance (with financial aid and student scholarship being part of it). The reason for the fast increase of capital and goods and services expenditures is DGHE's expansion of the number of public TEIs by building new public TEIs and also by nationalizing some of the private TEIs in that period.

Table 5.5. Public Expenditure Segments, Indonesia[51]

Year		2007	2011
Salary	(Million USD)	131	828
Goods & Services	(Million USD)	211	1,515
Capital	(Million USD)	252	1,373
Social Assistance	(Million USD)	168	228
Total	(Million USD)	762	3,944

The following figure presents a breakdown of how public funding is spent in TEIs. Funding is spent mainly on four categories: social assistance, capital, goods, and salary. The share of social assistance includes transfers to communities/individuals to cope with students' socioeconomic difficulties. Such assistance includes scholarship (for instance, *Bidik Misi*) and

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[51] Source: Created by the author with data from MOF.

health care. Social assistance is considered non-routine expenditure. Capital expenditures include the purchase of land, equipment, machinery, building, roads, network, and other physical capital. This is therefore considered as investment spending for TEIs. Goods and Services expenditures include consumable goods and services expenditures, maintenance, and travel expenditures (for instance, daily operational expenditures.) Salary refers to faculty salary, faculty supplement/subsidies, etc. As mentioned before, salary expenditure in this graph will not reflect the true expenditure on faculty salary because it is compensated by other sources of expense such as Capital, Goods and Services.

While public expenditure on tertiary education increased (from 2008 to 2009, tertiary education spending increased 49 percent in real terms, for instance), Salary spending decreased among the four main sources of spending. If we look at the annual increase in spending on Salary, it is fluctuating from year to year, with a decrease in the salary bill from 2006 to 2007, and 2008 to 2009. For the most recent year in which MOF data is available, the GOI spent almost 80 percent on non-salary items that include social assistance, capital, and goods. The share of public spending on salary merely reflects the basic salary coming from the government. There is potentially a large share of funding coming from Capital and Goods and Services. Total salary spending should account for more than 70 percent among all public TEIs according to data on UI and other universities.
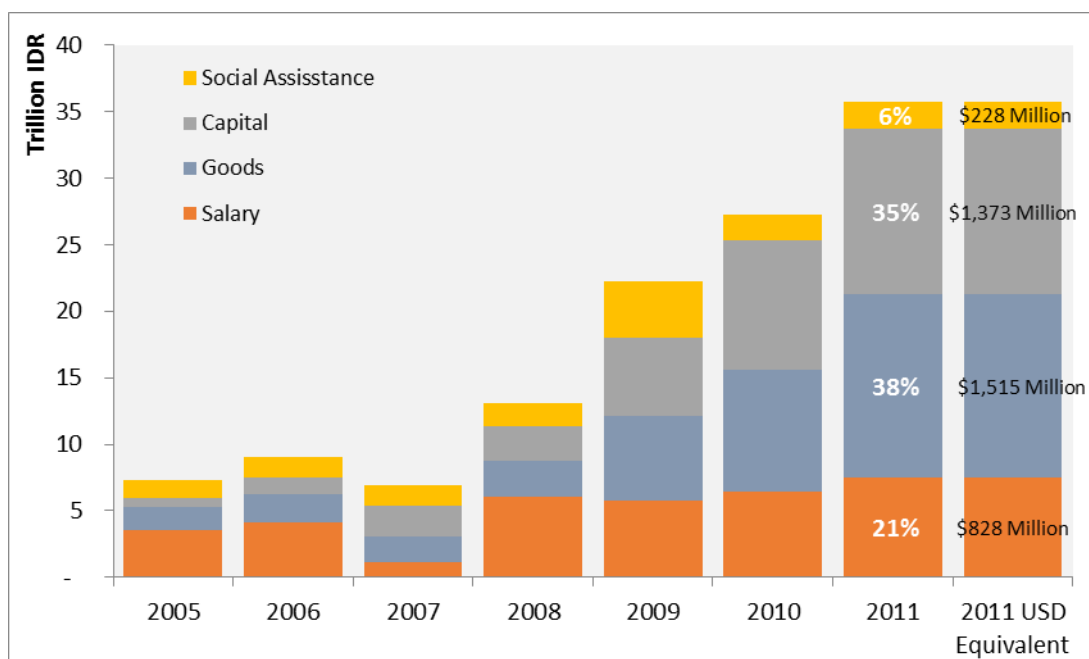
Figure 5.5. How the Public Funding (Government Tertiary Education Expenditure) are Spent in TEIs[52]

Spending on both capital and goods and services doubled in real terms from 2008-2009, and robustly increased from 2009 to 2011. This supported large infrastructure spending in public universities. From 2008-2009, public spending on social assistance grew by 80 percent. However, salary spending had a very modest increase during this period. There also emerged another category called "Other" which includes research grants for universities. In 2009, 74 percent of the total university program budget was spent on non-salary items. It focused more on new capital investment projects such as new research laboratories and a new polytechnic university, training and capacity building, R&D, and scholarship programs for university lecturers and students.

Funding channeling from the government is rigid and uniformly imposed for all government entities as a line item in the budget. Because of this, items such as research funds are also channeled as contracts instead of grants and are universally implemented through a

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[52] Source: Created by the author with data from MOF.

similar mechanism. Private institutions have different fund channeling systems depending on the financial regulation set by the respective foundations that own the private TEI. However, public funding for private TEIs also complies with the prevailing regulation.
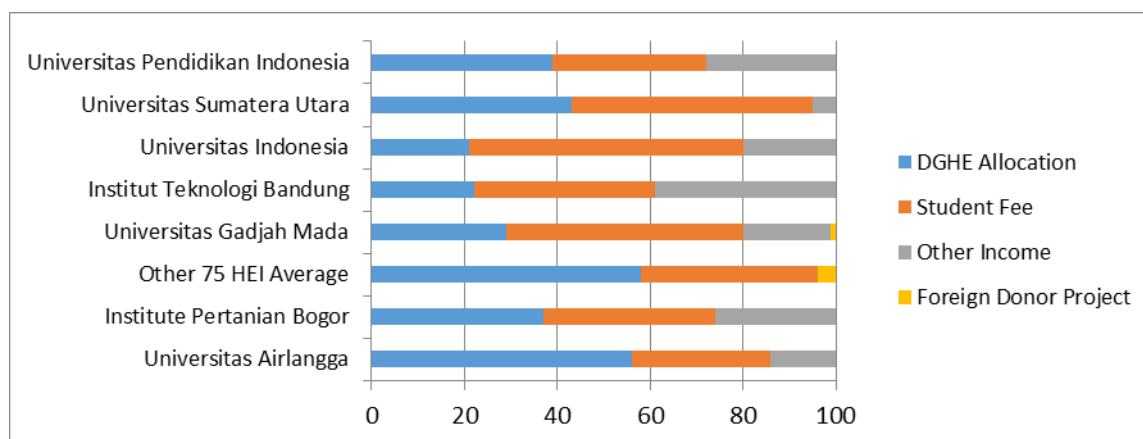
Figure 5.6. Big 7 Universities in Indonesia—Financing [53]

Public TEIs need to follow the regulatory framework to manage and allocate self-generated revenue. This is because public TEIs are considered part of the government bureaucracy and therefore should follow government regulations on public finance. In particular, Law 17/2003 states that self-generated revenue is considered a State's revenue and has to be deposited in the State Treasury. Autonomous universities are exempt from this rule and are only given certain degrees of freedom in allocating self-generated revenue. Private TEIs follow regulations by their corresponding Foundations. If public TEIs are unable to completely spend this revenue, the rest will be deposited into the State Treasury at the end of the fiscal year for future spending consideration.

An institution's degree of freedom in setting student tuition is one indicator of how much autonomy the institution has. TEIs in Indonesia consider tuition and fees as self-generated

[53] Source: Created by the author with data from MOEC.

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revenue and thus obey rules mentioned in above paragraph. There were attempts to empower public TEIs in terms of setting their individual tuition standards. However, this created public protests and political pressure and thus MOEC was forced to take action to re-regulate. A new decree (MOEC decree 55/2013) was carried out, supplemented by a DGHE decree, to provide guidelines in a complex and detailed manner. In this decree, flexibility was given for setting tuition charges only for post-graduate and non-regular programs.

In the most recent World Bank briefing on tertiary education development, it was specifically noted that one of the most important "To-Dos for TE" worldwide is to *expand institutional autonomy in exchange for accountability.* This applies to the case of Indonesia. Most public TEIs in Indonesia do not have autonomy in managing public and private funding. Public universities are accountable to the DGHE and subject audits by the State Auditor. (This does not apply to the autonomous universities because they are accountable to their Boards of Trustees, MOEC, and MOF.) Private universities are accountable to their Foundations. A broader definition for accountability should be considered, rather than just institutional compliance with prevailing financial management regulations. . An adequate balance between autonomy and accountability is a key ingredient in a good TE system, and government should facilitate this. TEIs being more accountable for their use of public funds would increase autonomy through a greater capacity to survive on their own. Under the condition of limited resources, expanding autonomy in exchange for accountability is even more crucial in order for TEIs to identify alternative sources based on cost-effectiveness.

5.5   OUTPUT—CRITICAL MASS OF HUMAN CAPITAL

An indicator to assess the returns to investment or the efficiency of the tertiary education system is the amount of human capital created and accumulated compared with human and monetary input. In previous sections, education inputs from various sources were presented. Though inefficiency in public expenditure exists, looking at returns to such expenditure is critical in evaluating the impact tertiary education has made in Indonesia.

Along with the expansion of the tertiary education system, the number of tertiary graduates has been increasing dramatically. This is without taking into account maturity—the time students take to graduate. Domestic graduates at the tertiary level, including both the undergraduate and graduate levels, is one of the approaches to accumulating human capital and bringing better educated and better skilled labor into the labor market. Another way, which most developing countries take, is by sending human resources overseas to obtain advanced and professional degrees.

Table 5.6. Number of Indonesian Students Studying Abroad, 2012[54]

Indonesian Students Study in	Number
Singapore	21,043
Australia	16,545
Malaysia	13,627
China	9,539
United States	6,942
Egypt	3,865
Germany	3,340
Rest of the World	7,094
Total	84,157

Countries that lack a critical mass of advanced degree holders often use a combination of publicly sponsored graduate training abroad plus investment in growth of the size, quality, and

[54] Source: Created by the author with data from MOEC.

diversity of domestic Ph.D. and Master's programs. Indonesia sends roughly 84,000 students abroad per year for TE.

Domestically, the annual graduation rate of Master's and Ph.D. programs seems to have grown steadily. Data for the latest available year show 1,765 Ph.D.s and indicate that 500 new Ph.D.s from 2006 to 2010 are trained domestically. By contrast, Brazil, with a smaller population, surpassed the milestone of 10,000 domestically trained Ph.D.s several years ago. Reaching a critical mass will require a similar effort by Indonesia.

Table 5.7. Number of Ph.D. and Master Graduates in Indonesia[55][56].

	2005 and before	2006	2007	2008	2009	2010
Ph.D. (S-3)	Not published	1,273	1,273	1,687	3,983	1,765
Master (S-2)	Not published	11,109	11,109	17,059	40,082	43,729

As described in previous sections on the quality of teaching force, the number of advance degree holders still needs to vastly improve. This is to ensure that the quality of the teaching force could potentially increase. More importantly, the R&D output and capacity should increase accordingly. Compared with ASEAN countries, the number of degree holders in Indonesia is still modest. This number does not yield an ideal return to the increasing amount of investment—government expenditure, for instance—into the tertiary education system.

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[55] Please note that MOEC's headcount method changes year to year and the quality of data is not ideal. The number jumps significantly high for Ph.D. and Master head-counts for year 2009 for instance. The quality of data negatively influences prediction of headcount increase and thus prevents readers to see a clear trend from the past. However, despite the kink in year 2009, the general trend is an increase from year 2006 to 2010, especially Master degree holders.

[56] Source: Created by the author with data from MOEC.

5.6   OUTPUT—R&D CAPACITY AND PUBLICATIONS

From 1996 to 2011, Indonesia published 16,139 scientific papers, or about 1,000 papers per year; in addition, 15,779 citable documents, 125,845 citations; 13,719 self-citations; and 10.85 citations per document. These numbers make Indonesia 11th within the region, but 63rd in publications globally. MOEC data show the average researcher producing 0.4 publications per year; researchers at internationally competitive research universities will publish at several times this average.

R&D outputs are generated from two sources, top tier universities and public research centers/institutes. The four autonomous top universities, together with the other three flagship universities, are the major players in R&D productions. Lecturers and Ph.D. students are the main labor force for R&D productions, both publications and patents. Though public funding is also going into public research centers/institutes, their R&D outputs are much less than universities. LIPI (Indonesia Institute of Science), the largest leading research institute, hosts roughly 4,000 researchers, while ITB has 1,155 academic staff and 834 Ph.D. students. The publication figures for LIPI are 1/6 of ITB, 1/5 of UI in 2011; and 1/4 of ITB and 1/3 of UI in 2012.
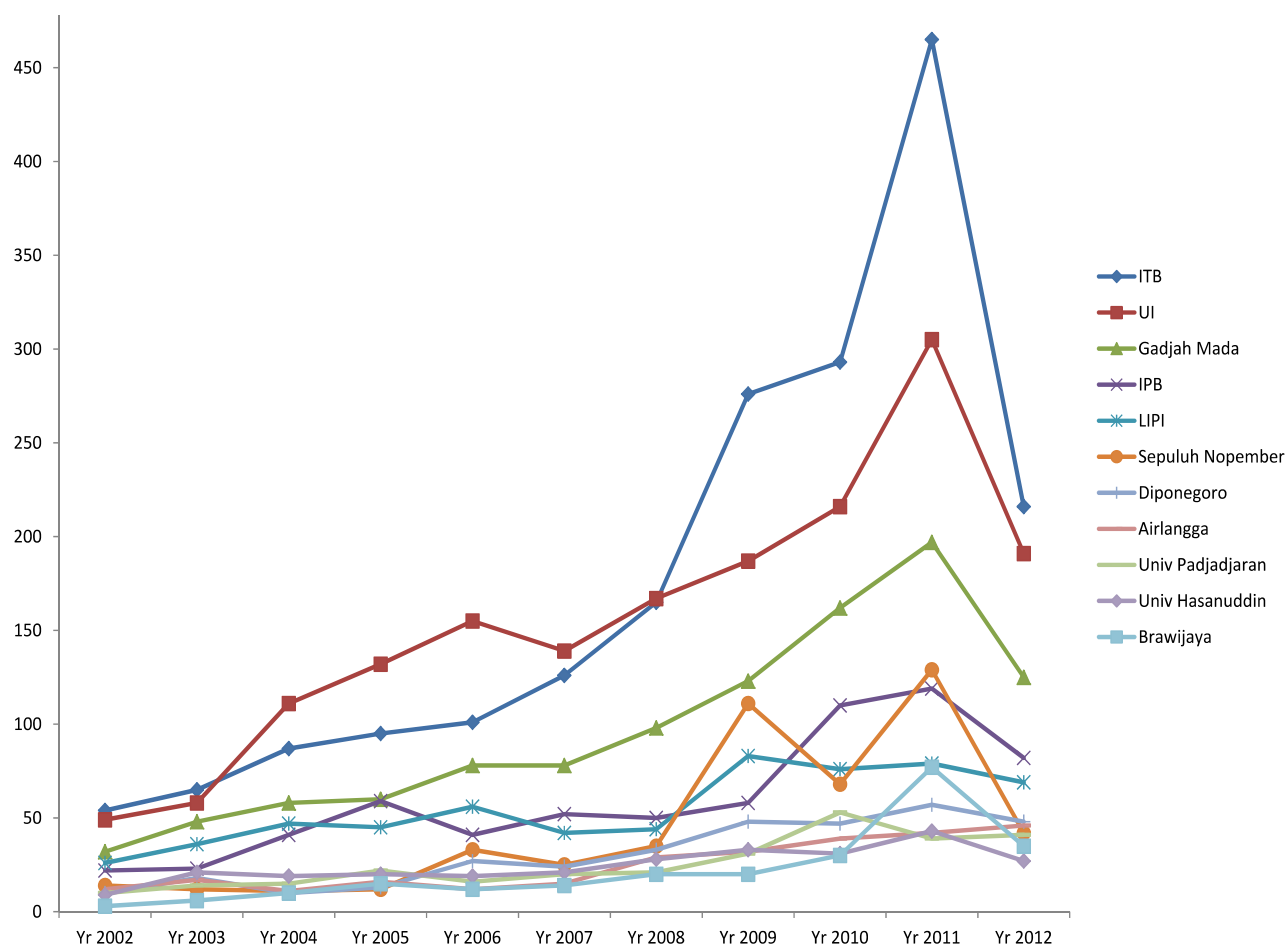
Figure 5.7. International Publications from Indonesia's Leading Universities and Research Institutes, 2002 to 2012[57]

Table 5.8. Publications from ITB and LIPI, 2011 and 2012[58]

	ITB		LIPI
Labor force for R&D	Academic staff and Ph.D. students		Researchers
Total number of labor force for R&D	1,155 Academic staff	834 Ph.D. students	4,000
Total number of International publications 2011	460		70
Total number of International publications 2012	230		60

Indonesia's education output, in terms of R&D production, is not as competitive as its

peers in ASEAN, nor in the world. An encouraging and nurturing environment will effectively

[57] Source: MOEC.
[58] Source: Created by the author with data from MOEC.

enhance R&D productivity. For instance, facilities and supply are constraining productivity, as well as public funding support. Each year, GOI allocates a small amount of funding to support R&D activities in public universities and research centers/institutes. This financial input does not serve the purpose of strengthening one's R&D productivity sufficiently, unless it combines with private sector input. In addition, R&D should not only rely on research universities and institutes. Adopting schemes that encourage firms to conduct their research independently, especially companies pursuing commercial gains, will be another step forward.

