Vocational Schooling and Occupational Matching: Gender Differences in Indonesia

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This document represents part of the author's study programme while at the Institute of Social Studies. The views stated therein are those of the author and not necessarily those of the Institute.

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List of Acronyms

BPS	Badan Pusat Statistik (Statistics Indonesia)
CBT	Competency Based Training
IFLS	Indonesia Family Life Survey
ILO	International Labor Organization
INPRES	Instruksi Presiden (President's Instruction)
KJI1982	Klasifikasi Jabatan Indonesia 1982 (Jobs Classification of Indonesia 1982)
KLUI9	Klasifikasi Lapangan Usaha Indonesia 9 (Employment Classification of Indonesia 9)
MDG	Millenium Development Goals
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Square
PUG	Pengarusutamaan Gender (Gender Mainstreaming)
RENSTRA	Rencana Strategis (Strategic Plan)
ROCC	Relevant Occupation
SAKERNAS	Survei Angkatan Kerja Nasional (National Labor Force Survey)
SAKMA	Sekolah Menengah Analis Kimia (Chemical Analyst Upper Secondary School)
SMAKBO	Sekolah Menengah Analis Kimia Bogor (Bogor Chemical Analyst Upper Secondary School)
SUPAS	Survei Penduduk Antar Census (Intercesal Survey)
SUSENAS	Survei Sosial Ekonomi Nasional (National Socioeconomic Survey)
UAN	Ujian Akhir Nasional (National Final Examination)
UNESCO	United Nations Educational, Scientific, and Cultural Organisation
USA	United States of America
VOCM	Vocational Occupation Matching
VOCR	Vocational Occupation Related

Abstract

As skill mismatch has become the problem in the labor market in Indonesia, this paper examines the effect of the matching between vocational major and occupation in the labor market. Facing the excess supply of working age population, Indonesian government has imposed the vocational policy. Previous empirical evidences showed that the relevance returns of skill and occupation increases earnings in the labor market. The paper uses SAKERNAS 2013 data. A special focus will be on the role of gender. A basic Mincer model is applied to estimate the impact. The results show that the vocational graduates who have major and occupational matching enjoy 13.5% higher wages than those with mismatched. Meanwhile, this effect is not statistically different for males and females. Furthermore, the effect reaches the highest point at the early career in the labor market for male workers, but in the middle of their working age for female workers. This may be due to the differences of the job mobility rate between men and women. Although the matching procedure may produce insignificant result, this research showed the prior studies on the major and occupational matching in vocational education. Nevertheless, this research provides novel evidence for the government to monitor the vocational education policies as it still generates gender inequality in providing training and job availability.

Relevance to Development Studies

One of the strategic development plans in many developing countries to create more skilled workers in the labor market is expanding the vocational education. Vocational education provides specific subjects in a form of specific curriculum. It produces skilled workers to be ready to work in the labor market. As they are targeted to have a specific occupation, their skill should match the type of occupation to gain the efficacy of their vocational education in terms of raising the earnings. Thus, they have more advantages and competitiveness than the general school graduates. The more skilled the workers, the less risk they are being unemployed. Therefore, it provides supporting information to the policy makers that investing in vocational education may be efficient as development strategy by considering the matching between vocational education and the labor market needs.

Keywords

vocational, education, occupation, matching

Chapter 1
Introduction

1.1 Background of The Study

School expansion has been implemented by some countries to be a good strategy for the government to increase labor participation and reduce unemployment. Israel (Neuman and Ziderman 1999) is concerned with vocational education by giving high subsidies to run the school. Meanwhile, significant enrollment of students in vocational education in Chile as compared with in OECD countries is now a focus for policy makers. Moreover, it is not only developing countries that implement the policy, but also the United States and Germany too which acknowledge that the policy on vocational education is beneficial to the labor market (Hotchkiss 1993 and Witte and Kalleberg 1995).

Why is vocational education so special? This is because the vocational schools are believed to have a higher capacity to create skilled worker. If the capacity of vocational school becomes higher, students will choose to attend vocational school rather than general school, particularly for marginal students. It is because when a student goes to a vocational high school, he/she is expected to be a ready-to-work person in a labor market. Thus, the probability to be unemployed will fall (Kim 2003).

Based on the aforementioned reasons, the Ministry of National Education in Indonesia puts a target in the Long Term Strategic Plan 2005-2025 to expand the ratio of vocational upper secondary students to general high school from 30%:70% in 2005 to 70%:30% in 2025 followed by some strategies to pursue the goals (Di Gropello *et al.* 2011). The first strategy is increasing the number of vocational upper secondary schools from 200 in 2005 to 347 in 2010[1]. Based on Figure 1-1, the number of vocational upper secondary school keeps increasing every year at 1.426%[2] on average. The second strategy is increasing the share of enrollment in vocational education. Data from Statistics Indonesia (BPS) (2012) shows that approximately 46% of total secondary education students enroll in vocational upper secondary school every year (Figure 1-2). The next strategy is expanding the major related to industrial sector (Di Gropello *et al.* 2011). In fact, since the financial crisis in 1998, the industrial sector growth has decreased from 10% in 1996 to 4% in 2013[3]. Finally, it improves the quality of vocational school through Competency Based Training (CBT) and ISO 9001:2000 certification. As a result of these strategies, the government has an expectation to obtain the benefit of having vocational education completers in the labor market.

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[1]Strategic Plan of Ministry of National Education 2009-2014

[2]Authors calculation based on data from the Ministry of National Education, 2015, http://dapo.dikmen.kemdikbud.go.id/portal/web/ Accessed 10 April 2015.