A stronger partnership with the private sector and the absorption of private input could supplement the shortage of public funding. Indonesia, unfortunately, has very rigid regulations in terms of private sector engagement. R&D input and support from the private sector has to be channeled through the MOF and will only be available to use the year after. It takes up to one year for the budget to be put in place.

More autonomous and flexible rules on annual planning and budgeting will be the third important factor. Indonesian universities with public and private funding must submit an annual plan listing all activities/workshops to be carried out in the next year and how much they will spend. Once approved, budget will be allocated as line items without room for change.

Consistent laws and regulations are also important in determining research outputs. The reason for the severe drop in publications from 2011 to 2012 is due to a sudden cancelation of law 9/2009 which granted private input and budgeting autonomy to the 7 flagship universities. Universities were unsure of the direction of policy, thus ceased private funding and reduced output for R&D.

Autonomous universities are exempt from the above situations and have stronger R&D support. They appear to be the most productive in R&D. They could allocate their financing

resources with degrees of freedom and without reporting to the ministry. The Board of Trustees and the Senate have the final decision on this matter.

5.7   OUTPUT—DATA AND INFORMATION

Current students, aspirants, and all stakeholders need information to make good decisions. The quality and availability of information is an essential part of helping students' investments yield positive returns. The same is true for policymakers: the Indonesian TE system involves millions of students and billions of US dollar equivalents in resources; understanding it sufficiently well to make good policy requires time, effort, and skill. When governments invest in information for policy, they too reap strong positive returns. One aspect in assessing TEQ is to look at the spinoff—data and information produced from the system, for instance.

Obviously, readily-available data about TE outcomes and options are critical to the goals of both students and policymakers. Poor information a key cause of disconnect. Thus, high-quality data and information are essential for the Indonesian TE system and all of its stakeholders. In any maturing TE system, policymakers, students, and parents rely on such data and information to make sound choices for the future. However, Indonesia currently lacks reliable basic information about most aspects of its TE system, from enrollment numbers to dropout rates to graduate employment outcomes. Improving data and making information more accessible are critical steps toward bolstering the system's efficacy and efficiency.

Most data about the Indonesian TE system are collected by the MOEC via its Statistics Department and DGHE or by the Central Bureau of Statistics (BPS) via its National Socioeconomic Survey (SUSENAS) and National Labor Force Survey (SAKERNAS).

Unfortunately, data sets are frequently inconsistent across sources due to data collection and management methods.

Because the Statistik Pendidikan and the DGHE are housed within the MOEC, they are publicly funded. However, data and information from the two departments are managed separately and come from different sources. Whereas the Statistik Pendidikan receives its data from provincial governments, the DGHE solicits periodic updates from TEIs. The response rate for the Statistik Pendidikan is below 20 percent, and it is unknown how many full-time staff members are responsible for managing and monitoring the department's data collection process. The MOEC recognizes the inefficiency of this process and has made efforts to merge data collection responsibilities between the Statistik Pendidikan and the DGHE. However, these efforts were made five years ago, and the departments still have not successfully consolidated their data and findings.

The BPS is also publicly funded, but it is managed by statisticians. BPS started conducting the SUSENAS, which tracks a wide range of household socioeconomic information, and SAKERNAS, which deals specifically with labor force information, once per year until 2001. From 2002 to 2010, however, the surveys were conducted twice annually, and they have been conducted on a quarterly basis since 2011. Changes in the frequency with which the surveys are conducted have been accompanied by changes in their geographical coverage, sample size, level of representativeness, questions, and data weighting. SUSENAS and SAKERNAS data in this dissertation come largely from the 2012 February iteration of the survey, which was disseminated to a roughly representative sample of 71,000 households across the entire country.

It should be noted that only about 100 public TEIs are supervised by the MOEC. Others fall under the authority of other ministries, especially the MORA. For all of the shortcomings associated data with the MOEC, other ministries are far weaker at collecting and processing information from TEIs. As such, MOEC currently supplies the best available TEI statistics and information. Furthermore, it has made multiple attempts to generate more accurate information through municipal- and district-level verification processes. However, staffing limitations, lack of expertise, and political constraints have prevented this potential remedy from improving the data situation in Indonesia.

Understanding a TE system requires accurate information about a variety of factors. In Indonesia, tertiary enrollment information is largely available through DGHE and the Statistics Department within the MOEC. However, the data inconsistency and inaccuracy at the two main departments hinders interest-groups or individuals in acquiring good quality information, and in conducting research and study to understand student and TEI characteristics. In order to provide reasonable policy recommendations on improving tertiary education quality and relevance, interest groups need to examine what the current situation and issues are within the system. This means people need answers to questions such as what kind of background students come from, what the salary scales are for tertiary graduates in the labor market, what the current TEI and program quality is, and what skills and knowledge the tertiary system could produce.

This set of questions translates into data and information on the following perspectives: (i) student characteristics: students' socioeconomic status background, degree types, institution types, dropout rates, number of applicants and aspirants, average number of years to complete tertiary education, etc; (ii) labor market observation: type of degree corresponding to type/skill level of jobs, average salary, historical patterns of labor market demand, forecast of future

skill/talent shortfalls by job sector and type, etc; (iii) education inputs: public funding and private investment in tertiary education by institution types and degree programs; specific segments on how TEIs are spending money: the amount that goes into salary, stationary, facilities, infrastructure and so on; the quality within the tertiary education teaching force; (iv) education outputs: the amount of R&D outputs by each discipline among all TEIs, publications, patents, and citations. Such information helps to provide a thorough description of a current tertiary education system and is essential in accurately diagnosing strengths and weaknesses of the system.

The experiences of other developing countries demonstrate that there are numerous benefits associated with strong data and information systems. Colombia, for example, has driven TE maturation partly through the successful management of data and information. In other words, the consolidation of information about TE (which, when disseminated transparently, helps to keep the general public informed about postsecondary educational options) and the expansion of TE systems are often complementary processes.

Colombia's 300 TEIs operate over 11,000 degree programs. The combination of sophisticated information systems run by government agencies and digital and print media produced by individual TEIs ensures that students have access to a wealth of information about the TE system and their options within it. The Colombian Ministry of National Education, which is the main source of TE information within the country, began systematically gathering information from TEIs in 2002. This information was consolidated into four main information systems that are updated frequently and are accessible through the Ministry's website.

Information about Colombia's tertiary education system is publicly and largely available, ranging from the information system managed by government agencies to websites, brochures,

and advertising material managed by individual institutions. The country created information systems with four main elements. The main source of information on the tertiary education system is the Ministry of National Education (MEN, *Ministerio de Educacion Nacional*). Since 2002, MEN has been systematically gathering information from TEIs and government agencies.

Additional information and other information systems are available through different web portals in Colombia. Despite the shortcomings on information gap and credibility of some information, the overall scope and amount of information on tertiary education is impressive. Colombia is definitely strides ahead of other developing countries in terms of the ownership and management of national data and the information system.

Table 5.9. Summarizing Four Main Information Systems on Tertiary Education in Colombia[59]

Information system	Features
The National System on Higher Education Information	A comprehensive system includes data on all TE programs and TEIs on Colombia's Register of Qualified Programs. Collects and organizes information about institutions, programs, faculty and staff, students and their well-being, graduates, research, internationalization, infrastructure, finances, applicants' standardized test scores, tuition and fees, and financial aid and loans.
The Higher Education Institutions Dropout Prevention and Analysis System	The main tool for monitoring and analyzing TEI dropout rates. Features statistics about total enrollment and graduation rates. Describe student characteristics increase the depth and usefulness of these data.
The Labor Market Observatory for Education	Focus on information about TE graduates' average earnings from 2001 to the present. Tracks the percentage of degree holders (by type of degree, discipline, institution, and geographic location) active in the labor market.
The Higher Education Quality Assurance Information system	Records program accreditation status. Allows TEIs to process accreditation procedures directly Update institution characteristics and legal status changes. Provides accreditation information directly to prospective students

Finally, TEIs have empirical bases for opening and closing degree programs in response to labor market demands. In recent years, for example, many Indonesians have trained to become teachers because of the high salaries associated with the profession. This has created a pronounced surfeit of teachers, which has forced many to work in lower-paying jobs. However, because this information has not been disseminated widely or used to shape TEI responses to the problem, demand for teacher training programs was at an all-time high in 2013. Collecting better data and using it more effectively would improve such situations dramatically.

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[59] Source: Created by the author with data from the World Bank.

5.8   SUMMARY

TEQ can be examined through various perspectives. Regardless of the approach, education input and output assessment are essential in this process. This chapter presents the evaluation of input and output from three perspectives each—on the input side, system selectivity for students, teaching force quality, and financial input from the government are evaluated; on the output side, creation of a critical mass of human capital, R&D production and capacity, and data and information are examined.

As a rising economies, the GOI realizes the importance of accumulating human capital through education. The government is committed to invest more—from both human and monetary aspects. With an expanding tertiary system, selectivity of incoming students is the start of ensuring the system's quality. However, despite the overall expansion and seemingly more affordable and accessible system, prestigious universities (mostly public) are still highly selective to enter. Students who secure a seat in those universities mostly come from affluent families, as well. Scholarships such as *Bidik Misi* tend to favor students from poorer families entering good-quality TEIs. Poor targeting and low capacity in scholarship management hinder the students who are actually in need of benefitting from it.

Indonesia's teaching force has relatively low quality compared to other developing and neighboring countries in ASEAN. This judgment comes from the teaching capacity evaluation and the small amount of advance degree holders in the teaching force. With government support and enforcement, though a large amount of teachers go back to academia to further pursue a higher degree, credentials and government civil servant status issues are severe. MOEC does not have an accurate data on the teaching force composition in terms of degree holders before 2009. This is due to the unsystematic management of full-time and part-time teaching faculty in TEIs.

Not until recently have the numbers started the show the trend of an increase in advance degree holders in Indonesia's teaching force. Indonesia needs to enlarge its output on advance degree graduates with reasonable quality to meet the needs in academia and industry.

With the growing amount of monetary input, efficiency in spending is extremely important to better utilize taxpayers' money and to push for higher R&D outputs. Indonesia is lagging behind internationally in R&D production. Flagship universities are more advanced in R&D capacity than other public and private TEIs domestically, and they are more productive than top distinguished research institutes in Indonesia. A new funding and management mechanism is needed for those government-owned research institutes.

Finally, TE outputs create data and information, which in return give valuable information to stakeholders for decision-making. Many of the most pressing problems in Indonesian TE could be solved (or at least ameliorated) by a concerted effort by the government to improve the quality and availability of relevant data and information. Students would be able to make informed decisions about which type of TE they should pursue and understand the financial aid systems and policies relevant to them. The MOEC would have a better understanding of the costs and benefits of TE and the types of people employed by TEIs.

6.0   TERTIARY EDUCATION QUALITY MEASUREMENT THROUGH RELEVANCE—LABOR MARKET OBSERVATION

Indonesia has a relatively young labor force, with almost half aged 35 or below. The education profile of these workers determines the earnings yield from degrees. Experience and socioeconomic background are two of the main factors that determine returns. In this chapter, the author attempts to measure the return differences between different degree holders in the labor market. In addition, the author will take an in-depth look at skills—how are the skills supplied from the TEIs (schools and non-formal institutions) meeting the demand of the labor market? The study is conducted with the help of household labor force data (SAKERNAS), which gives granularity of skill demands for each job and industry sector. This chapter will begin with a general analysis of Indonesia's labor market (composition and education level), followed by different sections on analyzing returns, demands of sectors, and skill mismatch.

Table 6.1. A Summary of Indonesia's Current Labor Market[60]

Facts and Numbers:	• The number of workers with at least some TE has doubled in the past ten years; • In 2000 about 5 million workers had at least some TE; by 2010 more than 10 million did;
Likelihood to be hired:	• Tertiary graduates have higher possibility to be in the labor force compared to all other levels of educational attainment;
Skill match:	• TE grads are generally finding jobs compatible with their skills and have the better working conditions than workers with lower levels of education;
Supply and demand:	• Labor force growth demanded for 21% with tertiary degree, however Indonesia has about 8% only;
Returns to TE:	• Returns to TE is twice as high as that of senior secondary graduates; and several times higher than that of basic education degree holders [61]; • On average, overall returns to TE remain high despite the large increase in the supply of graduates; • Returns to higher-level skills continue to be in high demand by private firms. Managers, leaders, and key technical personnel remain in demand and command premia on salaries and working conditions; • Subsequent policy changes have led to fewer high-paying teaching jobs and more low-paying contract job in teaching, with corresponding lower salaries and returns;
Labor force composition:	• The segment of the LF under age 35 has accounted for most of the increase in supply of graduates; returns to this segment are trending downward slightly but still remain significantly above return to all other levels of education;
Public vs. private sector jobs:	• Returns to private sector employment for TE graduates continue to increase despite increases in supply of graduates seeking these jobs; • Erstwhile policies setting high salaries for teachers have attracted many TE graduates to seek public sector employment (please see box on the oversupply on teachers).

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[60] Source: Created by author with data from the World Bank.

[61] The returns to education are presented as the additional wage relative to what a primary education graduate (or less) makes: in 2010, a tertiary graduate made slightly over 100% more than a basic education gradduate, return to gradates is roughly 1.1. A senior secondary graduate made 60% more, therefore return to senior secondary graduates is roughly 0.6. Junior secondary increases your wage by about 20 percent, thus 0.2. The general regression controls for age and gender.

6.1   LABOR MARKET OBSERVATION AND ANALYSIS

Indonesia is at a development crossroads. As one of the largest 20 economies in the world, Indonesia wants to achieve high-income status and join the G-7 by 2030. The status quo will not be enough to maintain current its economic growth rate, and maintaining this growth rate will not bring the country to high-income status by its target year. Accelerating the growth rate is crucial and it takes more than what the country is doing now. Building a skilled labor force is the key to leveraging the opportunities Indonesia has, such as the opening markets in ASEAN countries. A skilled labor force will require matching labor market outcomes with education outcomes. Tertiary graduates are the critical mass that could further enhance the skill level of labor in the near future (Manning 1998).
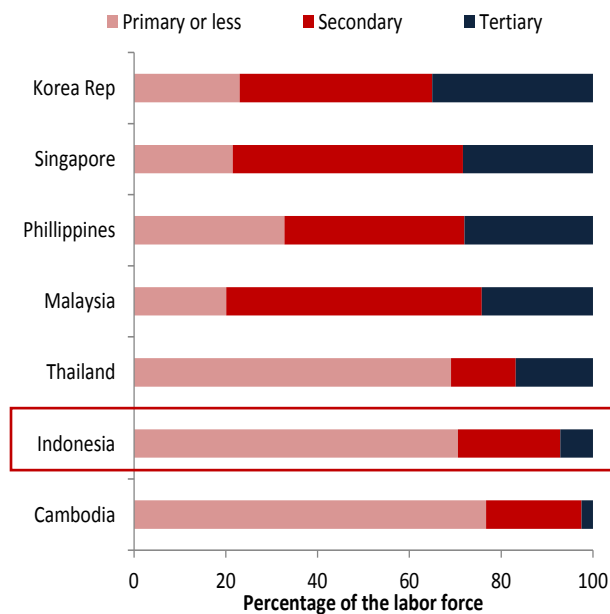
Figure 6.1. Percentage of Labor Force Having Different Level of Education by Country[62]

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[62] Source: (Cerdan-Infantes 2013), 34.

Across ASEAN countries, Indonesia has the lowest proportion of tertiary graduates in its labor force. Indonesia fortunately has a rather young labor force, aged 35 and younger, and this group tends to be the best educated as well. However, merely 10 percent of this young and "well-educated" labor force has a completed tertiary degree. In general, 8 to 10 percent of the labor force owns a tertiary degree. This, however, does not suggest a high-degree bias. A higher degree does not necessarily lead to higher skills. What the country needs is a good skill match and a diversified degree program to ensure the growing cohort of secondary graduates receives appropriate training for a better generic, practical/vocational, and behavioral skillset, or in technical terms, better cognitive and non-cognitive skillsets.

In the tertiary system, aside from the concern of quality, another concern that naturally comes along is the labor market observation in response to continuous expansion. Quality is a more complicated indicator to measure in the TE system and it takes a longer time to enhance and evaluate. Labor market response, however, gives a rapid result to the efficiency of a TE system. Questions such as: "how is the labor market reacting to the increasing class of tertiary graduates?", and "what are the general returns to tertiary degrees than other degree levels?" intersect with indicators such as the speed of absorption by industry sectors, and skills' best match.

Middle-income countries like Indonesia easily fall into the trap that hinders more rigorous economic advancement because: (i) A large share of national income comes from natural and human resources; (ii) Industry stagnates at low-wage and low-skilled manufacturing; (iii) There exists a rising sense of the importance of education but without the capacity and know-how. The current labor market in Indonesia is still very low-skill based. Even though it is absorbing expanding growing amount of tertiary graduates, it is experiencing difficulty in best

utilizing them. This has two causes: (i) Skills brought from tertiary graduates don't match what the industry needs—issues from the supply side; (ii) The unhealthy labor market does not focus on human capital investment and thus employers do not focus on the professional development of current employees—issues from the demand side. At some point along the line of continuing economic growth, Indonesia will need to manage the transformation from market economy to knowledge economy and enhance the capacity of high-skilled works and innovation. This comes from a better-educated population and will eventually come back to the rising awareness of the importance of continuing high quality education.