Figure 1-1. Number of General High Schools and Vocational High Schools 2007-2012
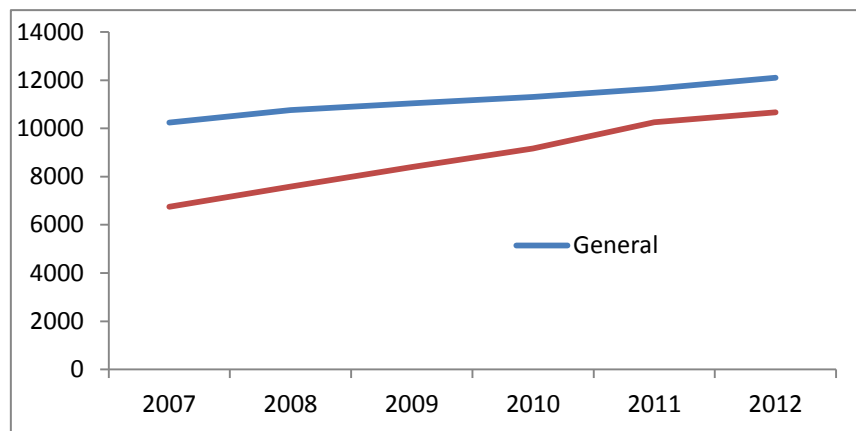
Source: Statistical Year Book of Indonesia 2014 and 2011

Figure 1-2. Share of Students Enrollment at General and Vocational upper secondary schools: 2007-2012
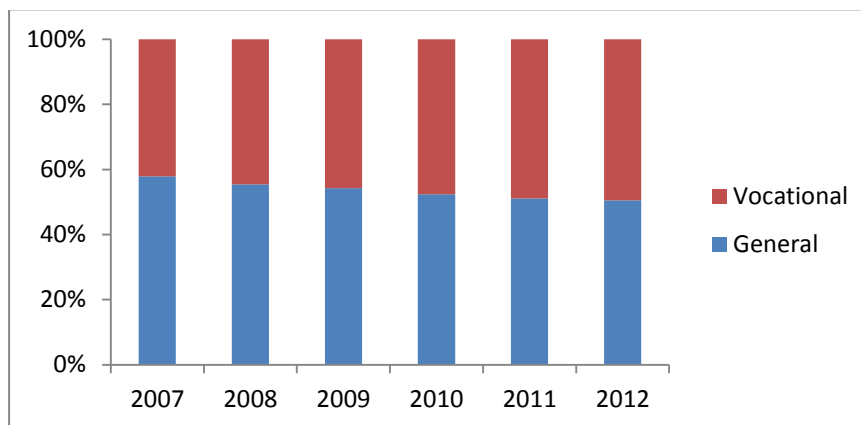
Source: Statistical Year Book of Indonesia 2011 and 2014

However, the real benefit of applying vocational education policy has been experienced by Germany for almost 20 years through its dual system program. This program combines the vocational education with "the apprenticeship training. It provides vocational skills geared to current practices in specific occupations" (Witte and Kalleberg 1995:293). The school has cooperation with the firm to give students the opportunity and experience in applying their skills as a part time student. After joining the training, the students with satisfactory classifications have a higher chance to get the position in the firm.

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[3]Authors calculation based on data from the World Bank Indicator, http://data.worldbank.org/country/indonesia, Accessed 1 July 2015.

The position is surely fitted to their skills and differs between men and women. "That is, a large proportion of skilled occupational positions are open only to persons with the appropriate apprenticeship training" (Hamilton 1992 as cited by Witte and Kalleberg 1995:297). As a result, those who have a fitted employment and the training program gain more significant earnings.

Moreover, reflecting on the successful Germany experience in vocational education, a matching training and occupation is essential for vocational education policy. A small difference in earnings between vocational and general education completers (Neuman and Ziderman 1999) is not enough for policy makers to encourage more students to enroll in vocational education. The effectiveness of having vocational education will be greater if the vocational graduates work in an occupation related to the training, particularly in the long term (Neuman and Ziderman 1999 and Hawley 2008). Furthermore, vocational students acquire a specific skill that will be difficult to apply in other field of jobs. In this case, the vocational graduates have no different value from general graduates in the labor market so that the risk of being unemployed might be greater. Therefore, the target will be clearer for the policy makers; if they are able to identify which trainings are needed based on the availability of the occupation in the labor market.

Furthermore, the labor market condition in Indonesia is experiencing supply abundance of working age population (ILO Jakarta 2013), known as a demography dividend, which generates problem in the labor market. The excess supply of labor could be anticipated by investment in education with specific skills. In this case, Indonesia has been in its right track by imposing the policy on expanding vocational graduates. By this strategy, these graduates have more chance and earnings in the labor market. The increase in vocational graduates triggers the increase in its unemployment[3]. What makes this happen is that structural problems and lack of demand as well as the skill mismatch occur in Indonesian labor market (ILO Jakarta 2013). Indonesia and Russian Federation are two developing countries of which the skill mismatch was captured more than 20% during 2000-2011 (ILO 2013). Thus, the latter problem is the concern on the vocational education policy to reduce the probability of being unemployed.

This research attempts to add to vocational education research literature, particularly in Indonesia with a recent and larger data set to estimate the differences of the rate of return to vocational upper secondary school major-occupation matched between women and men. The data set are taken from the SAKERNAS (National Labor Force Survey) of 2013, BPS. By using SAKERNAS 2013 data, this research emphasizes the differences between men and women who have an occupation related to their major in vocational upper secondary school. Their earnings in the labor market will be estimated using Mincer wage equation model.

1.2 Statement of The Problem and Justification

The labor market in Indonesia has not captured the success of the policy. The expansion policy is indeed successfully creating lower unemployment rate of vocational graduates than general graduates. Unfortunately, the unemployment

rate of vocational upper secondary school in Indonesia has shown an annual increment of 4% since the last three years (Statistics Indonesia, 2014). The rising number of vocational completers is in line with the increase in the rate of unemployment.

Besides, the recent evidence from some scholars on vocational education in Indonesia indicate that increasing the number of enrollments in vocational upper secondary school might not be appropriate. Chen (2009) noted that graduates from vocational upper secondary school had neither advantages nor disadvantages of getting better earnings than those from general upper secondary school. Moreover, there has been a declining trend of these earnings over time, especially for males (Suryadarma and Newhouse 2011 and Purnastuti *et al.* 2013). As the economy of Indonesia shifted from industry to services after financial crisis in 1998 (Figure 1-3), the returns of major related to the sectors have been affected. From Figure 1-4, males tend to choose technical and industrial major, while females prefer major related to the service sector, such as nursing and hospitality, to technical and industrial fields. This condition brings the reason for the declining rate of return for males rather than females.

Figure 1-3. The Annual Growth (%) of Industry and Services Sectors 1990-2012
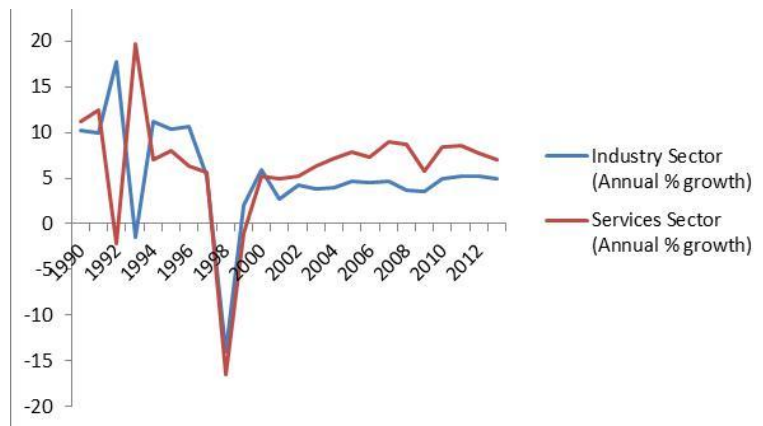
 Source: World Bank Indicator (http://data.worldbank.org/country/indonesia, Accessed 5 July 2015)

Figure 1-4. Vocational Major Choice Based on Gender
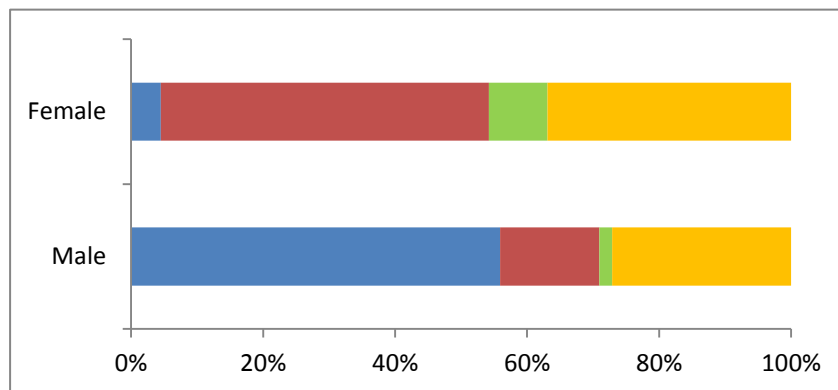
Source: Author's calculation based on SAKERNAS 2013 survey data.

Technical and Industrial
Economics, Bookkeeping, and Statecraft
Fashion, Culinary Art, and Housekeeping
Hospitality, Tourism, and Nursing

When the human capital gap between women and men in the same level of education becomes smaller, it reduces the probability to get discrimination in earnings (Hawley 2008). As women show high enthusiasm in the services field of study, their earnings generate similar effects with the increasing growth of services sector in Indonesia (Suryadarma and Newhouse 2011). Moreover, this conclusion from Suryadarma and Newhouse (2011) together with Chen (2009) and Purnastuti *et al.* (2013) has shown very limited information on estimating the correlation of matching services major related to the occupation and labor market outcome. Thus, the successful experience of Germany vocational education could be a good start to find out that the vocational education might be more beneficial to the labor market if there is a matching between the field of study and occupation.

1.3 Research Objectives

One of the aims of expanding vocational upper secondary school is improving labor participation in Indonesia which in the end, it is expected to reduce the unemployment rate. Arum and Shavit (1995) conclude that students choose vocational secondary education to minimize the possibility of being unemployed. Mainly for students who seem less likely to continue the education to a higher level, vocational education allows them to be skilled workers and "… reduces the risk of falling to the bottom of the labor queue" (Arum and Shavit 1995:187

This research aims to estimate the effect of secondary education on the labor market outcome using Mincer wage equation model. In this case, the vocational school will focus on the secondary education level. After that, the study will examine the differences in the level of major-occupational matching between men and women in the related secondary education.

1.4 Research Question

Based on the aforementioned background of the study, the main research question of this paper is defined as follows:
- To what extent does having vocational upper secondary school major matching occupation affect earnings?
- How do the earnings differ for male and female?

1.5 Limitation of The Research

The research used SAKERNAS 2013 data. There are some problems using this data set. First, the earnings data in this data set only cover paid workers. Unfortunately, the self-employed and unemployed workers are not included. Second, the SAKERNAS data does not provide any information on socioeconomic and education background of the parents and ability measure, for

example exam scores of lower upper secondary school. The education attainment is measured by its major and the highest education level achieved by the respondent. Third, the majors of vocational upper secondary school in this data set are divided into four categories. The classifications (by coding) of the major are as follows:

42. Electrical, Engineering, Graphics, Textile, Aviation
43. Economics, Bookkeeping, and Statecraft
44. Fashion, Culinary Art, and Housekeeping
45. Hospitality, Tourism, and Nursing

Some majors such as forestry, stockbreeding, fishery, and agriculture are not in the classification, thus the occupations related to these majors are defined as not related. These classifications generate problem of identifying the major-occupational matching because it not as detailed as it is expected. To maximize the matching, a job classification in 1982 (KJI1982) is considerably useful to present detailed matching. They provide nine types of occupations. Each occupation consists of three-digit details of jobs type. Third, matching between major and occupation has been done by looking at the sample carefully one by one. If there are some samples with the same match, it will use stata command to replace the dummy variable of vocational upper secondary school major and occupational matching. By using more than 40,000 observations, it becomes a big challenge to finish it.

1.6 Organization of The Research

This research is organized into six sections to answer the research questions. First, the introduction chapter contains background of the study; the research problem, objectives, and questions; and the research limitation faced by the author. Second, the brief detailed information on secondary education system in Indonesia will be described in chapter two. After that, chapter three covers the conceptual framework of the research, previous studies, and empirical evidence model. Next, the information on the data used and the methodology to estimate it are explained in chapter four, while the results are analyzed in chapter five. Finally, the conclusion follows in the last part.

Chapter 2
Indonesian Secondary Education System

Education system in Indonesia is implemented under the Law No. 20 2003 about the National Education System. Based on this Law, Indonesian Education system consists of three education levels; basic, secondary, and higher education. Basic education is divided into Primary School (six years) and Junior Lower Secondary School (three years), while secondary education covers two types which are general and vocational upper secondary school. Higher education is divided into diploma, undergraduate, master, and doctorate. Additionally, all of the education levels have Islamic school as another option for students who want to have a balanced learning between academic and religious subjects. Students can start school at 6 years old. Their ages are 15 years old after completing the Basic Education. Beginning at the age of 16, they start to take Upper Secondary School for three years.