Despite large increases in the supply of TE graduates in the labor market, demand for graduates remains robust. In fact, demand by private employers for tertiary graduates has grown faster than supply in the past decade, despite a near doubling of annual graduates. Wages have not held up as well for those seeking public sector employment (especially as teachers), but overall the premia for a tertiary degree have remained positive and higher than returns to any other level of educational attainment (Boothby 2010). This suggests returns outweigh costs and expansion should continue until these inflect.
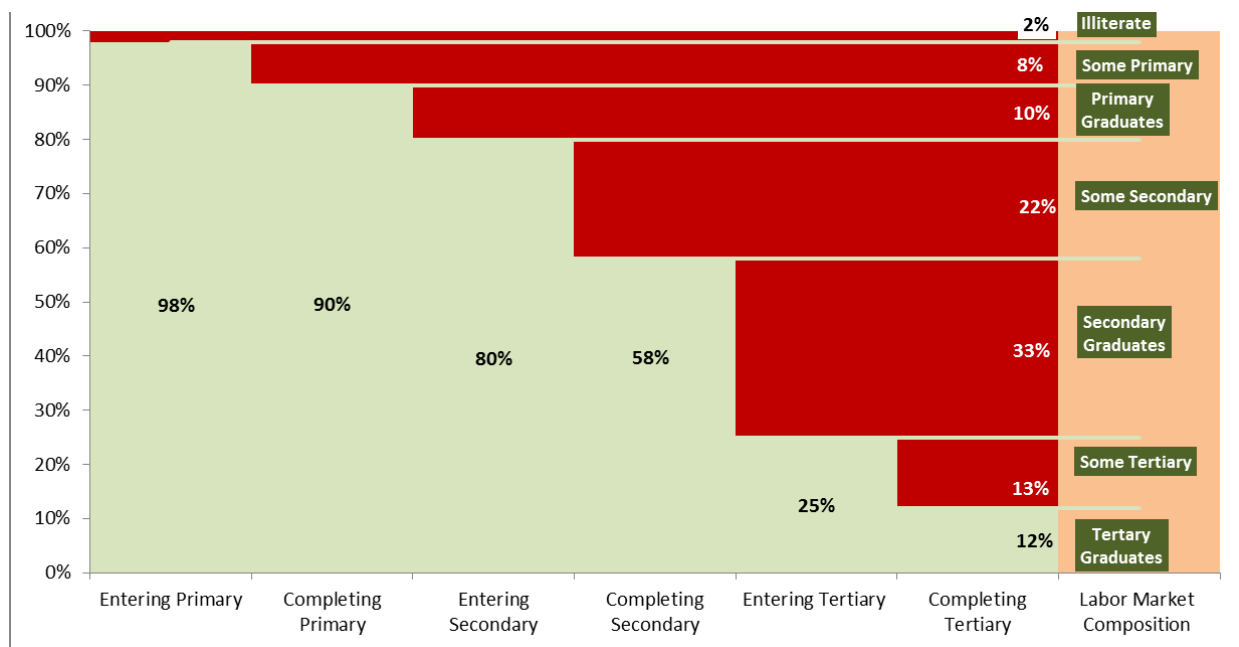
Figure 6.2. Labor Force Composition - Percentage of Labor with Different Degree Levels[63][64]

In fact, a recent World Bank report commissioned by Ausaid (Cerdan-Infantes 2013) had several major findings regarding labor market outcomes for TE graduates. Taken together, the following findings strongly support continued expansion. Of course, it is not possible to predict precisely how supply and demand for skills will evolve. The experiences of other growing economies suggests Indonesia is on a sustainable path. Currently, economic returns for tertiary graduates are attractive. The labor market is absorbing rapidly increasing numbers of tertiary graduates while keeping salaries relatively stable. This is especially true for private sector employment of tertiary graduates.

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[63] Numbers and percentages presented in this figure are sourced from MOEC data, and they are different from those from figure on labor force composition, by different age group. MOEC data are inconsistent with data collected through BPS (SAKERNAS for instance) and therefore present different trends and specific numbers. The figure on labor force composition by age group is more focused on the population currently active in the labor force, working while still involved in school. It also has information on number of degree holders, and those numbers are different from MOEC's. This figure is aimed at giving a general sense of how well educated is Indonesia's entire labor force.
[64] Source: Created by the author with data from MOEC.

Indonesia has a relatively younger labor force, with almost half of the entire labor force below age 35.

The next figure shows a picture of the younger segment of the labor force (workers under age 35) having much more TE but close to the same salaries and returns. To the extent that graduates obtain high-quality relevant skills in TE that raise their productivity, their wages should further rise, allowing for greater enrollment before a leveling equilibrium of costs and returns. So analysis of supply and coverage of TE should be the first policy issue, but quality and relevance should be of equal concern to policymakers.

As one would expect, TE graduates have a high share of formal, public sector, high wage employment. They also have the highest rate of labor force participation compared with individuals with other levels of educational attainment. The official unemployment statistics show that TE graduates have higher levels of unemployment compared to less educated workers. The difference is modest—13 percent for TE graduates versus 3 percent for those with basic education. However, this is likely due to at least two factors. First, TE graduates have more resources to bear unemployment without working while they look for jobs. Second, most measures of employment ask about work in a given period. Those with basic education will have done more work in the informal sector and therefore be classified as "employed" in the official statistics. When one considers both labor force participation and unemployment together, those with TE have a higher share of employed individuals than any other category of educational attainment. For example, workers with basic education have only 3 percent unemployment, but 25 percent of this group is out of the labor force. For TE graduates, 13 percent unemployment is counter-balanced by only 10 percent of this group outside the labor force.
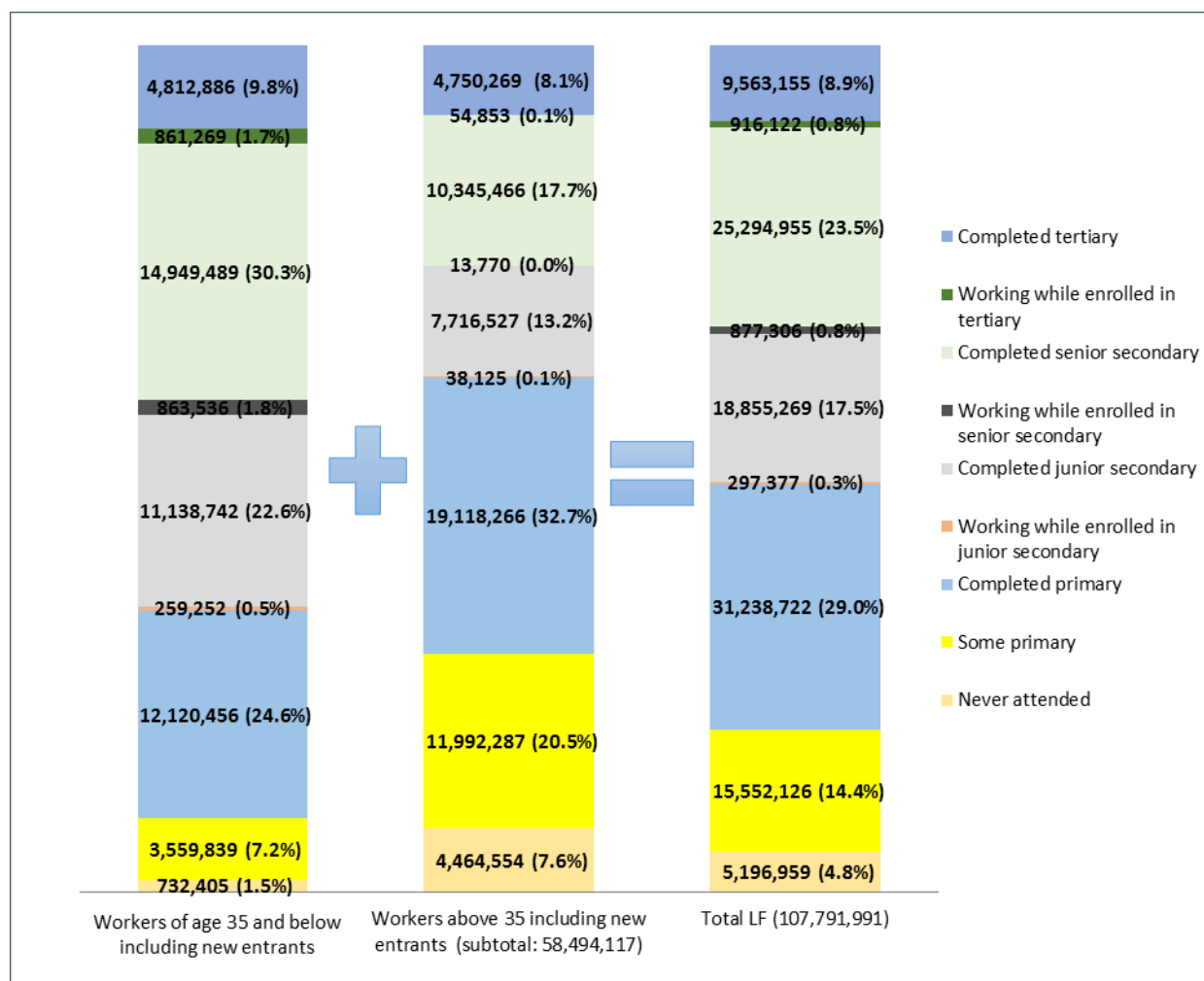
Figure 6.3. Labor Force Composition (Headcount and Percentage): Workers Below and Above Age and Total, by Education Level, Year 2012[65]

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[65] Source: Created by the author with data from SAKERNAS.

6.2   RETURNS TO TERTIARY EDUCATION AND ITS COMPARISON TO OTHER LEVELS OF EDUCATION

In the most recent study carried out by economists at The World Bank Group, rates of return to tertiary degrees are significantly higher than those for primary and secondary degrees, in which the returns to both tertiary and primary degree holders are higher than that of secondary degree holders. This signals the low productivity of secondary education around the world—obtaining a secondary degree does not necessarily yield higher returns, and the demand from the labor market of certain skills cannot be found or matched from secondary education degree holders. Rates of return are generally higher among females than males at any level of education. This has to do with the base of females who are illiterate in many low-income countries. Once those underprivileged people are offered access to education, the distinction of returns to education versus no education will naturally be significant. In Indonesia, returns to different levels of education make more difference than of different genders. The rate of return to tertiary degree holders remain high.

The share of TE graduates in the labor force is increasing while economic returns remain relatively constant. The number of TE graduates in the workforce in Indonesia has been increasing by about 8 percent per year over the past decade. Between 2001 and 2010, the number of individuals in the labor force with TE doubled from almost 5 million to almost 10 million. Despite this doubling, the returns to education have remained relatively constant. The absorption of this big influx of graduates without declining salaries signals that there is room for further expansion of the system. If the increased supply of graduates is overwhelming their demand, one would expect the returns to education to decline. This, while not necessarily a bad

thing, would mean that the growth in the supply of graduates is exceeding the demand. But this is not the case in Indonesia—the demand for graduates seems to be keeping up with supply.
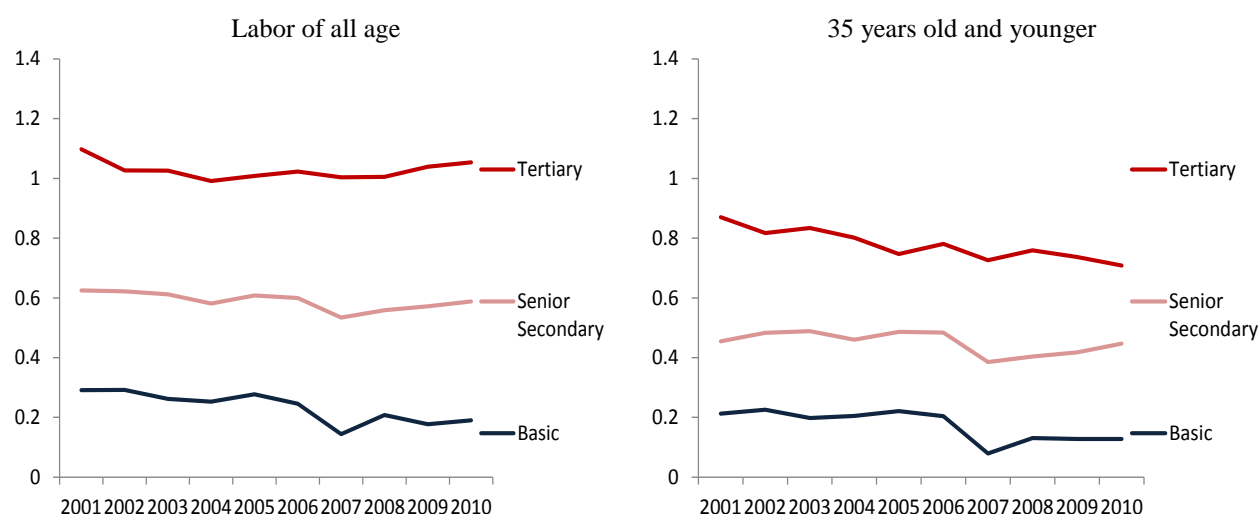
Figure 6.4. Trends in Returns to Education, All Labor Force and Younger than 35, Year 2001 to 2010[66]

Rates of return to shorter degree programs (DI and DII technical degrees) have been dropping precipitously for most of the past 10 years.   While DI and DII graduates are much more likely to be employed in the formal sector than Senior secondary school graduates, their salaries are now not very far above those of Senior secondary school graduates.   Careful empirical analysis is needed to understand the drop in returns, but one explanation presents itself as likely: when tertiary graduates were very scarce, DI and DII graduates were hired for high paying jobs for which they were under-qualified. As SI (bachelor's degree) graduates have become more plentiful, DI and DII graduates now have to compete for jobs against more senior secondary school diploma holders. They do well on formality and working conditions, but not so well on salary (figure below).

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[66] Source: (Cerdan-Infantes 2013), 23.
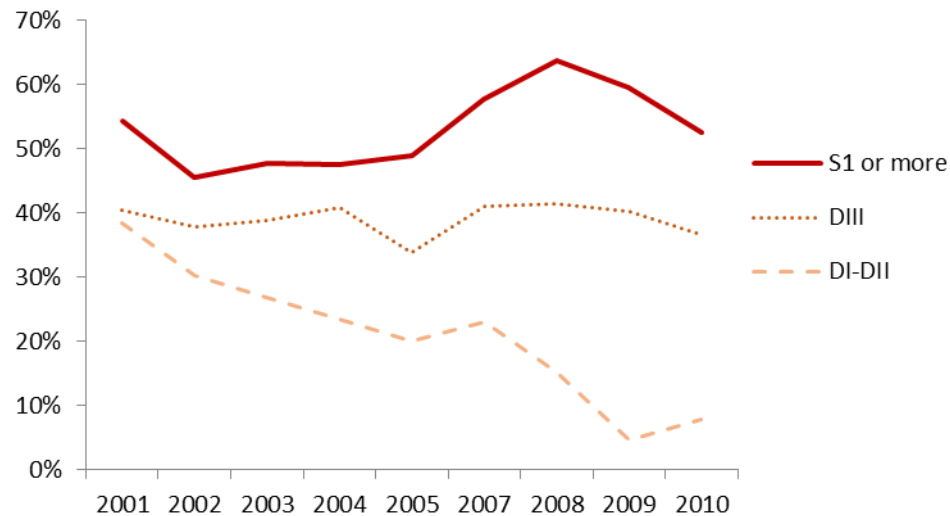
Figure 6.5. Returns to Tertiary Education DI –DII, DIII and SI or More, Year 2000 to 2010[67]

This phenomenon occurs in many countries. Initially, the labor market will absorb tertiary graduates even if they are from degree programs of low relevance because of a general scarcity of workers with tertiary-level skills. To avoid saturating the labor market, skills have to become better and more focused. It suggests, however, two important points:

- It is not enough to expand under "business-as-usual" policies. Higher enrollment without better, more relevant degrees may strain graduates' ability to get a positive return on their investment.

- Study options for poorer students have to be affordable. High cost programs are likely to have negative returns.

Some observers feel that conditions for quality ought to improve before any further expansion takes place. They worry that students will pay for useless degrees. This is a legitimate concern, but policy experience shows that creating affordable, relevant options can be done quickly and on a large scale. Currently, roughly 500,000 aspirants have no chance to attend TE (this is calculated by subtracting the number of senior secondary school graduates who

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[67] Source: (Cerdan-Infantes 2013), 32.

were invited for SNMPTN or tested for SBMPTN by the number of students who earned seats at TEIs). Once they pass the relevant age, they are very unlikely to further their education. Postponing their inclusion to allow conditions for quality to improve offers them nothing.

People seek TE in large measure because of the prospect of economic returns for graduates in their working lives. TE graduates worldwide generally have lower unemployment, higher wages, and better working conditions than their less educated peers. This is generally the case in Indonesia as well (Tong 2013).

A key future direction of policy then will be to promote a greater range of relevant, high-quality programs, so that, inter alia, labor productivity increases and returns to TE remain robust. It is recognized that Indonesian labor markets are short of workers with qualified generic skills such as communications, computer science, and even writing. However, employees with good technical, leadership, and management skills are more difficult to find. Indonesian TE policy should promote this virtuous circle wherein high-quality, relevant programs boost productivity, and therefore wages, and in so doing also continue to attract more students to tertiary studies.

6.3   THE SUPPLY OF SKILLS AND LABOR MARKET DEMANDS

Indonesia's labor supply is incentivized to be responsive to market demand, but failed in doing so due to the constraints of weak and outdated information transmitted between both ends. Parents and students make judgments on whether or not to pursue education based on market information, and if they do pursue education, what exactly to pursue among all disciplines in TEIs. All these decisions rely on information and government stewardship.

The road to improving information systems for a better skill-matched labor force is long, costly, and difficult. The first step is to have a good understanding of what the current labor market looks like. The figure below shows some of the industries or jobs in Indonesia by their skill and salary level. Indonesia's labor market supply is generally responsive to demand. Indonesia has a relative young labor force, with a good amount aged 35 or younger. The market is growing with a steady speed and creates almost 500,000 new jobs each year. Indonesia's economic expansion is driven mainly by domestic consumption, which means it is immune from the instability of global economic forces or crisis.

	Skill level low		Skill level high
Salary low	Agriculture, plantation	Manufacturing, production	Teaching (basic), technician
↓	Fishery, cleaning	Tourism, sales	Engineering, legislative
Salary high	Petroleum, timber, natural gas	Entry level management	Management consulting, financial services

Figure 6.6. Some Examples of Job Types by Skill and Salary Levels in Indonesia[68]

People living in rural areas keep their traditional skills just enough to cover and maintain agriculture or fishery productivity. However, the country also faces issues with urbanization. It brings more people to the city desiring better social access and salaries. Indonesia's highest household income quintile is about 5 million IDR per month, which is about 500 USD, with a weekly income of 125 USD. This suggests that the majority of income are still from low-skilled jobs. In areas with higher population densities, there are clear needs for higher-skilled workers,

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[68] Source: Created by the author.

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but this usually comes with a shortage of people who possess the right skills. (Strauss, John, and Universitas Gadjah Mada 2004)

In the most recent Boston Consulting Group report "Growing pains, lasting advantage—Tackling Indonesia's talent challenges", there several facts regarding the future direction of Indonesia's labor market:

- Companies face two issues: lack of talent quantity and quality. There is a 40 percent to 60 percent gap between demand and supply for middle management jobs;

- Entry level demand problems are not as severe as filling in the management level positions. But by 2020, top companies will fail to fill half of entry level positions with qualified people;

- The service industry is looking at a rise from 36 percent to 41 percent of GDP from 2010 to 2015. This means an increase from 255 billion USD out of 709 billion USD in 2010 to 415 billion USD out of 1012 billion USD in 2015, a 160 billion USD[69] difference;

- Administrative/managerial jobs will rise from 36 percent to 55 percent of GDP from 2013 to 2020. This means an increase from 316 billion USD out of 878 billion USD in 2013 to 690 billion USD out of 1254 billion USD in 2020, more than a doubling increase;

- Technical skills shortfall: the market demands 50,000 engineers per year but the education system is only able to produce 30,000, a shortfall of 40 percent, and this will become a shortfall of 70 percent in 2025;

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[69] All IDR USD conversion is using current currency exchange rate.
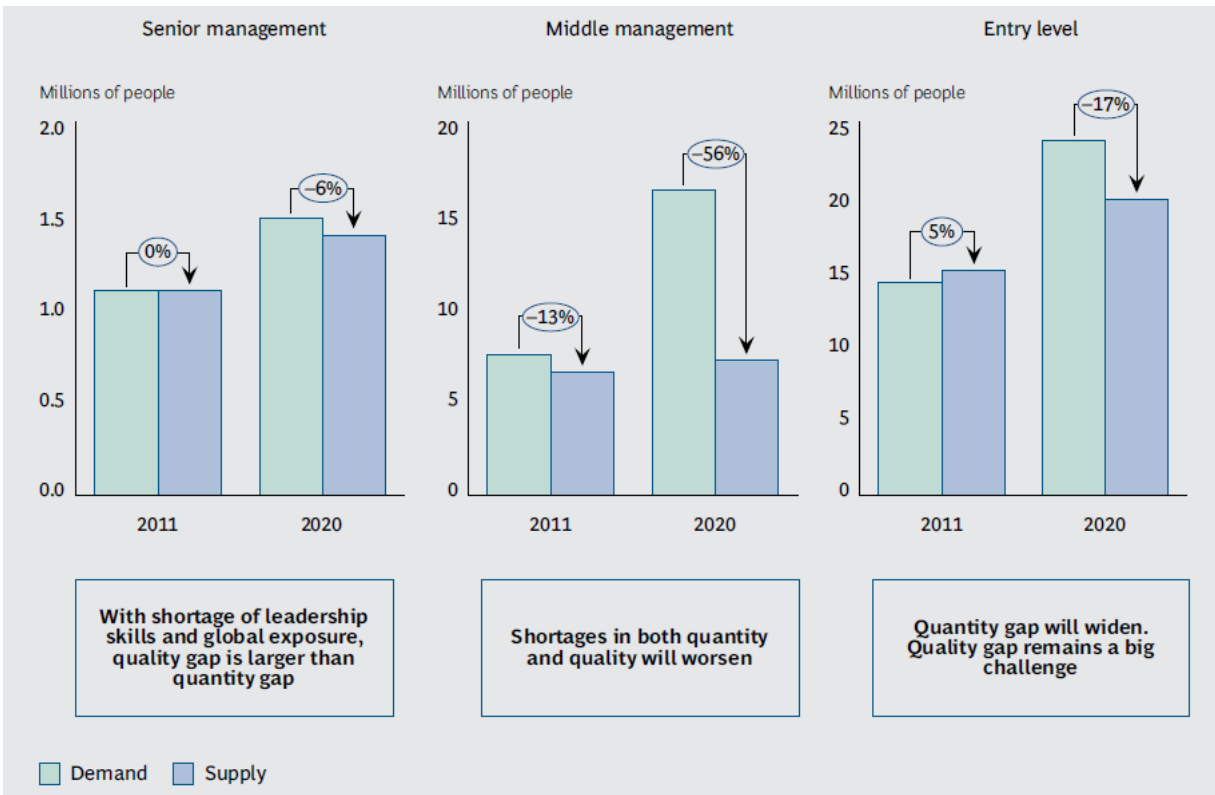
Figure 6.7. Talent Gaps at Senior, Middle and Entry Level of Career in Indonesia[70]

Indonesia's top companies have brand and university bias during recruitment. Most of the well-paying companies recruit only from a minority of TEIs due to lack of quality in small and unprestigious TEIs. In the current job market, 60 percent of graduates switch jobs within the first 3 years of employment, and more than 1/3 of them switch jobs more than twice within the first 3 years of employment. Instead of strengthening skills, they change to another job, and companies seek for better talent from other companies instead of investing in current employees (poaching rather than developing skills). Bad signals are sent to both employer and employee.

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[70] Source: (Tong 2013), 5.
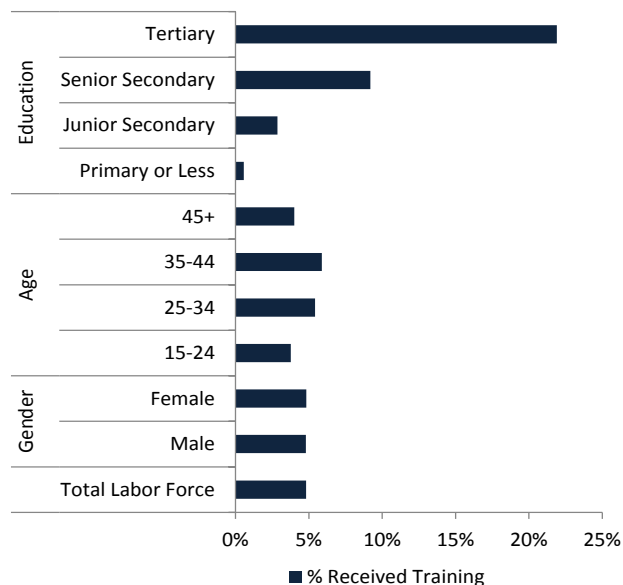
Figure 6.8. Share of Labor Force Reported Having Received Training[71]
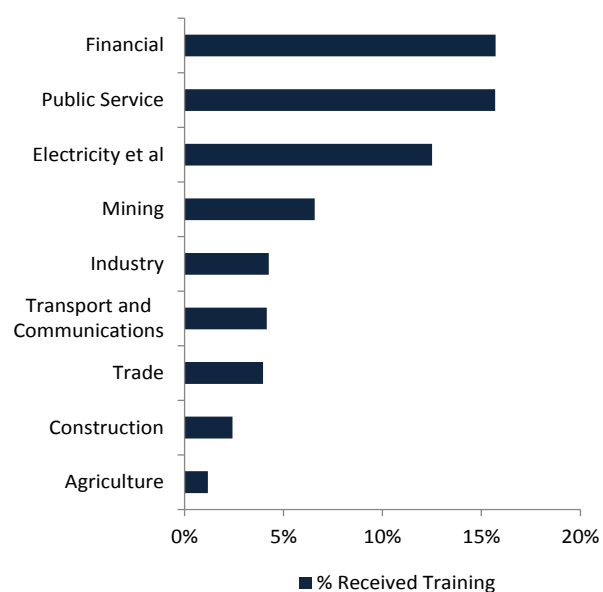
Figure 6.9. Share of Labor Force Report Having Received Training by Job Sector[72]

The figures above present a clearer view of employers' willingness to invest in their current employees through the provision of training. Virtually all employers think skill requirements will increase in the future. Merely 5 percent of the labor force reports having received training, and a large share of them come from the financial sector because often the sector requires certifications/licenses to maintain jobs. Others, such as teachers and health workers within the public service sector, also receive training more than other fields.

Indonesian companies are very weak on providing formal training to its employees. The East Asia and Pacific region has an average of 70 percent of employees receiving formal training in large companies with 100 or more employees, while Indonesian large companies have less than 40 percent. In the area of receiving formal training overseas or domestically, Indonesia has

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[71] Source: (Cerdan-Infantes 2013), 25.
[72] Source: (Cerdan-Infantes 2013), 25.

a very small share as well. The world average of providing formal training overseas is about 53

percent, whereas Indonesia has about 18 percent.
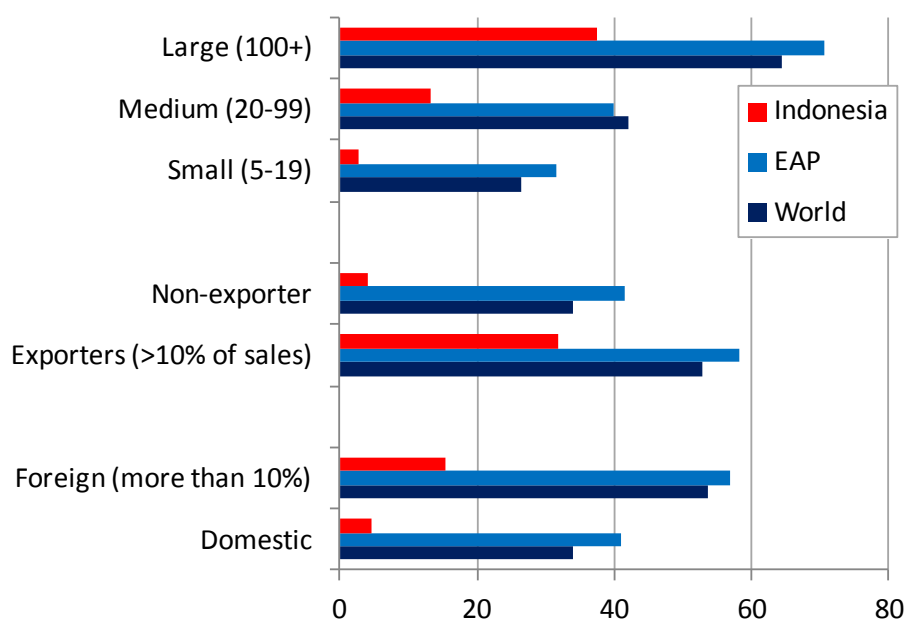
Figure 6.10. Share of Firms Providing Formal Training[73]

The job market is in need of better and more skilled workers to meet development. The

effort needs to be made from both ends. On one hand, with the awareness of the shortcomings of

Indonesia's current TE system, employers need to cooperate with institutions and commit to

human capital investment by providing larger scale support to enhance skills. On the other hand,

to meet the effort coming from the market side, schools need to know how to train and what to

teach so that students are better equipped upon entering the labor force. Usually, skills related to

the labor market come from the tertiary level, technical/vocational and academic TEIs included.

To support this claim, the next section will focus on the monetary returns to TE as compared to

other levels of education. It is common sense that rates of return to tertiary level degrees are

higher than those of other levels. But within different degree programs, returns differentiate

[73] Source: (Cerdan-Infantes 2013), 28.

greatly. This also signifies a clear policy direction for the Government on top of providing stewardship.

6.4   IN-DEPTH—SKILL LEVELS AND JOB TYPES

The figures below show how Indonesia's economy has been growing by each particular industry. Traditional and low-skilled industries such as Agriculture, Mining and Quarrying, and Construction are among the slowest growth industries in Indonesia. The absolute demand for labor in such industries is naturally declining, given the growth trend from 2001 to 2013.
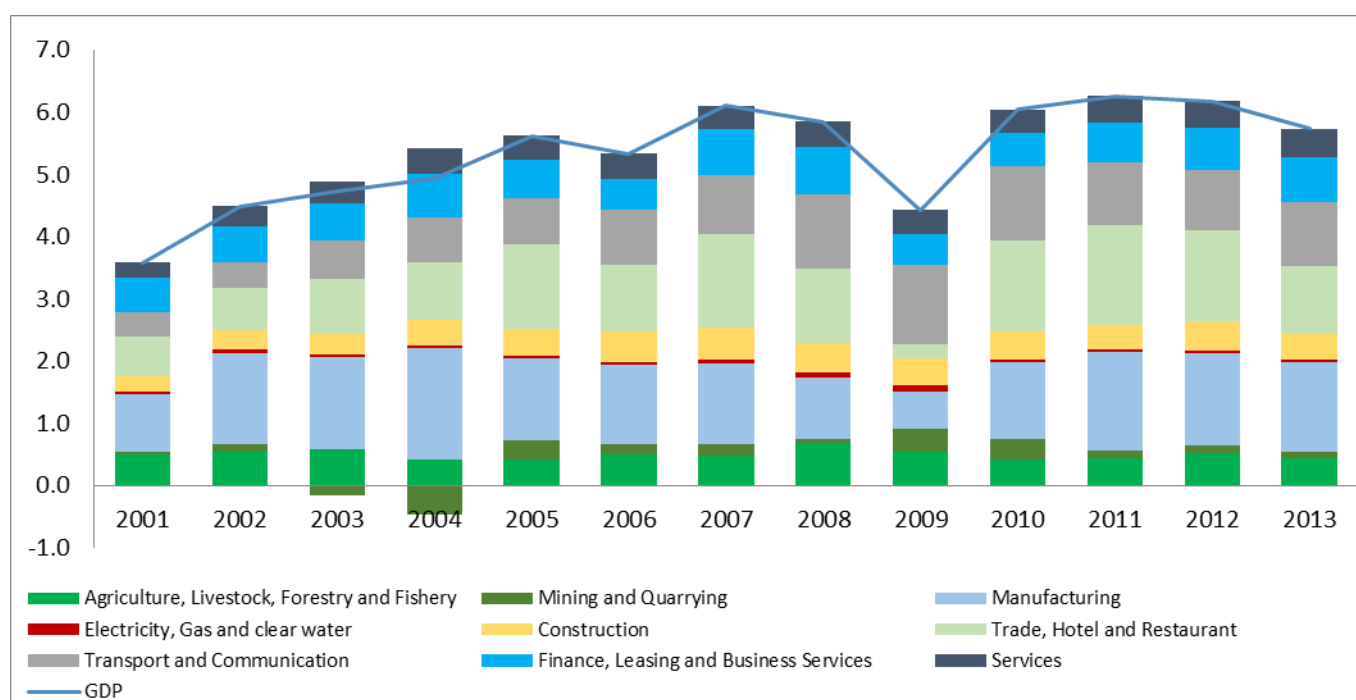
Figure 6.11. Real GDP Growth by Industry, Indonesia 2001-2013[74]

When we take a closer look at the employment number changes and trend, we can clearly see that Indonesia no longer demands an overwhelming amount of labor working in the slowly

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[74] Source: Created by the author with data from BPS.

growing industries. As a rising economy, it demands labor to work in more vigorous and fast changing industries such as service, trade, finance, etc. Those industries will require higher-skilled labor or works with specific training in such fields.
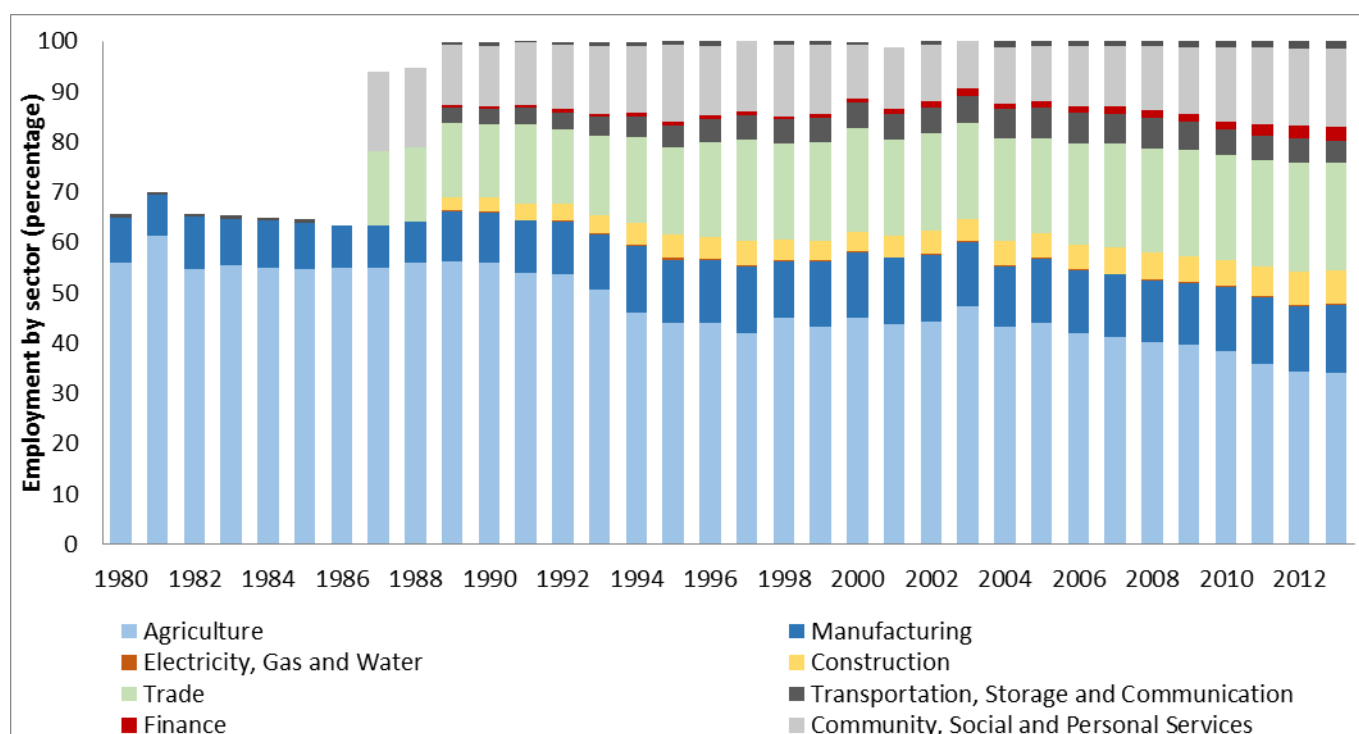
Figure 6.12. Employment by Sector, Indonesia, 1980 to 2012[75]

To be exact, what are the skills or degrees needed in those industries? One of the more reasonable approaches to answer this question is to look at what kind of degrees each kind of industry has been attracting over time, and how the trends have been changing. In the 2010 SAKERNAS data, the majority of basic or less degree holders work in agriculture, whereas the majority of tertiary degree holders work in manager, legislative, and senior government official type of jobs.