Based on Figure 2-1, the secondary education system in Indonesia consists of vocational, general, and Islamic upper secondary school. According to the funding, each type has two types of schools, public and private. A public school is funded by government, while private is funded by "national, regional, and local private foundations and school fees cover capital and operational costs" (UNESCO 2010:12).

Figure 2-1. Indonesian Secondary Education System
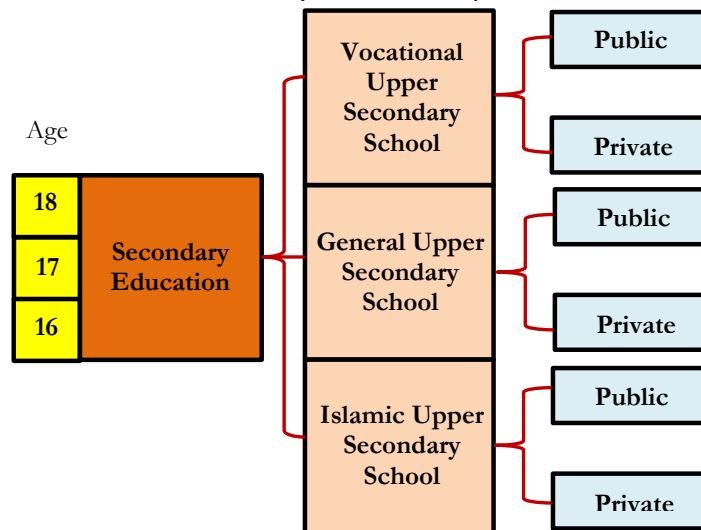
Source: Education System in Indonesia, Law No. 2 1989
(http://www.indonesianembassy.org.uk/education/education_system1.html,, accessed 11 June 2015)

Moreover, each type of the schools has different tasks. The general education promotes expansion of knowledge and improvement of student skills in general such as language, natural science, and social science, whereas a vocational education prepares students with specific skills to be able to work in a particu-

lar sector. The Islamic education has a similar program to general education, but the portion of religious subject is larger and more specific. Commonly, students in Islamic upper secondary school stay in a dormitory to make them focus more on learning their religion.

The three types of secondary school are governed by the Ministry of National Education, with the Islamic school governed by both the Ministry of National Education and the Ministry of Religious Affairs. Basically, the Ministry of National Education regulates education system as a whole. It is only the Islamic school that is governed and monitored by both ministries. Their Islamic curriculum is regulated by the Ministry of Religious Affairs. Although educational regulations are under the Ministry of National Education, since local autonomy system was enacted in Indonesia in 2001, local governments have been in charge of educational implementation by still referring to the regulations set by central government.

This research only covers the general and vocational upper secondary school without considering whether it is public or private school type. It is because the Islamic school type is not covered in the SAKERNAS data. The public and private types of school are also not described in the data set.

2.1 General Upper Secondary School

The curriculum of general secondary education and Islamic secondary education covers learning substances for three years, starting from grade X to XII (Government Regulation No. 17 2010 on Education Management and Implementation). It is based on the standard of competency in learning subjects and examinations.

The classes are organized as follows; in grade X, all students study general subjects, after that students can choose a special program for the next two years - in grade XI and XII. The programs are:

1) Natural Science Program

2) Social Science Program

3) Language Program

4) Religious Program, only for Islamic Upper Secondary School

Each program has its own specific subjects. These subjects earn more hours to study. The Natural Science program offers biology, mathematics particularly the advanced level, physics, and chemistry subjects. The Social Science program contains anthropology, sociology, economics, and civics subjects. The Language program covers an advanced version of Indonesian language and literature, English and other foreign languages, and cultural history subjects (UNESCO 2010:11). The basic subjects such as English and Indonesian language, and mathematics are included in the final exam in the final year. There-

fore, basic mathematics is covered in the Social Science and Language programs, while basic Indonesian and English language are included in the Natural and Social Science programs.

In addition, the national examination (UAN-Ujian Akhir Nasional) takes place at the end of the school year. It is to evaluate student's academic ability. Students are considered competent if they achieve the minimum grade at each subject. The subjects tested in the final examination are divided into two, main subjects and special subjects. Main subject tests apply to all programs, comprising mathematics, English, and Indonesian language. However, special subject tests depend on each program in a High School. There are three special subjects that are tested in each program; thus, there are six subjects in total that are tested. The requirements are set by the Ministry of National Education. These results often become a parameter to assess student's capability by the firms.

2.2 Vocational Upper Secondary School

Vocational schools in Indonesia comprise two types based on their education duration, which include vocational schools with the duration of 3 years and those with the duration of 4 years. The common ones are those with 3 years' duration with similar education system to that of general upper secondary school. On the other hand, the four-year vocational schools are specially designed to fulfil professional demand (Government Regulation No. 17, 2010). The example of the four-year vocational school is chemical analyst upper secondary school, under the Ministry of Industry.

The vocational education curriculum contains specific subjects to improve students' self-development. It prepares students to have refined knowledge on the basics of science and technology and ability to fit and implement the curriculum to specific jobs. It has been set by the government considering the input from the industry managers, company directors, workers, and professional associations. It has been completed based on Competency Based Training (CBT) for 20 years to increase the quality of vocational school graduates. The CBT concept combines educational skills, knowledge, and attitude. It is one of the prerequisites for students to graduate from school. In response to the update of recent technology, the government has launched the revision of the curriculum by adding the computer and entrepreneurship as a compulsory subject.

There are various vocational schools in Indonesia in accordance to the Government Regulation of the Republic of Indonesia No. 70, 2013 on Basic Frame and Structure of Vocational School / Islamic Vocational School Curriculum. The subject matters of the vocational school include technology and engineering; health; art, craft and tourism; information and communication technology; agribusiness and technology; fishery and maritime; business and management; and other expertise needed by public.

The most significant difference between vocational schools and general high school is the on-the-job training, which is a part of curriculum. The work duration is different from one school to another depending on each school's policy. The purpose is to apply the knowledge and skills that have been learnt at school, so that students can evaluate whether what has been learnt can be implemented in the professional context. The on-the-job training venue is not determined by the school. Each student can choose the place for the job training according to his or her interest or based on the availability (World Bank 2013). Companies, governmental offices, and private offices are the common places for this training. At the end of the program, students are given assessment grades by the job provider. The grade is then used by the school to evaluate the student. Additionally, students are compelled to make a report of the job practice and it is proposed to the school as one of the requirements to take the UAN.

The weakness of this on-the-job training is that there is no cooperation between the school and the job provider. As we know, vocational school students have specific skills that make it difficult for them to apply what is beyond what they have studied. Consequently, they have to choose a place that suits their studies so that they can get the benefit of the job practice. In addition, this job practice can be sustained if they are able to show satisfactory grade and results; the job provider will happily recruit them. In reality, however, due to the absence of cooperation between the school and the job provider, it is difficult for the students to search for a place that suits their skills. Therefore, it is not impossible for them to get the job that does not match their skills later on.

A real example of the successful synergy among the program, on-the-job training and the real job is Chemical Analyst High School (SAKMA). One of SAKMA examples is Bogor Chemical Analyst High School (SMAKBO). This four-year school runs under the Ministry of Industry. The curriculum of general subjects is similar to that of common high schools in general; only with several specific subjects added related to chemistry such as chemical analytics, physics chemistry, organic chemistry, and several practices related to laboratory. The curriculum has been designed by considering the latest industrial updates. To support this, the school regularly places in its agenda the updates from industrial sectors that will improve the quality of the school in the labor market (Di Gropello *et al.* 2011).

Next, how are SAKMA graduates in the labor market? According to the data from the World Bank, 80% of SAKMA graduates become chemical analysts in chemical companies; 15% continue to diploma program; and 5% continue to university (Di Gropello *et al.* 2011). The demand-driven system has successfully been implemented to these SAKMA graduates. Sucofindo, one of the biggest chemical companies in Indonesia, accepts these graduates every year to employ. The four-year duration at school becomes a very adequate asset for SAKMA graduates to prove their quality at work. Their skills in the laboratory along with excellent theory become their basis more than enough to become a chemical analyst. The salary they get from Sucofindo is even not significantly different from that received by diploma graduates. This is because Sucofindo

applies a system that treats all employees with the same treatment when they start working.

Based on the facts from SAKMA, the specific program and skills that the graduates have will be beneficial to their jobs performance in the labor market. Specific skill leads to specific occupation. If the skills match the occupation, it will be more beneficial to them to get a better outcome. Cooperation with employers will create demand-driven for the vocational education graduates. This is not only based on the facts from SAKMA, but also learnt from the vocational education in Germany. For that reason, this matter can be a consideration and more crucial focus for the government of Indonesia in developing vocational education.

2.3 Government Policy on Vocational Education

The policy on vocational education is considered to be beneficial to the economic growth of a country. As argued by Self and Grabowski (2005), the economic expansion in Japan was supported by the vocational graduate workers. Their skills, particularly female workers in manufacturing sector, played an important role in increasing the growth of employment at the early stage.

Vocational education in Indonesia runs under the regulation and supervision of Vocational Upper Secondary School Directorate, Ministry of National Education. The directorate has a major role in building strategies to increase the proportion number of vocational school graduates, from 30% in 2005 to 70% in 2025. This strategy has been built based on several countries' experience such as Germany and the USA, which have been successful in creating labor absorption by increasing the proportion of vocational school graduates compared to general school graduates in the labor market (Witte and Kalleberg 1995 and Hotchkiss 1993). This expansion has considered the future forecast on promising industrial sector growth, thus this sector becomes the government's focus in applying its policy.

Based on RENSTRA of the Ministry of National Education (2010), to improve the quality of education, the government applies several policy steps; First, increasing the number of international-standard vocational schools through CBT and International Standard Organisation (ISO) 9001 certification for schools; Next, improving the quality of teachers by providing training for teachers to update their knowledge and by compelling teacher certification to improve their competency. Finally, the government provides adequate facilities and infrastructure to support teaching and learning process. For instance, in 2006 all vocational schools were aimed to have been connected to the internet to provide easy access to information. After that, the government compelled communication-and-information-technology-based learning in vocational school curriculum as this served as an interactive learning. Lastly, the government also repaired broken facilities and infrastructure to support learning process.

The government allocates some budget to implement the strategies. Based on the data of the RENSTRA of the Ministry of National Education in 2010, the government allocated budget for every strategy that had been set. The budget increased every year in accordance to the desired target. The budget allocation is illustrated in Figure 2-2 below. The most significant increase in the budget allocation, up to twice as much within three years, was in infrastructure. This was according to the target of the Strategic Plans, which aimed to get 24% of the facilities having an increase of 70% in 2014. In addition, to improve the quantity of vocational school participation and school standard implementation, the budget allocation rose by 30% and 67% respectively in 2014. Nevertheless, of all budget allocation, expansion of vocational education enrolment received the largest budget allocation since this is the main target of the policy.

Figure 2-2. The Shares of Budget Allocation (in hundred million rupiahs) of Vocational Upper Secondary School Gross Enrolment, Improvement of the Infrastructure, and Improvement of the Implementation of National Education Standard (2011-2014)
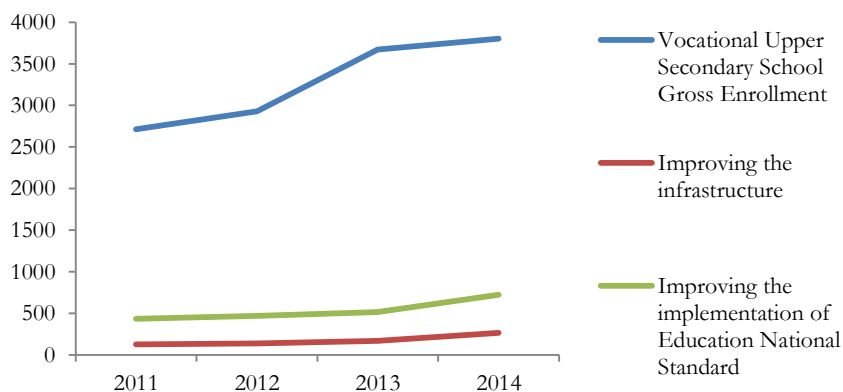
Source: RENSTRA Ministry of National Education 2010

Furthermore, in the policy implementation, the government also considers other matters related to strategy building. With the condition of sector growth in Indonesia, it is considered that the industrial sector will have significant growth in the future; hence the expansion policy is focused on industrial sector development. For example, the development of computerization needs supports skill needs in industrial sector which is dominated by male (see Figure 1-4). However, this skill is also needed in service sector dominated by female (see Figure 1-4). Furthermore on gender equality, the government has a target in decreasing this gender discrepancy (Figure 2-3). The real effort from the government for this matter is called *Pengarusutamaan* Gender (PUG). In this program, the government monitors every school in implementing gender equality in terms of school participation and also knowledge improvement regarding gender equality.