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[75] Source: Created by the author with data from BPS.
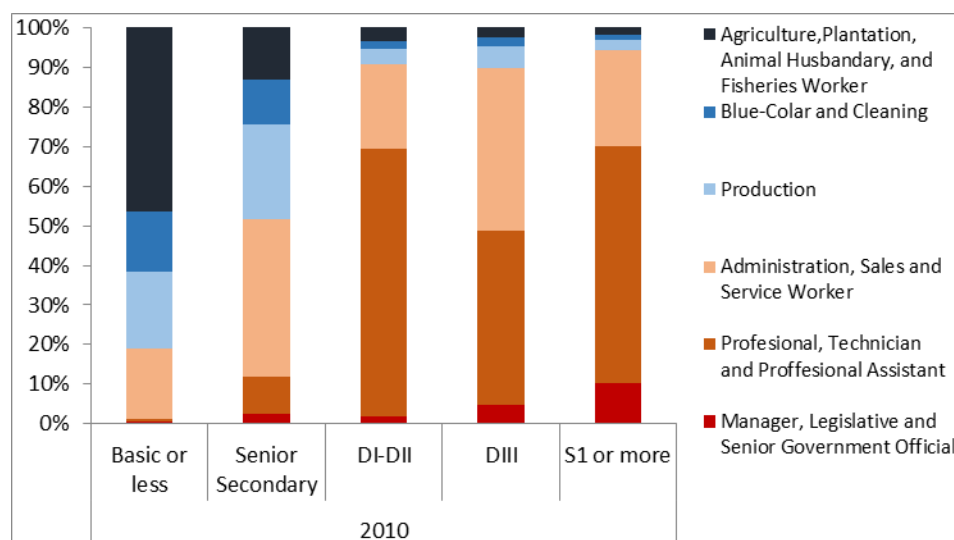
Figure 6.13. Distribution of Degree Holders among Different Job Types[76]

There are 9 main labor sectors in Indonesia. The National Labor Survey (SAKERNAS) captured the number of workers that work in each sector from 2001 to 2010. The sectors are: Agriculture, Forestry, Animal Husbandry, and Fisheries; Mining and Quarrying; Industry; Electricity, Water and Gas; Construction; Wholesale, Trade, Hotel, and Restaurant; Transportation and Communication; Financial and Real Estate; Public, and Individual Service. These 9 main sectors cover all levels of skills required for a particular type of job. The distinctions of skill level requirements are not as clear as within the job types.

There are 6 main job types in Indonesia's labor market per its requirement of skill levels: manager/legislative and government official, professional/technician, administration/sales and service, production, blue-collar and cleaning, agriculture/plantation/animal husbandry and fisheries. We could label each type of job by a number that indicates a skill level. For instance, a work that is "manager, legislative, and senior government official" will probably require the highest skill sets in the job market and thus is a skill level 6.

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[76] Source: (Cerdan-Infantes 2013), 30.

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Table 6.2. Job Type, Skill Level and Academic/Technical Training Required, 2001 and 2010[77]

Job Type	Skill level 2010	Least training required	% 2001 composition	% 2010 composition
Manager, Legislative and Senior Government Official	6	DIV or less	40% basic or less 27% senior secondary 23% DIV/SI or above	22% basic or less 38% senior secondary 1% DI&II 5% DIII 33% DIV/SI or above
Professional, Technician and Professional Assistant	5	Secondary / DI-DIII or less	3% basic or less 39% senior secondary 19% DI&II 11% DIII 29% DIV/SI or above	7% basic or less 30% senior secondary 11% DI&II 10% DIII 41% DIV/SI or above
Administration, Sales and Service Worker	4	Secondary or less	64% basic or less 29% senior secondary	51% basic or less 40% senior secondary
Production	3	Secondary or less	74% basic or less 24% senior secondary	69% basic or less 30% senior secondary
Blue-Collar and Cleaning	2	Basic or less (Primary + Junior Secondary)	79% basic or less 20% senior secondary	78% basic or less 21% senior secondary
Agriculture, Plantation, Animal Husbandry, and Fisheries Worker	1	Basic or less (Primary + Junior Secondary)	94% basic or less 6% senior secondary	90% basic or less 10% Senior secondary

By the number and distribution of workers holding certain types of degrees within each type of job from 2001 to 2010, we can draw a pattern that a skill level 6 job will most likely require workers with a completed DIV/SI or above degree training, skill level 5 possibly require a complete training at DIII level, and so on. The skill/degree requirement of course has been increasing during this time period. This is also because of the increase of higher degree holders available in the labor market year by year.

In jobs such as production and administration, sales, and services worker, there will be a very blurry distinction of skills requirements. It is unclear if they would prefer workers with complete DI-3 or a complete secondary level training. This is because there is no clear

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[77] Source: Created by the author with data from SAKERNAS.

distinction of the main level competence by these levels of education, especially for the technical and vocational nature of the work. The returns to DI&2 and Senior Secondary degrees are almost identical as well.

Table 6.3. Diploma (Technical) Track Key Competence[78]

Type of Diploma Program	Period of Study	Main Competence
Diploma I (DI)	1 year	Execute specific task and solve routine problems under guidance
DII	2 years	DI competence + Independence
DIII	3 years	DI + DII + ability to solve unfamiliar problems, supervise and guide in specific technical area
DIV	4 years	DI + DII + DIII + ability to apply skills in complex area, follow science & technology development in his/her expertise

In the National Labor Survey, 2001 data captured a total of 98 million, and 2010 data captured more than 107 million active workers in the labor force. Over this 10 years period, the absolute number of people who work on agriculture, plantation, animal husbandry, and fishery (mostly skill level 1) fell by 2 percent (773,649). Among medium technical or skill level workers, blue-collar and cleaning is the only category that experienced some increase. Other jobs, such as administration/sales and production, are shrinking during these years. There is an increase of about 4.3 million workers in professional, technical, and professional assistant types of job, and the manager/legislative and government official jobs tripled within these 10 years, with a labor headcount 1 million workers higher in 2010.

In 2001, 46 percent (34 million) of people with basic or less education worked in Agriculture (skill level 1), and this is 93 percent of the entire working population with basic or less degree. The rest of the workers who had basic or less education worked at administration/sales (skill level 4), production (skill level 3), and a small portion (10 percent)

[78] Source: (Cerdan-Infantes 2013), 15.

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worked at blue-collar and cleaning (skill level 2) types of jobs. All 44 percent of senior secondary graduates worked at medium skill level jobs: administration/sales (skill level 4) and 26 percent work at production (skill level 3), with only a few work on skill level 1 and 2 jobs. 65 percent of DI&II degree holders worked at professional/technical jobs (skill level 5). Most of the DIII degree holders worked at administration/sales (skill level 4) jobs and above, with only a few (10 percent) working at production (skill level 3). DIV/SI and above degree holders were mostly located at skill level 4 and above jobs, similar to DIII degree holders.

The pattern of degree holders performing at specific skill level jobs remained similar from 2001 to 2010. In 2010, more DIV/SI degree holders worked at skill level 6 jobs than 10 years ago.

If we look at the labor force composition of different degree holders, there is a more dramatic contrast. First of all, the total amount of manager/legislative/government official types of jobs tripled during these 10 years. The number of people who do manager/legislative/government official types of work with a completed basic or less degree increased 143,000, a 68 percent increase. Whereas, within the same job type, people who are DIV/SI or more degree holders increased four times (324 percent net increase) from 2001 to 2010, from 124,000 to 527,000, respectively. People who work at the professional/technical level with DIV/SI degrees also increased 244 percent over 10 years, from 908,000 to 3.1 million. The population with tertiary degrees doubled during these 10 years, from 5 million to 10 million, within which, the increase of DIV/SI degree holders was the largest proportion.
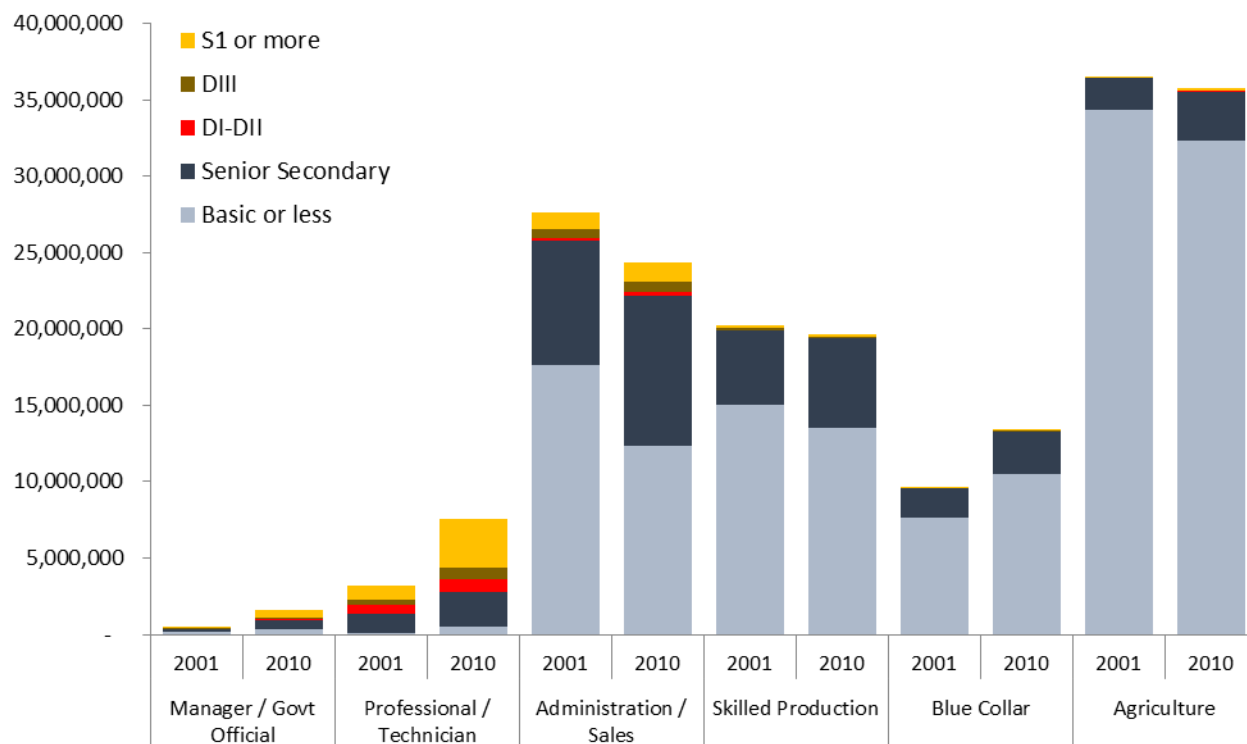
Figure 6.14. Job Type and Its Corresponding Number of Degree Holders, 2001 and 2010 [79]

On the other hand, when we look at the enrollment change by different degree types, the increase of graduates with DIV/SI or above degree will not meet the increase in job demand that requires labor with skills of DIV/SI or above.
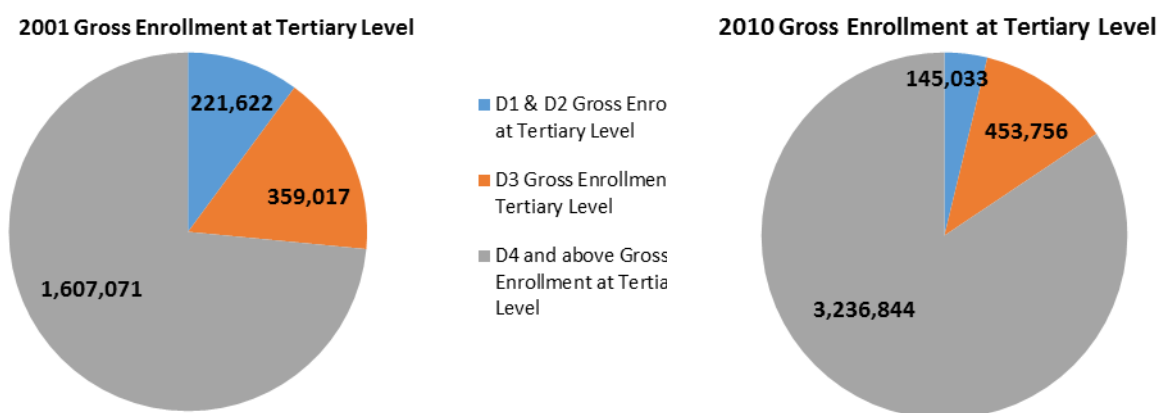
Figure 6.15. Tertiary Enrollment by Degree Type, Year 2001 and 2010 [80]

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[79] Source: Created by the author with data from SAKERNAS.

From 2001 to 2010, the amount of manager/legislative and government official workers tripled. 1 million more people work at manager/legislative and government official types of jobs, 4.3 million more people work at professional/technician types of job. As Indonesia is stepping into a mid-income, jobs that require DIV/SI or above degrees will increase even faster. However, from 2001 to 2010, we see an increase in enrollment of 1.6 million for DIV/SI only, and an increase of less than 100,000at the DIII level.

Table 6.4. Number and Percentage of Labor Change over Time by Job Type[81]

Job type and skill level	2001	2010	% change over time	# change over time
Manager, Legislative and Senior Government Official	529,827	1,594,989	+201.0%	+1,065,162
Professional, Technician and Professional Assistant	3,183,622	7,526,542	+136.4%	+4,342,920
Administration, Sales and Service Worker	27,599,770	24,364,855	-11.7%	-3,234,915
Production	20,202,560	19,652,624	-2.7%	-549,936
Blue-Collar and Cleaning	9,677,206	13,414,872	+38.6%	+3,737,666
Agriculture, Plantation, Animal Husbandry, and Fisheries Worker	36,508,012	35,734,363	-2.1%	-773,649

6.5   IN-DEPTH—RETURNS TO TERTIARY EDUCATION BY JOB SECTORS

Returns to graduates employed in private firms are increasing. Graduates who choose to work in private firms are finding robust demand and strong salaries. Returns in the natural resource, industry, and service sectors, all dominated by private firms, are higher than returns in the public sector. Moreover, returns in private sector firms are increasing or stable, while those in the public sector are declining. For reasons discussed below, many graduates lack the skills or the

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[80] Source: Created by the author with data from SUSENAS.
[81] Source: Created by the author with data from SAKERNAS.

inclination to work for private firms. Or, conversely, the number of graduates with the skills and the preference to work in the public sector exceeds its demand for new employees.
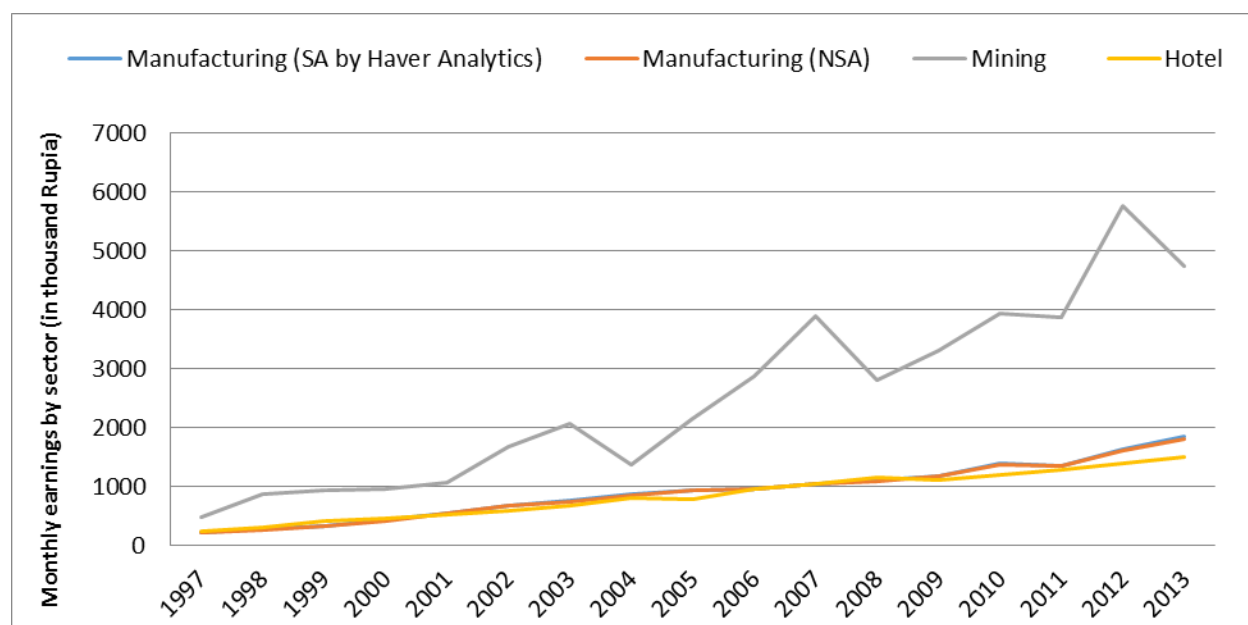
Figure 6.16. Monthly Earnings by Job Sector, Year 1997 to 2013, Indonesia[82]

The small observed declines to returns to TE for young graduates are likely due to mismatches rather than supply factors.   The recent observed declines are modest, but understanding the reasons is important. To the extent that it is just that graduates are becoming less scarce, this would be a natural result of the expansion, and the slow pace of the decline suggests that there is room. But if the decline is due to a mismatch between what graduates bring to the market and what employers demand, this may be a problem, especially as the system continues to grow quickly. Understanding where young graduates are employed may shed some light on trends in the education. Most of the increase in the number of graduates in the labor force has been in urban areas, though in percentage terms, the number of workers with TE in

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rural areas has more than doubled. At the same time, the returns to education in rural areas are falling quickly, which may partly explain the general returns to education.