Figure 2-3. The Improvement Target of Gender Equality Ratio (%) (2007-2011)

To sum up briefly, the government policy to improve the quantity of vocational school participation within 20 years from 30% to 70% has been accompanied by supporting strategies and budget; however it still has some weaknesses that the government misses to attend to. Vocational school participation improvement strategy is not only in terms of quantities, but also in terms of quality. The implementation has been supported by a significant budget. Nonetheless, unfortunately, with the government focusing on industrial sector, it could have an impact on one gender benefit where males dominate this sector (Neuman and Ziderman 1999). Thus, this weakness must become the focus that needs major attention as Indonesia is a part of G20 that must support the third Millennium Development Goals (MDG3), i.e. minimizing gender discrimination.

Chapter 3
Literature Review

This research contributes gender difference analysis to the vocational literature research either outside or in Indonesia. It observes the efficacy of vocational education graduates from the skill match occupation view. In Indonesia literatures, previous research argued that vocational education has no beneficial to the labor market outcome more than general school (Chen 2009). However, others succeeded in showing that public vocational school graduates earn more than those from the private schools, but failed to show that vocational education benefitted the general education graduates (Suryadarma and Newhouse 2011). If specific skills might have no influence in getting better earnings, having an occupation related to the field of the study gives better possibilities in raising earnings. Indeed, the vocational education is more effective than the general one if the graduates have matching between the major and occupation (Neuman and Ziderman 1999, Hotchkiss 1993, Hawley 2008, Witte and Kalleberg 1995). However, they failed to show the effects of male workers in narrower matching procedure. After all, this research provides the effects of matching between vocational major and occupation on earnings together with its male and female workers analysis in Indonesia labor market. Larger data set; covering many vocational majors; and specific occupations give complementary literature on vocational education research.

3.1 Conceptual Framework

The idea of investment in human capital concept has been developed for a long time by many economic thoughts. Schultz (1961) and Becker (1964) found that human capital investment in terms of education has been found to be essential for productivity. Furthermore, the education gives benefit to the labor market outcome. In view of this, education generates knowledge and skills for the individuals which determine the performance of their occupation. Therefore, investment in education has a long term benefit as it raises the income in the future. Besides, it can be a signal for employers to recognize the individual's characteristic in the labor market (Stiglitz 1975). Thus, it is considered to be an important investment in human resources.

Schultz (1961) in "Investment in Human Capital" argues to acknowledge human capital as two dimensions, qualitative and quantitative. The division is based on the tangible and intangible resources. The quantitative part includes working hours, the number of workers in the labor market, and "the proportion of workers who enter upon useful work" (Schultz 1961:8). These tangible resources are physically easy to be estimated. Meanwhile, the qualitative part accommodates the intangible resources of individuals, for example knowledge, skills, and other capabilities of individuals to increase the productivity. The latter dimension involves cost to enhance the performance. This cost includes all expenditures spent in accumulating this type of investment. As these parts are intangible, more techniques are needed to estimate the return of the cost incurred.

Moreover, investment in qualitative resources of human capital can be estimated through its cost (Schultz 1961). According to Schultz (1961), the costs include the expenditures to improve the capabilities and the opportunity cost. The examples of the first cost mainly are the education fee and the training cost to enhance the knowledge and skills, whereas the latter cost covers the time spent to be more educated and more skilled. It is called opportunity cost because it is compensated from being unproductive worker in the labor market during the time spent. Although it sacrifices time and cost to spend years in education, the opportunity cost will be worthwhile to obtain higher job performance in the long term. Moreover, both costs are non-refundable. They could not be sold, but they are returned in a way that the individuals will have higher earnings in the labor market as they get higher either education or skills. "The resulting increase in earnings is the yield of investment" (Schultz 1961:8).

Supporting Schultz idea on education as human capital investment, Becker (1964) expanded the relationship between education and earnings. He developed a theory followed by empirical evidence on the effect of education on earnings. Becker tried to apply a model for on-the-job training to find its relation to earning. Next, other human capital investments are also applied to this model. He divided the training into general and specific. The general training is the training provided by the firm in which the workers' pay for it as it will improve their wages in the future as the compensation. In contrast, the specific training is provided and paid by the firm to increase the firm's productivity.

Figure 3-1. Correlation between Earnings and Age for Individual with and without Training
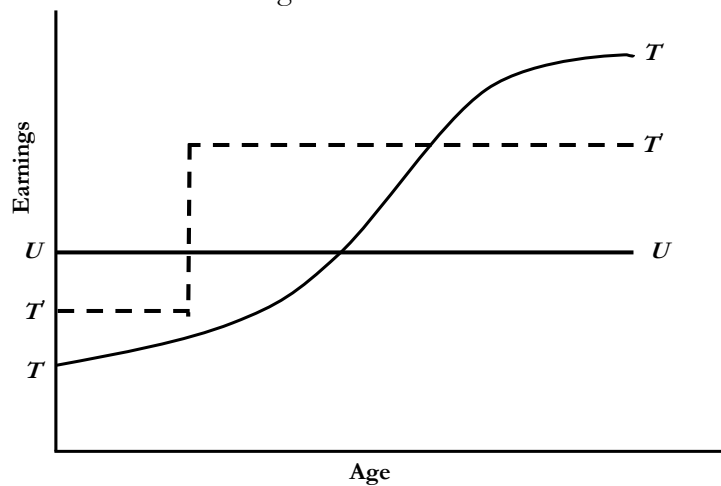
Source: Becker in Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education (1964:15)

Both trainings affect earnings. As it can be seen from Figure 3-1, the training surely shows positive effect to earnings. The UU line is the relation between earnings and age for individual without training. It shows that the level of earnings is flat for individual without training. Meanwhile, the earnings become higher as the individual get trained (line TT, with its marginal productivity illustrated by line T'T'). Its concave shape depicts "the rate of increase in earnings is affected more at younger than at older ages" (Becker 1964:16). As it was

mentioned before, the human capital investment has a long term benefit, the line TT shows that the training affects earnings significantly at the end of training. Overall, the skilled workers enjoy the earnings differential from unskilled workers which leads to their advantages in the labor market.

Furthermore, the aforementioned model has fitted to be applied in other resources of human capital investment particularly education. Schooling is one of the other investments (Becker 1964). The investment in schooling influences the earnings positively as well. Specifically, he described it in the rates of return to the college and high school education. The empirical evidence is presented to ensure the assumption. Although the evidence for high school is less than that for college education, he found that the rate of return for high school is higher than that for college education. After considering the ability, it shows decreasing returns because college students have higher ability. In addition, the earnings and age illustration (Figure 3-1) for schooling show similar prediction to the training for both schools. The investment in education increases earnings in line with the increase of the years of education and the age.

Regarding Becker's finding that ability in education affects earning, Stiglitz (1975) examined it as a signal for employers to find more information about the workers, known as a screening theory. The concept is based on the argument that "since individuals are able to capture the returns to general information about their skills themselves, they are willing to spend resources to provide this information-indeed, this is the only way they can fully capture their ability rents" (Stiglitz 1975:287). As education is used by the firm to sort the workers, the education per se does not capture the innate ability of the workers. This idea generates "self-selection mechanism" (Stiglitz 1975:293) to screen the ability of individuals to the firm when they look for a job. This also aims to increase the productivity. As the individuals know their own ability better than the firm, it means that they have more information than the firm. If the firm offers an occupation, a specific occupation with specific skill, a worker who has the characteristic and ability required by the firm will apply for the job. Rationally, the requirements make them select themselves to which job they fit. The rewards are received in the form of greater income for those who match the requirement. Thus, "the better the information of the individuals and the greater the differential rewards, the better the sorting will be" (Stiglitz 1975:293).

Moreover, the screening theory gives benefit to the workers indirectly. According to Stiglitz in his article "The Theory of "Screening", Education, and the Distribution of Income" (1975), one of the social categories of screening theory is matching. Workers have different abilities and skills because they are educated in different programs. In view of this, it is necessary to match the ability and the education program. They know in which part they should improve to be more skilled and educated. Thus, if firms screen them through their education, it will help them to obtain better job performance. Another category is from the private return through job-matching screening. Skilled workers have the possibility to be positioned in the unskilled occupation if there is either no screening or less screening. They will be less productive in this job. Additional-

ly, they gain similar wage to the unskilled workers. Overall, the benefits depend on the heterogeneity of the skilled and unskilled workers in the labor market.

Finally, Mincer (1974) combined the theory developed by Schultz, Becker, and Stiglitz to develop a Mincerian wage equation model. The model presents a comprehensive empirical evidence of the relationship between education and earnings. This part will be discussed further in section 3.3 in this chapter.

3.2 Previous Studies on Vocational Education

Studies on vocational education have been done in many parts of the world. In Israel, Neuman and Ziderman (1991 and 1999) examined the efficiency of vocational education through the matching between the vocational major and the type of occupation. Afterward, their method was followed by Hawley (2008) to observed similar effect in Thailand. Criticizing Neuman and Ziderman method, Hotchkiss (1993) matched the occupation which is related to the vocational training track and observed its effect on wage. Moreover, in Germany, a country with successful vocational education system, Witte and Kalleberg (1995) applied the matching with different perspective from others though it noted findings supporting the prior research in Israel. Meanwhile, more specifically in Indonesia vocational literature, none of the researches focus on this matching. Consequently, most scholars found little evidence on the efficacy of vocational education compared with that of the general education in the labor market. All of the studies apply the aforementioned theories (section 3.1) and Mincer model as a basic concept.

Introducing the matching method to find the efficacy of vocational education, Neuman and Ziderman (1991) argued that vocational school benefitted the labor market by certain approach. They estimated 1983 Census data that Male Jews vocational secondary graduates only work after their conscription to the military service for three years. Using Mincer earning model, they found that vocational graduates who match their major in choosing the type of occupation earn higher wages than those who work in other different occupation from the training. The results are 9.6% for direct matching and 8.6% for wider matching. The matching procedure used is related to the vocational education system in Israel. The system focuses on industrial sector; therefore this type of education is regulated under the Ministry of Industry, Trade, and Labor (Nuffic 2015). The subjects are set to be applied appropriately in industry, thus they are prepared for specific purposes. The Professional Certificate obtained in the final year determines their participation in the labor market. That is why the direct matching and wider matching procedure are suitable as they are already identified as a professional.

Unfortunately, Hotchkiss (1993) did not agree to the matching procedure proposed by Neuman and Ziderman (1990). He observed US vocational graduates in the labor market by matching the occupation with the training. He pointed out that "… apparent effects of a training-related occupation are, in fact, only an effect of the occupation with which the training is matched" (Hotchkiss 1993:482). Thus, this matching is broader than the previous one. As they classified the vocational major only in two main majors which are Busi-

ness; and Trade and Industry, applying the broader procedure is a more appropriate approach. After confirming that OLS estimated no significant results different from switching regression, they found that broader matching produced stronger effects than narrower matching applied by Neuman and Ziderman (1990).

Furthermore, a few years later, Neuman and Ziderman (1999) confirmed the Hotchkiss critics by re-analysing the sample. They included either narrower or broader procedure in the model. The findings have higher significant results and greater effect than those of Hotchkiss variable. Two main factors contribute to these different results. The first factor is that US and Israel have different vocational education system. Vocational school in US is only in higher level, while Israel has two vocational school levels in secondary and higher education. As higher education may have higher qualification, different education level may produce different results. The second one is that Hotchkiss used only young graduates and omit the older workers observation with two main broad majors. On the other hand, Neuman and Ziderman identified vocational graduate workers with all level of working age followed by more specific field of study. Thus, the narrower procedure generates stronger evidence.

Based on the aforementioned reason, Hawley (2008) applied similar procedure to find the efficacy of vocational secondary education in Thailand. He made improvement analysis from both prior studies by analyzing both male and female workers. He found that female workers with matched classification enjoy 16% higher wages than those with mismatched classification. Meanwhile, he failed to show this effect to male workers. The failure is due to the matching procedure that the education major may have broader match to many types of occupations. Therefore, the analysis for both sexes becomes incomplete.