TE in Indonesia over-produces workers in public services, especially teachers. Almost 2/3 of graduates are employed in sectors classified as public services (education, health care, government administration and other social services). The public services sector has also seen the fastest growth in recent years, mainly in the education sector. Almost ¾ of TE graduates working in the public services sector in Indonesia are employed in the education sector, mostly as teachers. Along with the over-supply of teachers, meanwhile, there is evidence that other sectors are severely skill-constrained, especially in professional and managerial level positions (Quinn 2003). The type of degree also seems to matter in the labor market, and the demand for Diploma I and Diploma II graduates is declining. In fact, the returns to education for Diploma I and Diploma II graduates have declined over the last 10 years. By 2010, a graduate of a Diploma I or Diploma II program only received about 10 percent more salary than a senior secondary graduate (versus 100 percent for DIII and above). Many senior secondary school graduates are turned away due to financial and socioeconomic constraints, especially from the bottom 3 quintiles.
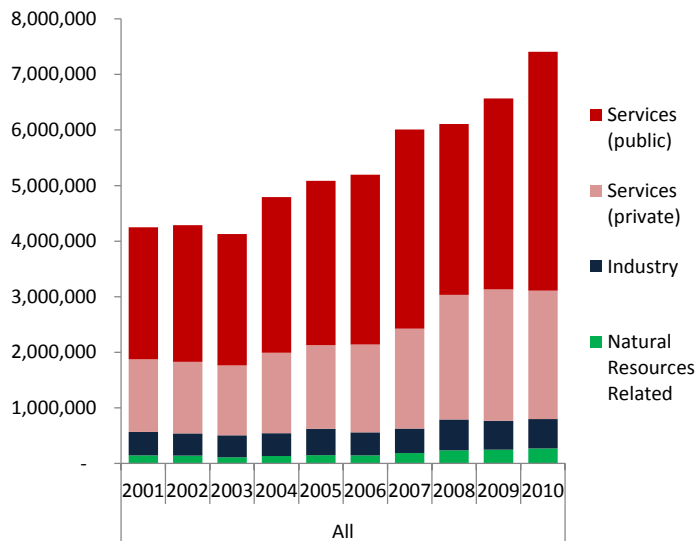
Figure 6.17. Number of Tertiary Education Graduates

Employed by All Big Sectors, 2001 to 2010[83]
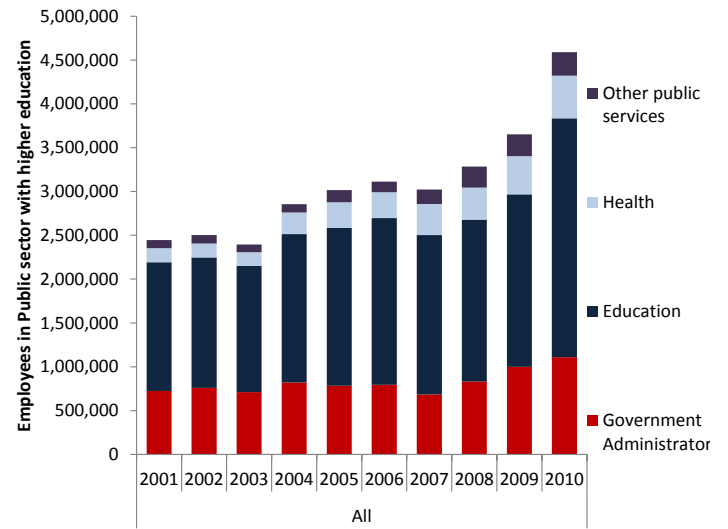
Figure 6.18. Number of Tertiary Education Graduates

Employed by Public Service Sector, 2001 to 2010 [84]
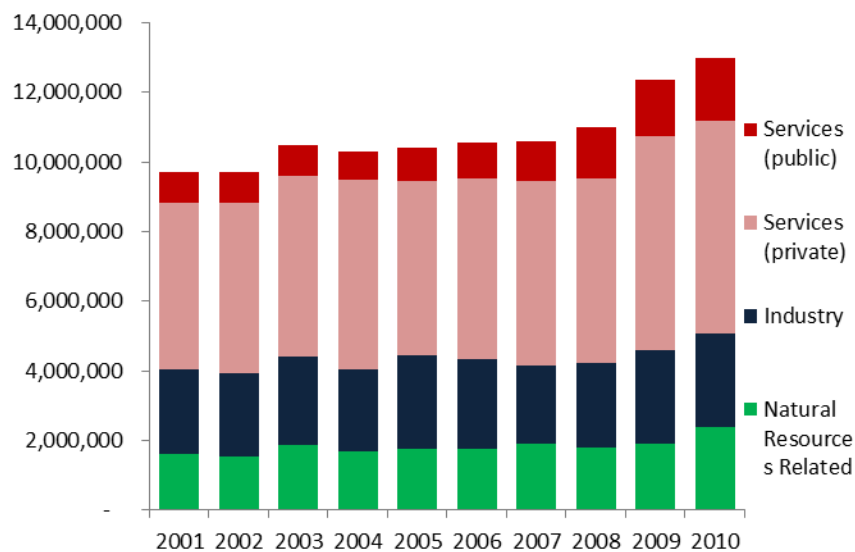
Figure 6.19. Number of Secondary Education Graduates Employed by Private Service Sector, 2001 to 2010 [85]

The sectoral distribution of employment goes a long way in explaining the broad

indicators of labor market performance of graduates. As this section has shown, when looking at

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[83] Source: (World Bank 2010), 46.
[84] Source: (World Bank 2010), 46.
[85] Source: (World Bank 2010), 46.

the entire labor force, TE graduates seem to be doing well. They are more likely to be active in the labor force, slightly more likely to be unemployed, receive better jobs at higher wages, and the returns to education, despite the large influx of graduates, seem to be largely constant. They are increasingly in high skilled "professional and managerial" positions. The fact that almost 60 percent are in public sector jobs and 40 percent are teachers goes a long way to explain these trends.

This influx of new graduates of teacher training colleges has resulted in a sharp drop in the returns to education in the public sector, driven by education. The education sector explains the declining trend in returns in the public sector. At the same time, the returns to education follow the opposite trend: returns in industry and private services are increasing, while returns in the public service sector are decreasing, driven mainly by returns to teacher training. Private services, which included wholesale trade, hospitality, financial sector, and construction, employ the second largest share of graduates—about 1/3 of graduates. The manufacturing sector employs a very small share of graduates—only 7 percent. Natural resource related sectors (agriculture, fisheries, and mining) employ a tiny share of graduates (3 percent). The fact that this is not preventing increased demand for teacher training programs despite the known oversupply of teachers is an indication that the system is not responding to labor market demands. Teachers and government administrators are unlikely to be the force for competitiveness in Indonesia. In fact, manufacturing and natural resource related sectors are larger providers of jobs and bigger contributors to GDP growth.

6.6   SUMMARY

This chapter examines TEQ through the lens of labor market observation. One effective method to assess the productivity and impact of a TE system is to look at the knowledge and skills produced by TEI and talent flowing into to the labor force. Unfortunately, despite progress in getting more students educated before going into the labor force, there is clear evidence of skills mismatches and disconnects between institutions and the labor market.

Indonesia hosts 10 million people with tertiary degrees (complete and incomplete), which comprises about 8 percent of the entire working population. Tertiary graduates are more likely to be active in the labor force, with the lowest unemployment rate of the population. Returns to TE are overwhelmingly higher than other levels and have been consistent during the past 10 years. Among different TE degrees, returns to DI-DIV are much lower than S degree holders. Returns to private sector employment for TE graduates continue to increase even though students still prefer public and government jobs, which are already experiencing an oversupply of labor.

Indonesia ranks relatively low compared to other developing economies in terms of tertiary degree holders in the labor force. With steadily increasing GDP growth each year, there is increasing demand for high-skilled or medium-skilled labor. This is possibly another reason why the labor force has been responding very positively to the growing amount of tertiary graduates each year.

With regard to the low return to DI to DIII degrees, it is important to note that "business-as-usual" polices will no longer work. An expanding TE system needs to go hand in hand with quality control, including strengthening current academic, technical, and professional degree programs and diversifying degree training to meet the demands coming from the labor market.

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More affordable options need to be granted to poorer students to fill the gap of skilled labor for the near future. High cost programs and unit costs usually yield negative returns.

To create a healthier job market and to face the skills shortfall in many job types, both pre-job training, which usually takes place in TEIs, and on-the-job training need to be strengthened to avoid labor "poaching" from the labor supply side and the unwillingness to invest in current employees from the employer demand side. In order to avoid stepping into the middle income trap, Indonesia should focus on its tertiary education system in two aspects: expansion and affordability for the majority of students, and diversifying degree programs to create more efficient short degree programs in exchange for positive fast results.

7.0 TERTIARY EDUCATION QUALITY MEASUREMENT THROUGH QUALITY ASSURANCE SYSTEM

In this chapter, the author will evaluate Indonesia's TEQ through the assessment of its quality assurance system. There are three parts to this chapter: (i) an assessment of the current quality assurance system; (ii) the quality assurance framework upon which Indonesia's QA system is based; (iii) TE governance systems in response to the desire for quality enhancement.

Quality assurance (QA) of TE is a challenge many countries face in expanding TE. Some QA agencies follow the accreditation model, which is an evaluation of whether an institution (or program) qualifies for a certain status or threshold level. The 'yes or no' outcome of accreditation may have implications for the institution (or program) in terms of recognition as an institution of higher learning or approval for offering degree granting programs or for public funding. Some agencies follow the assessment approach. The typical outcome of an assessment is a graded outcome—numeric, literal, or descriptive. An assessment asks: 'how good are your outputs?' Academic audits are focused on those processes by which an institution monitors its own academic standards. Audits generally result in public reports. Examples of all of these practices are found in the region. Indonesia is one of the countries that follow a combination of both internal and external approaches, which respectively are the self-evaluation process and the accreditation. While an internal quality audit could be done by each university in various forms,

accreditation will be a set of assessment activities aimed at the appropriateness of study programs of institutions toward a set of standards (Jacob 2012).

7.1   THE ACCREDITATION SYSTEM

The accreditation system is centered on the National Accreditation Board (BAN-PT in its Bahasa acronym) and is considered—along with faculty credentials and productivity—to be a main proponent of improved quality.   BAN-PT was established in 1994 as an independent body appointed by and reporting to the Minister of Education.   With complete budget control from the ministry, BAN-PT accredits mostly degree programs, including Bachelor's, Master's, and Ph.D. programs.   It also conducted institutional accreditation in 2007-08, but a high failure rate forced BAN-PT to suspend this and review its instruments. Institutional accreditation was then reinstated in 2011.

The accreditation process involves self-evaluation by the program using standardized questionnaires, desk review, and evaluation of these by BAN-PT assessors. In theory, site visits are done, but in practice very few site visits have been conducted due to budget constraints. The process concludes with a review of the revised evaluation report by the BAN-PT Council as the basis of the accreditation decision.   Accredited programs receive recommendations for development and improvement. Programs that are denied accreditation are subject to a closure by DGHE.   By law, accreditation is compulsory and accreditation will become a license to open a study program.   Unaccredited programs are not allowed to produce certificates for their graduates and their graduates will not be recognized by DGHE.

Accreditation of a study program is valid for 5 years, and needs to be renewed at the end of its 5 year term. There are around 4,000 TEIs and 16,770 study programs in Indonesia. As of December 2012, 9,638 study programs had been accredited and 7,132 were in need of accreditation. BAN-PT's annual budget only allows them to accredit 2,200 study programs per year.

Table 7.1. The Accreditation Results (Programs) from BAN-PT and DGHE as of 2012[86]

Public TEI				Private TEI				Total # Public & Private study programs	Accredited study program	%
# of study program	Valid	Expired	Not yet accredited	# of study program	Valid	Expired	Not yet accredited			
4721	2879	639	1203	12049	6759	1253	4037	16770	9638	57.47

Many countries initiating formal accreditation processes in TE concentrate on program accreditation. For countries with new and inexperienced accreditation agencies, the stakes are lower when one can fail to accredit a single program and leave the bulk of any given institution in place. Institutional accreditation is higher stakes because institutions that fail to win accreditation are often candidates for forced closure. Forcing the closure of a TEI is complicated and difficult, and tests the institutional capacity of the entity charged with the responsibility.

Program accreditation may achieve some of the same ends while avoiding major conflicts, but often it creates much more work and is less effective at promoting quality. Institutional issues, such as whether "funding follows priorities", can be much more consequential for quality than reviews of the content of programs. By emphasizing program accreditation, countries often create a large and expensive system with real but limited value. Program accreditation may be able to identify the programs that fall most egregiously short of required standards, but they often lack the impact that comes with labeling an institution as

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[86] Source: Created by the author with data from MOEC.

substandard. Institutional accreditations generally offer a better and more effective way to promote quality and relevance. BAN-PT has the option of focusing on either program accreditation or institutional accreditation only, instead of both at the same time. This singular accreditation mandate of BAN-PT could potentially increase efficiency and effectiveness of quality assurance.

The Government of Indonesia has progressed in strengthening its accreditation system. The new law 12/2012 regulated that all TEIs have to receive valid accreditation by 2015. New ministerial regulations are still under debate with regard to the specifics of establishing an independent accreditation body, which focuses on accrediting study programs only. TEI accreditation will become BAN-PT's only responsibility.

Indonesia is experiencing the exponential growth of TE since 2004, when roughly 2,000 TEIs and 10,000 programs existed in the country. By 2007, the number of TEIs grew by 30 percent and reached 2,836, while study programs increased 35 percent and reached 14,294. As of today, there are a total of 130 public and more than 3,400 private TEIs offering close to 20,000 degree programs. Public TEIs account for only 4 percent of the total number of institutions but enroll 32 percent of the total student population. The Director General of Higher Education (DGHE) has an initiative to move towards becoming a guarantor of quality assurance by establishing the National Accreditation Agency for Higher Education (Badan Akreditasi Nasional Perguruan Tinggi, in short, "BAN-PT"). This Agency was established in 1994 at the initiative of government and began operation in 1996. BAN-PT is responsible for developing the national accreditation system and accrediting both public and private TEIs in Indonesia by Higher Education Law No. 12/2012. The total number of active accredited programs is 13,349, with roughly 6,000 yet-to-be accredited.

BAN-PT's accreditation of TE programs and institutions is used by the government for funding purposes and accreditation outcomes are now increasingly being used by employers from both public and private sectors in determining the quality of professional education. In addition, prospective students also use the accreditation results to make decisions about applying to particular institutions and study programs. Overseas employers as well as external quality assurance bodies in various parts of the world, such as New Zealand, Malaysia, and South Africa, also consult BAN-PT on its accreditation of study programs and institutions. Table IV represents the accreditation level and status for Indonesian TEIs. The BAN-PIT process classifieds TEIs into a range of four levels: A-Satisfactory to D-Unsatisfactory.

Table 7.2. Accreditation Level and Status for Indonesia TEIs, Indonesia, 2013[87]

Program	Count	%	Accreditation Level								Accreditation Status			
			A	%	B	%	C	%	D	%	Active	%	Expired	%
DI	17	0.1%	2	0.1%	10	0.1%	5	0.1%	0	0.0%	8	0.1%	9	0.3%
DII	93	0.6%	4	0.2%	47	0.7%	42	0.5%	0	0.0%	7	0.1%	86	3.0%
DIII	3348	20.7%	137	8.3%	1226	18.1%	1978	25.4%	7	41.2%	2726	20.4%	622	21.7%
DIV	244	1.5%	22	1.3%	135	2.0%	87	1.1%	0	0.0%	224	1.7%	20	0.7%
SI	10750	66.3%	1022	62.2%	4455	65.9%	5262	67.6%	10	58.8%	8820	66.1%	1931	67.5%
SII	1455	9.0%	334	20.3%	747	11.1%	374	4.8%	0	0.0%	1280	9.6%	175	6.1%
SIII	301	1.9%	123	7.5%	140	2.1%	37	0.5%	0	0.0%	284	2.1%	18	0.6%
Total	16208	100%	1644	100.0%	6760	100.0%	7785	100.0%	17	100.0%	13349	100.0%	2861	100.0%
Accreditation Level %			10.1%		41.7%		48.0%		0.1%		82.4%		17.7%	

Preliminary analysis shows that study programs in public TEIs have better accreditation levels than those in private institutions. Of all "A" - accredited study programs, 75 percent of them are public TEIs. Out of the total study programs, only 10 percent have level A accreditation, while almost half of them (48 percent) have C level and another 42 percent B level. For Diploma II, Diploma IV, and Doctorate, there is a consistently higher share of public TEIs with A and B accreditation levels, with almost all "A"--accredited Doctorate study programs being public TEIs. Also, for Diploma II Teacher Training, more than 70 percent of

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[87] Source: Created by the author with data from BAN-PT.

those with A and B accreditation are from public TEIs (although, note that the majority has expired). Among the listed DI, there is a bigger share of private TEIs with B accreditation level.

Under the BAN-PT accreditation system, institutions or programs are also asked to respond to standards through a written report. This is part of the self-evaluation, which takes several months and involves various stakeholders such as administrative and teaching staff, students, and employers. Program self-evaluation tools are produced by the BAN-PT and used generically for all academic study programs. Study programs have to complete three set of forms: self-evaluation reports, student programs, and forms for the TEI, which is carrying the study program. The set of self-evaluation tools include: (i) a report entitled "The Academic Document"[88]; (ii) standards and accreditation procedures; (iii) study program forms; (iv) faculty/advanced school forms; (v) guidelines for completing forms; (vi) guidelines for the evaluation of completed forms; (vii) a matrix for the evaluation of completed forms; (viii) guidelines for field assessments; and (ix) guidelines for the completion of the self-evaluation.

External peer review, which is conducted by a team of experts who belong to the TE community or professional community, reviews the self-evaluation report. After the desk evaluation, assessors conduct a 2-day site visit to particular study program or institution and complete the review report to submit to BAN-PT. The team of assessors determines the score for accreditation decisions.

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[88] The Academic Document is a part of the information package which contains information about the legal rationale for accreditation. It is not a form which has to be completed by the TEI, study program or assessor.

7.2 QUALIFICATION FRAMEWORK AND QUALITY ASSURANCE ISSUES

In 2012, the Indonesian Qualification Framework (IQF) was mandated by Presidential Decree No. 8/2012. The IQF is intended to serve as a reference point for all education and training providers. It is an instrument that identifies various qualification levels vis-à-vis competencies. It seeks to compare, balance, and integrate education and training across different providers and sectors, and to include work experience, in a scheme of competencies for specific occupational requirements. The newly introduced Law No. 12/2012 on Higher Education provides a stronger legal basis for IQF. The IQF consists of nine levels of qualifications derived across four different pathways, namely education, job experience, professional certification, and individual learning or self-learning (Figure below). As envisioned, the IQF is designed to be utilized to strengthen the quantity and quality of manpower in the country, increase academic mobility and collaboration between universities across various countries in the world, and promote the country's recognition, both regionally and internationally.
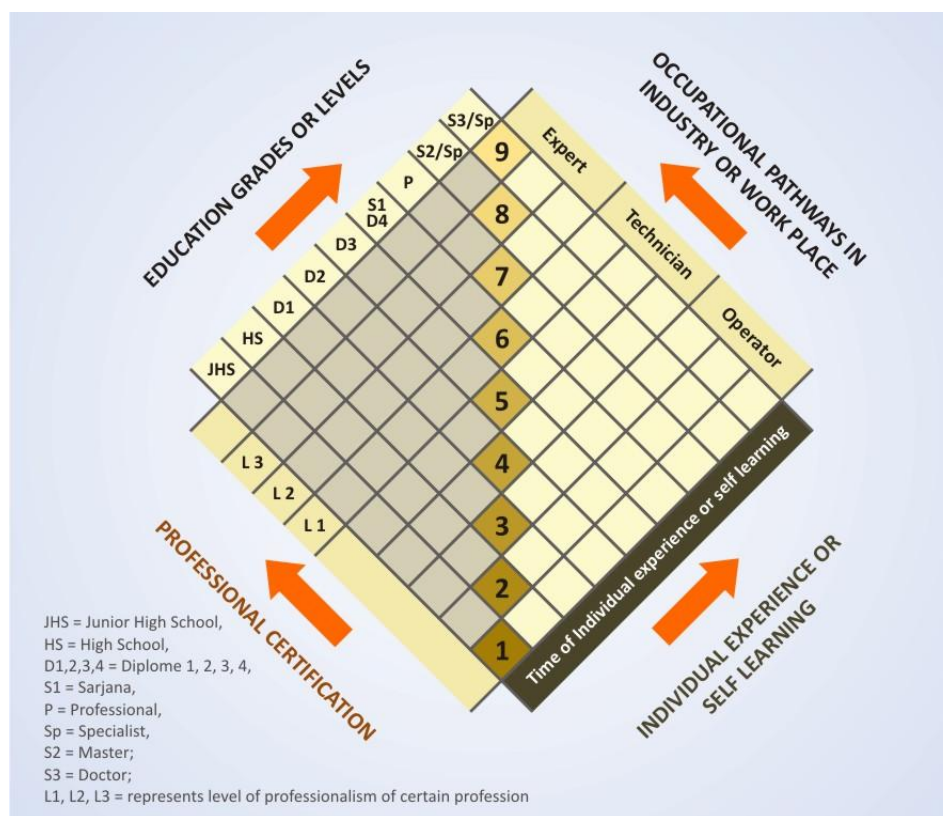
Figure 7.1. Indonesia Qualification Framework[89]

Quality issues and the search for methods of quality assurance are gaining a central place in TE policy discussions. Several Southeast Asian countries face similar concerns in assuring quality in their TE systems. These constrains also exist in Indonesia:

- Insufficient funding

- Insufficient quality assurance experts, tools, and knowledge

- Lack of awareness of assurance implementation

- Limited participation in voluntary quality assurance processes

- Quality assurance results not incorporated into institutions' quality improvement processes

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[89] Source: MOEC.

- Limited national quality assurance development strategies

- Overlap of quality assurance functions in government

The interpretation of the above constraints from Indonesia's perspective would be the government controlled funding and the lack of fiscal autonomy. BAN-PT has never been directly involved in the financial management of its budget. BAN-PT's budget was rising slowly and steadily from approximately IDR 43 billion in 2007 to IDR 100 billion in 2011. However, in 2012, the Indonesian government announced the insufficiency of accreditation work completed by BAN-PT, with 6,000 programs yet-to-be-accredited. The reasons are multifold and include BAN-PT's lack of capacity and thousands of study programs never having been applied for accreditation since their establishment.

In addition, some programs are not yet accredited by BAN-PT because of the complex governance structure of Indonesian TE. The Ministry of Health (MOH) and the Ministry of Home Affairs (MOHA) had governed a large number of TEIs, roughly 110, and used their own accreditation system (which differs from the BAN-PT system). In 2012, MOH and MOHA handed over the accreditation authority to the Ministry of Education and Culture (MOEC) to ensure the institutions comply with the law and follow the same accreditation systems. The idiosyncrasies of the TEI management systems used by different Ministries make regularizing accreditation in Indonesia a challenge. Table V represents the various TEIs managed by each ministry in Indonesia.

Table 7.3. Number of Tertiary Education Institutions under Various Ministries, Indonesia, 2013[90][91]

Ministry of	Public TEI Number	Private TEI Number
Education and Culture	98	3119
Religious Affairs	61	378
Home Affairs	72	0
Health	38	0
Industry	7	0
Agriculture	5	0
Transport	9	0
Tourism	4	0
Marine & Aquaculture	4	0
Defense & Police	7	0
Others	11	0
Total	316	3497

7.3   TERTIARY EDUCATION GOVERNANCE—IN RESPONSE TO QUALITY ASSURANCE ISSUES

The QA system and its framework vastly need improvement. While the GOI is trying to tackle budget and personnel issues, there are other options for TEIs to ensure quality. In most developing countries, institutional autonomy is one of the main reforms that governments carry out in exchange for institutional-level accountability. In this case, accountability works hand in hand with the QA/accreditation system to ensure that tertiary education does not sacrifice quality along with system expansion. To fundamentally endow TEIs with autonomy, the government

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[90] Please note that the numbers presented in this table, which are pulled out from the official DIKTI website have some level of inconsistency with other numbers provided within MOEC. Reason is the Statistics Department within MOEC has different data source and managing approaches than DIKTI/DGHE. It is impossible to judge which set of data are more outdated.
[91] Source: Created by the author with data from MOEC and MORA.

needs to fully understand how its TEIs are governed and through what channel autonomy could be provided.

Indonesian TEIs can be grouped into three broad categories based on different governing mechanisms: public TEIs, private TEIs, and autonomous state-owned legal universities (PTN-BHs/BHMNs). Public TEIs' by-laws, which govern all decision-making processes and academic and administrative structures, are approved by decrees from the DGHE and signed by the Minister of Education and Culture. (In contrast, private TEIs' by-laws are approved by the Chief Executives of the private foundations that fund them, while PTN-BHs' by-laws are approved by government regulations produced by inter-Ministry decisions and signed by the President of Indonesia.) Once the by-laws for a public TEI have been approved via MOEC statute, it has very little latitude to make decisions or structural changes. All proposed modifications to the by-laws require MOEC re-approval.

Moreover, the MOEC has a great deal of control over public TEIs' institutional leadership and management teams. Following Government Regulation 66/2010, public TEIs are governed by four major entities.

- The Rector (or Director or Chairperson), as the chief executive of a TEI, is responsible for the overall management of the institution. The person in this position is usually supported by three or four deputies.

- The Senate oversees the management of academic affairs. It is the main determinant in the governance process and is chaired by the Rector.

- The Oversight Unit oversees the management of non-academic affairs (with an emphasis on financial affairs).

- The Advisory Board advises TEI management on non-academic matters.

The Senate is responsible for identifying and screening Rector/Director/Chairperson candidates, but the Minister of Education and Culture controls 35 percent of the voting rights for determining who will ultimately fill the Rector/Director/Chairperson position. This control becomes especially relevant when the Minister has a political interest in the outcome of the election. Even after the Rector/Director/Chairperson has been elected, he or she reports to the Minister and is subject to dismissal by the Minister. Although it should be noted that the Minister has never actually dismissed a Rector/Director/Chairperson, it is clear that the Minister wields tremendous power over the selection and work of the people in this position within public TEIs.

The Senate is, in theory, the governing entity with the most power. However, because it is chaired by a TEI's Rector/Director/Chairperson (who is so closely influenced by the Minister of the MOEC), it has limited ability to make independent decisions on behalf of the institution. Furthermore, governance bodies like the Oversight Unit and the Advisory Board (and even the Boards of Trustees at PTN-BHs) do not have nearly enough external representation to ensure that TEIs are accountable to stakeholders and the public.

Because of these limitations on organizational autonomy, it is virtually impossible for public TEIs to make appropriate strategic decisions for themselves. If executive leaders and bodies like Senates were empowered to control university affairs to a greater extent, they would be able to create policies and administrative structures that were more conducive to institutional progress.

Such policies might allow them, for example, to quickly respond to new demands from emerging study areas in fast-moving fields such as ICT. Or they might allow an institution to set institutional goals for quality that could be backed up by alignment of other institutional

resources. The ability of Indonesian TEIs to match the agility of their peers in other parts of the world is directly affected by their ability to govern themselves.

Staffing. Public TEIs in Indonesia have very little latitude in making staffing decisions. All teaching and administrative staff are considered civil servants, so hiring and firing are handled by the State Civil Service Agency (BKN) rather than by the TEIs themselves. Such centralized control of human resources leads to a rigidity that is not at all conducive to academic freedom or institutional autonomy. For example, newly-recruited teachers are granted lifetime tenure after a maximum of two years at a TEI and face long, bureaucratic processes if they wish to move from one TEI to another. (Within this context, it is worth noting that MOEC Decree 84/2013 demonstrates the government's intention to impose stricter control over all TEI recruitment processes. However, at the same time, the Indonesian parliament is now debating a bill that would give TEIs more control over lecturer recruitment by hiring them to contracts that allow for more mobility.) Staff appointments tend to be based more on seniority and loyalty than on merit, and promotions generally occur automatically after employees have fulfilled specific administrative requirements. Termination is extremely rare, even for staff members whose performance is poor. In fact, TEI leaders do not even have full authority to adjust salaries and incentives in response to employees' performance. Instead, remuneration (like promotion) follows civil service regulations and is based largely on administrative criteria.

Any fully-functional TEI must have the ability to recruit and hire the faculty and staff members that it desires. Successful TEIs around the world are empowered to pay salaries commensurate with employees' abilities, dismiss underperforming employees, etc. Indonesia's civil service approach to TEI employment diminishes the quality of teaching and encourages staff members to be more reactive than proactive. Professors and researchers under the civil

service system engage in less creative projects and activities and take less of the risks that tend to correlate with innovation and progress. Until Indonesian TEIs are allowed to hire the best available person for each position, Indonesian TE students will experience lower-quality educational experiences.

It is hard to overstate the negative effects of the lack of autonomy in staffing decisions. Indonesians who work as lecturers and instructors routinely talk of their frustration with a system that treats the excellent and the very mediocre in exactly the same way. They describe a system where the smartest path forward is to take one's paycheck with as little effort as possible to help students, or where the effort stems from the instructor's personal dedication. This stands in stark contrast to many systems worldwide in which professors and instructors face clear rewards and disincentives for performance, and their behavior is significantly influenced by these.

Academics. Public TEIs have very limited autonomy with respect to academics. By setting TEIs' budgets and detailing appropriate activities and indicators, the MOEC ensures that there is close alignment between TEIs' individual strategies and its own strategy. It regulates the programs that TEIs may offer, the duration of these programs, standards for degrees, etc. Indeed, TEIs cannot offer new degree programs or discontinue old ones without the MOEC's permission, and the process for obtaining approval is long and complex enough that it discourages many TEIs from trying to expand their academic offerings. Furthermore, despite numerous reports of irregularities, the DGHE rarely uses its power to close problematic programs.

However, TEIs do have some academic autonomy. For instance, they are entitled to set their own curricula, which they do in consultation with various non-governmental academic and professional organizations. More significantly, they have complete control over the decision to admit or reject individual applicants and the number of applicants to admit to each degree

program in a given year. To be sure, though, the government sets some admissions standards. TEI entrants must hold high school diplomas, and the Minister of Education and Culture has recently mandated that at least 50 percent of new students be admitted under the National Admission Scheme. New laws also require that specific percentages of entrant classes come from underprivileged backgrounds and less developed regions of the country.

Fundamentally, although the government exercises a fair amount of control over some aspects of TEI academics, it also offers individual institutions some meaningful powers. Still, Indonesian TEIs that aspire to compete with their counterparts in other parts of the world need to have more control over their academic programming so that they can respond to labor market trends by offering students more relevant training. Public TEIs need to be allowed to open and close degree programs as they see fit to avoid stagnation and promote the development of critical skills for the country's future.

7.4   SUMMARY

This chapter goes into detail on Indonesia's TE QA system. When evaluating a country's TEQ, the QA system usually is the first part of the discussion. However, this paper intends to present a different perspective—largely investing in building a QA system that will not be the most efficient approach to enhance quality unless equity, relevance, and inputs are addressed in a TE system.

In Indonesia, QA experiences the usual difficulties such as insufficient funding, insufficient quality assurance experts and knowledge, lack of awareness of assurance implantation, limited participation, assurance not effectively translating into quality

improvement, lack of strategies, and so on. A country could have the most perfect quality assurance framework and sufficient funding support in a QA system, but mediocre TE quality. The reason why this study does not heavily focus on QA analyses is that the author believes TEQ will not be enhanced unless the other driving factors improve at the same time. This scenario applies to Indonesia and many other rising economies in the world that seek to improve their education systems.

Given the limited public funding that could be channeled into BAN-PT and the potential long time the government will take to establish independent accreditation agencies, granting more autonomy to TEIs could be a short-term remedy to increase institutional accountability. Institutional autonomy intends to give TEIs more room to generate revenue, determine tuition fees, flexibility in staffing, and utilizing existing resources.

The final part of this chapter focused on the governance analysis of the TE system in Indonesia. The rigidity of the current governing mechanism has been hindering TEIs from going further. Without flexibility in spending, staffing, academic arrangements, tuition, and so on, it will be very difficult for institutions to generate knowledge, produce R&D output, and attract academically or technically talented aspirants. The GOI needs to consider inefficient spending, such as compensation for faculty salaries in private TEIs. If the accreditation system cannot be improved in the short-term, TEIs will need to maximize resources available in order to increase productivity and international competiveness.

8.0   CONCLUSIONS AND POLICY RECOMMENDATIONS

As Indonesia is stepping into a transition period and contending for a seat as a high-income country, it can only focus on a few priorities at a time. For better TE development, at least four of them apply to the case of Indonesia at the current stage. Indonesia needs a skilled workforce that can help to sustain high levels of productivity. This in turn would contribute to levels of economic growth, which could propel it toward high-income status. As the ranks of the highly educated grow, those with less education would be fewer. The latter group would experience less competition for the dwindling amounts of low and unskilled work, and therefore earn higher wages than they might if overall aggregate education levels remained low.

From the beginning of this dissertation, issues of access and equity, labor market, and quality are discussed in a certain level of depth. In order to address issues in a timely and effective manner, priorities for policies should include: (i) a view of TE as a good option for most if not all Senior secondary school graduates, and the provision of relevant, affordable opportunities to all; (ii) financial aid policies and financial assistance to students and aspiring students from poorer families; (iii) a notion of quality and relevance in TE broad enough to encompass excellence on a variety of levels—from the nation's leading universities to its most humble academies and community colleges; (iv) rules, regulations, and financing to simultaneously give institutions greater freedom and to push them to be the best that they can be.

To be concise, the Government of Indonesia needs to focus on the following four directions for TE:

1. Continue and expedite expansion of enrollment for "first-generation" entrants and new Senior secondary school graduates;

2. Revamp and broaden the student financial aid system;

3. Increase quality and improve relevance of TE; and

4. Provide more autonomy in exchange for more accountability.

The four policy recommendations are proposed by the author for several reasons. Indonesia is still struggling with its under-educated teenagers who come out of senior secondary schools and expect to enter TEIs. Most of these children who eventually earn seats in TEIs are either elite students or come from affluent family backgrounds. The underprivileged will need to rely on public and government support, such as tuition deduction and scholarships. With an expanded TE system, equity would be the next concern—how to ensure students who aspire to enter TEIs actually receive financial assistance and earn their seats in college. Diversifying the TE system goes hand in hand with system expansion. Indonesia clearly is short of talent from certain skill sets, and has a surplus in its government and public sectors. Students need to be more efficiently educated and trained so as to contribute to social productivity. The author also highly recommends that Indonesia reform its governing system over TEIs. Instead of putting large amounts of funding only into BAN-PT, granting more autonomy to large scale TEIs would be another effective way to enhance TE system quality. In the following parts of this chapter, details of the above four policy recommendations will be presented.

8.1 CONTINUE AND EXPEDITE EXPANSION OF ENROLLMENT FOR "FIRST-GENERATION" ENTRANTS AND NEW SENIOR SECONDARY SCHOOL GRADUATES

To expedite expansion, Government stewardship is needed to facilitate and create conditions that promote a greater range of good quality providers and degree options at affordable levels. Aside from benefits to income and wages, greater TE attainment and relevance could produce other benefits. As this dissertation has presented in the Equity and Access section, access to TE in Indonesia is greatly influenced by students' socioeconomic status and household income. Other factors, such as geographical location, rurality and remoteness, and ethnic and linguistic differences also impact access and equity.

Japan, Korea, Finland, and, more recently, Singapore and China (Shanghai in particular) have built world-class education systems in a single generation. Matriculation to some type of post-secondary education and attainment of some type of post-secondary degree went from a rarity to the norm. The path to this future is open to Indonesia, and great progress is possible with sustained implementation of sound policies.

Getting to an optimal system will not be easy. Indonesia's experience with TE reform has vacillated in recent years from cutting-edge innovation and experimentation to significant policy reversals occasioned by repeal of key legislation. The notion that for TE to be "affordable" it must be publicly provided has held sway even while public spending has been regressive and most families have seen their children unable to enroll. Rules about use of resources make it hard for institutions, professors, and students to raise performance to internationally competitive levels.

8.2   REVAMP AND BROADEN STUDENT FINANCIAL AID SYSTEM

Access and equity is a central concern of the new Higher Education Law that addresses the key concern of underrepresentation of students from low socioeconomic groups in the nation's TEIs. The new law places responsibility for educational provision for economically disadvantaged students on national and regional governments, together with TEIs. At present, over 80 percent of spending on TE benefits the better-off 40 percent of households and over 60 percent benefits the richest 20 percent. This means that public expenditures on education are skewed to increase the benefits and privileges of the already well-off. Government should optimize and enhance the current scholarship system with a vastly more comprehensive and cost-effective financial aid system. The new system should offer assistance to all financially-needy TE students and provide the basis for increasing enrollment among poorer students.

As the numbers of disadvantaged students accepted into TE increases, institutions themselves will need to develop a range of strategies to ensure that quality is not lost. Middle class students stay longer at school and then progress to tertiary levels of education. They derive the benefits of publicly funded institutions for longer, regardless of whether they make other financial contributions as well. Students from low socio-economic backgrounds also need support once they have been accepted to TE. This is because there may be a mismatch between the students' home and school culture and the expectations and social culture of TEIs.

Being included in TE by gaining access to the system is only one part of the challenge. Ensuring that disadvantaged students are also included in learning and gaining the kind of education they require is also essential. Disparity in access to education only reflects part of the problem. The other issue is how to provide adequate support for those who are already within the system. Without such support, many students with disadvantaged economic backgrounds will not

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be able to finish their study. Improved understanding of the student profile is essential in designing any attempt to provide support for students from underprivileged population groups.

8.3 IMPROVING EDUCATION RELEVANCE, REDUCING THE CHANCE OF SKILL MISMATCHING

Besides increasing access to TE, other issues shall be addressed, including the issue that the current TE system is incapable of responding to the dynamics of the labor market, resulting in important skills mismatches. In response to the agenda on massification of TE, another challenge that Indonesia' teachers and lecturers face will be gaining the skills to teach a broader variety of students with differing needs. TE programs should be developed to support students from disadvantaged groups and can include mentoring, orientation, academic skills development, and other strategies aimed at supporting students to make successful transitions to TE and contribute to retaining students within the system.

The relevance of TE will depend on an effective system, with information and incentives being the most important components of the system. Improving the relevance of TE is intertwined with another key issue, and could be realized by making improvements in these areas in the modern TE system: (i) accurate and updated labor market information; (ii) a good quality assurance system; and (iii) better financing and governance of institutions.

Increasing the knowledge of the system and the nature of the skill mismatches would be one of the solutions. In particular, a complete mapping of skills demand and supply, including cognitive, technical, and non-technical (social and behavioral) skills in different economic sectors would provide a clearer picture of what graduates are missing and where they show

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strengths. Some countries have established labor market observations to address this lack of information. They also provide forums and lists of job openings for both students and employers to use. These systems rely on the quality of the data available at the Ministry, so it is crucial that institutions collect more and better data on their graduates' performance in the labor market.

The quality of TE in Indonesia is high on the national agenda. It is imperative that the future development of the quality assurance and accreditation system and process be guided by a road map and by clearly articulated objectives and action plans. The accreditation system should be transparent and flexible, to be able to respond to the continued growth in programs and institutions. It also needs to be credible and current. The availability of information portals (BAN PT's accreditation database, DGHE's database and summary analysis portal, and the website of each study program) is a step in the right direction, but it needs to be consolidated into one system, on that is expanded and improved. Efforts to unify or better integrate them may help potential students (and parents) to make informed decisions on the quality of the various programs.

Public and private institutions respond to different incentives, so it is important to align them so that institutions respond to labor market demands. The specific financing of public institutions has a clear set of incentives for these institutions. Non-autonomous universities financed based on inputs have much less incentive to adapt. A per capita financing of universities may increase their incentives to adapt (to attract more students). An even stronger incentive to capture students is faced by private institutions. The latter, in addition, receive no public resources, so they are likely to focus on low cost programs. The way institutions are financed shapes their incentives, so it is important that the financing system provides the right incentives. Finally, there may be a need to explicitly establish and incentivize active forms of collaboration

between TEIs and the private sector. These may take the form of contracts for research, internships and apprenticeships, and staff exchange programs.

8.4   GRANT MORE AUTONOMY IN EXCHANGE FOR MORE INSTITUTIONAL ACCOUNTABILITY

The value of autonomy is that—when conceded in tandem with proper incentives and in a competitive environment—it facilitates continuous efforts by TEIs to meet the reasonable demands and needs of students. When autonomy is low, student needs and demands often go unmet (Moeliodihardjo, 2013).

Students have the biggest stake in the investment in their own human capital. While they can never be perfect judges of their future wellbeing, they are arguably the best judges of it. They therefore mostly seek programs, degrees, and education that is best for them, especially when they have good information. The most successful policy environments create the incentives for TEI to monitor what students seek and, within reasonable limits, respond by providing it. When this system is properly structured, the most effective TEI grow in enrollment, resources, and reputation while the least effective are shunned by students. Governments then can play a "stewardship" role for the system as a whole and are not required to engage in time consuming and ineffective micro-management of TEIs.

In recent years, access to education has improved as control of schools has become less centralized. However, similar reforms have not occurred at the TE level; government control of the TE system is still rigidly centralized. The country's 100 public TEIs are managed by national ministries (primarily the MOEC and the Ministry of Religious Affairs, or MORA), which control

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their internal governance, staffing, academic programming, tuition, budget, and all other major functions and activities. There have been some attempts to expand the autonomy of TEIs (especially universities), but inconsistency in public policies has prevented these initiatives from having a major impact on *de facto* TEI governance. The lack of meaningful autonomy represents a significant challenge for Indonesian TEIs, which must work within domestic regulatory frameworks that constrain operational flexibility while seeking to make progress and compete at the international level. This section of the dissertation examines the extent to which pubic TEIs in Indonesia have autonomy with respect to organization, staffing, academics, and finances.

8.5   SUMMARY

As the final chapter of this dissertation, practical policy recommendations are proposed. They draw lessons from global best practices and the specific context of the Indonesian TE system, though not the most perfect recommendations of all. In light of the World Bank's most recent Top 10 Do's for Tertiary Education, the author proposes four policy priorities for the GOI to consider: (i) Continue and expedite current expansion. View TE as a good option for most if not all Senior secondary school graduates, and the provision of relevant, affordable opportunities to all; (ii) Strengthen public financial aid policies and financial assistance to students and aspiring students from poorer families, to solve inequality; (iii) Bring relevance to the top of the policy agenda in evaluating TEQ. Achieve diversification in TE broad enough to encompass excellence on a variety of levels—from the nation's leading universities to its most humble academies and community colleges; (iv) Establish rules, regulations, and financing to simultaneously given institutions greater freedom and to push them to be the best they can be.

It will not be easy to implement government policies that heavily favor tertiary education. A better target on short and long term achievement will help along the way. The government cannot always expect fast results to come from the education system as graduates take years to show positive results either from the private or the social return side. In the final part of this dissertation, there is a section on PISA results of Indonesian teenagers. The results further proved that in order to obtain a more productive tertiary education system, equity, program diversification, and better targeting of scholarships are very important. Indonesia's TEIs are taking in a large number of Senior Secondary graduates who are not ready for tertiary level study. During the transition period of major industries, Indonesia's labor market demands higher skilled and better-trained entrants to take on new jobs. This is why stakeholders (job seekers and tertiary education aspirants in this case) very much need accurate and valuable information to make decisions on the proper training to pursue.

TEQ in this dissertation is redefined as an endogenous variable influenced by four exogenous variables—equity, relevance, input, and assurance. This suggests that Indonesia can no longer rely or focus on one area of tertiary education for development. Public polices need to shift focus and come from a broader perspective to look at the TE system as one entity that produces knowledge and skills. As the country gradually moves toward a better skilled labor force, policies will shift again in slightly different directions.

Table 8.1. BIDIK MISI recipients and other private funded financial aids

	Continuing to benefit	Continuing to benefit	Continuing to benefit	Continuing to benefit	Continuing to benefit
Year	2010	2011	2012	2013	2014
For new entrants	20,000	20,000	20,000	20,000	20,000
For new entrants		30,000	30,000	30,000	30,000
For new entrants			40,000	40,000	40,000
For new entrants				50,000	50,000
For new entrants					60,000
For public TEI only	20,000	50,000	90,000	140,000	200,000
For new entrants (private, since 2012):			2,000	2,000	2,000
For new entrants (private)				8,000	8,000
For new entrants (private)					30,000
Total Financial Aid recipients (public plus private)			92,000	150,000	240,000
Other Financial Aids(new entrants, partial, public plus private)				180,000	180,000
Total Financial Aid recipients (public plus private)				330,000	420,000

APPENDIX B

A NOTE ON INDONESIA'S PISA PERFORMANCE

PISA 2012 revealed that Indonesia's 15 year olds are mainly below level 2 on both Math and Language competence. Around 80 percent students scored below level 2 at Math, and around 50 percent scored below level 2 at Language. The Math result is worse of year 2012 than 2006 where 65 percent of them scored below level 2. Language ability stayed almost the same within these 6 years with very little improvement.
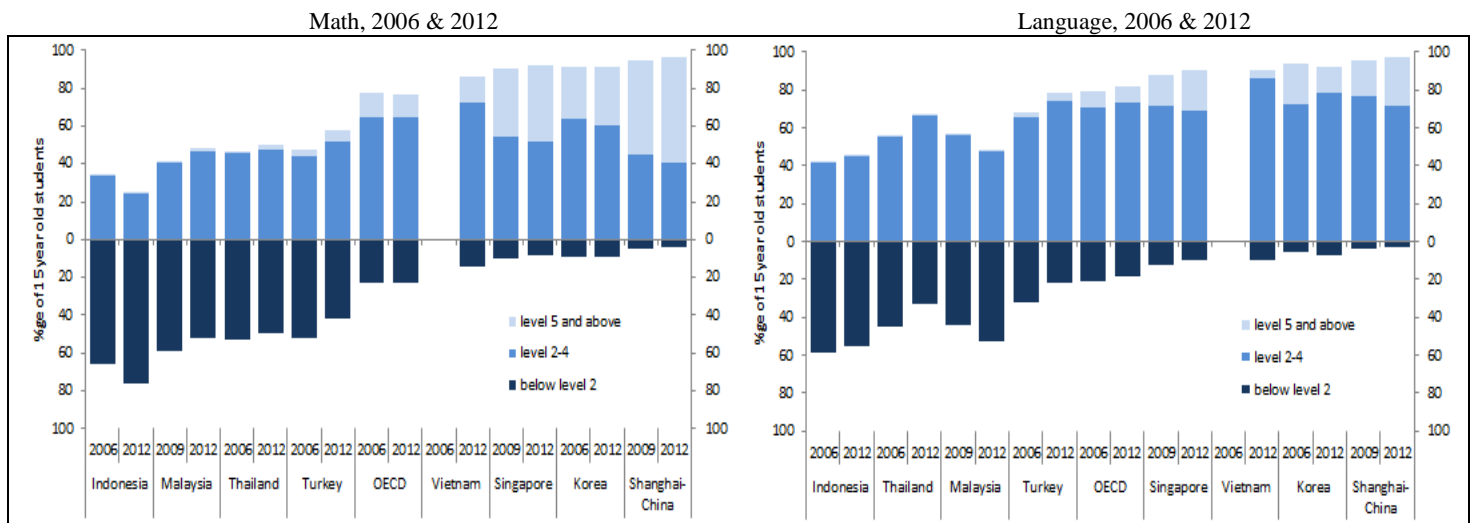

Figure 8.1. PISA scores cross country comparison[92]

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[92] Source: OECD.

Table 8.2. Indonesia PISA score range, year 2006, 2009, and 2012[93]

	2006 Science	2006 Reading	2006 Math	2009 Science	2009 Read	2009 Math	2012 Science	2012 Read	2012 Math
Indonesia's National Average Score	393	393	391	383	402	371	382	396	375
Below level 1(%)	20	21.8	35.2	24.6	1.7	43.5	24.7	4.1	42.3
Level 1 (%)	41	36.5	30.5	41	51.7	33.1	41.9	16.3	33.4
Level 2 (%)	28	29.1	20.4	27	34.3	16.9	26.3	34.8	16.8
Level 3 (%)	9	11.1	10.6	6.9	11.2	5.4	6.5	31.6	5.7
Level 4 (%)	1	1.5	2.8	.5	1	.9	0	11.5	1.5
Level 5 (%)	-	-	0.4	-	-	-	-	1.5	-
OCED Average Score	500	492	498	501	493	496	501	496	494
Below level 1 (%)	5	7.4	7.7	5	1.1	8	4.8	1.3	8
Level 1 (%)	14	12.7	13.6	13	17.7	14	13.0	4.4	15
Level 2 (%)	24	22.7	21.9	24.4	24	22	24.5	12.3	22.5
Level 3 (%)	27	27.8	24.3	28.6	28.9	24.3	28.8	23.5	23.7
Level 4 (%)	20	20.7	19.1	20.6	20.7	18.9	20.5	29.1	18.1
Level 5 (%)	8	8.6	10.0	7.4	6.8	9.6	7.2	21.0	9.3
Level 6 (%)	1		3.3	1.1	.8	3.1	1.1	7.3	3.3

PISA's Mathematical literacy tests student's capacity to identify and understand the role that mathematics plays in the world, make well-founded judgments, and use and engage with mathematics in ways that meet the needs of one's life as a constructive, concerned and reflective citizen. And its reading literacy indicates student's capacity to understand, use and reflect on written texts, in order to achieve one's goals, develop one's knowledge and potential, and participate in society.

At level 1 Math, where majority of Indonesia's teenage is located at, students are able to answer questions where all relevant information is present and questions are clearly defined. Students are able to carry out routine procedures according to direct instructions in explicit situations. They can perform actions that are almost always obvious and follow immediately from the given stimuli.

[93] Source: Created by author with data from OECD.

At level 1 Language, where majority of Indonesia's teenage is located at, students are able to locate single piece of explicitly stated information in a prominent position in a short, syntactically simple text with a familiar context and text type, typically comes with support to the reader such as pictures. There is minimal competing information.

The Math and Language proficiency results speak of Indonesia's secondary students' learning ability—they are likely to be 3 or more years behind compared with OECD average teenagers.

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