Moreover, from Germany, Witte and Kalleberg (1995) confirmed similar findings to other researches though they applied different matching procedure. This procedure matters for the dual system of vocational education in Germany. In Germany, students participate in the vocational education and apprenticeship program in the firm. In the program, firms choose the students to join them, that is, they get higher risk to be positioned in mismatched program-related vocational education. Based on this condition, there should be consideration to take subjective perspective approach from the workers to determine the matched term. The result found that men tend to prefer job that fit their apprenticeship program, thus they earn higher wages. In contrast, women have higher wages if they have fit all education, training, and occupation. The latter result applied similar procedure to previous evidence. It is more suitable to Indonesian vocational secondary condition. It is because the vocational education program in Indonesia has not been integrated yet with the industry, thus the education major matters for either students or employers to screen the match.

On the contrary, most of the researches in Indonesia focus on the rate of return to education, but only few are concerned on vocational education. Duflo (2001) and Comola and Mello (2009) observed the rate of return in all education level. Meanwhile, Deolalikar (1993) and Purnastuti *et al.* (2013) did similar studies to the previous, but they specifically report the return to vocational education. Only Chen (2009) and Suryadarma and Newhouse (2011) noted the

significant contribution to the vocational education literature. Unfortunately, none of them focused on the matching, thus they failed to show the efficacy of vocational education.

Deolalikar (1993) noted some finding related to secondary education. He used one year, 1987, data set of National Socioeconomic Survey (SUSENAS) merged with Village Potential (*Potensi Desa*) as a part of Economic Census 1986 data. He found no significant difference between OLS and logit approach method estimation results. The result is that the returns to education for women are higher for secondary and tertiary education, even though the enrollment of women in these schools is lower. Specifically, the significant effect can be seen from vocational secondary education.

Moreover, Duflo's research (2001)[4] was striking because he used the strong instrument in earnings function to estimate the return to education which is considered by other scholars to be applied in Heckman's estimation method. The instruments are "… the interactions between age in 1974 and the program intensity in the region of birth…" (Duflo 2001:807). Regarding the strong instrument, Comola and Mello (2009) estimated the employment and earnings determination using SAKERNAS 2014 data. This is explained further in section Methodology (4.3). The result shows positive correlation between education attainment and earnings with the interval of 9% to 10.8%, which is comparable to the estimate result by Duflo (from 6.8% to 10.6%). They may produce good information for this research regarding the appropriate estimation method.

However, from all studies that observe the returns to education in Indonesia, only two are concerned with vocational education namely that of Chen (2009) and Suryadarma and Newhouse (2011). Both scholars used a two-step Heckman selection estimation method to address the bias. By using two waves of Indonesia Family Life Survey (IFLS) data in 1997 and 2000, it is noted from Chen (2009) that taking vocational education at secondary level has no effect on the labor market outcome in comparison with those who enroll in a general high school. Unfortunately, there were some limitations in his research. First, he used two waves of IFLS data (three years' time difference), which are not enough to follow a young cohort (working age 18-21) data for three years after graduation in the labor market. Second, he did not differentiate the earnings between men and women.

Meanwhile, Suryadarma and Newhouse (2011) studied determinant factors of students who graduated from private and public either from general high school or vocational high school and its effect on labor market outcome. He used three waves of IFLS data in 1993, 1997, 2000, and 2007. These data provide family socioeconomic background and an education exam score to estimate sample selection method in the first step of Heckman model.

[4]Duflo (2001) observed the impact of Indonesian government schooling construction program on labor market outcome. The program, namely INPRES (*Instruksi Presiden*), was held between 1973 and 1978. Using data of 1995 from intercesal survey of Indonesia (SUPAS), he took only data of men with age of from 23 to 45 years old and used the panel cohort data instead of individual data. The research did not study the return to secondary education because the program was intended for Primary School only.

Unfortunately, they failed to distinguish the earnings differences between vocational and general school graduates. However, their results show that public school male graduates enjoy more labor market advantage than private school graduates, but this return has been falling for the past ten years.

The result from Suryadarma and Newhouse is supported by Purnastuti *et al.* (2013). Purnastuti *et al.* (2013) used the OLS estimation method to estimate two waves of IFLS data in 1993 and 2007 to see the declining rate of return to education in Indonesia after a certain length of time. According to the scholars, the reason behind the decline is because the economic activity in Indonesia shifted from industrial sector to the services sector. Thus, female who tends to choose services major enjoy more benefit than male.

Resulting from all the empirical evidence, this research provides two mains contribution to the vocational literature. First, using Mincer equation model, it includes both gender analyses using narrower matching with specific vocational major classification and detailed jobs classification across all level of working age. Second, it enriches the research with gender cohort analyses. Finally, using SAKERNAS data, it contributes to the Indonesian literature with recent and larger data

3.3 Mincerian Wage Equation

The advantages of education as human capital investment can be viewed from different approaches. Investment in human capital generates high economic growth in a country and increases individual efficiency. Improving capacities, raising the competitiveness in searching for a job, and increasing the economic return are the benefits of education to the individual as a worker in the labor market. The latter has been interesting for researchers to find the correlation of education attainment to earnings of workers. Most researches on earnings as an economic return to education have applied Mincer model to obtain the empirical evidence.

The Mincer model estimates the rate of return to education. The returns are estimated as annual earnings of the individual, while education is measured by years of schooling (Mincel 1974). The finding is that there is a positive correlation between earnings and education. In other words, the earnings increase by the increase of one year of education. The earnings function of Mincer model is written as follows (Heckman *et al.* 2003:4):

$$\ln[w(s, x)] = \alpha_0 + \varrho_s s + \beta_0 x + \beta_1 x^2 + \varepsilon$$

Where w is earnings of individual at level of educations, s is years of schooling from every level of education, x is years of experience, x^2 is experience squared considering the increasing return to experience resulting a diminishing return to years of experience, and ϱ_s is the rate of return to education as a target estimation.

Furthermore, the experience as a determinant factor for earnings is one of the essential parts in Mincer's findings. He used experience rather than age to see the effect of age to earnings. The experience is measured by the formula as fol-

lows: Years of experience equals to age subtracted by years of completing schooling and age of starting school. The relationships between schooling, experience, and earnings are presented in Figure 3-2.

In his book Schooling, Experience, and Earnings, he emphasized that the relationships between earnings and either experience or age are almost equal to different level of education cohorts. As it is presented in Figure 3-2, Mincer showed the relationship between the three variables using U.S. Census 1960 with weekly earnings for white nonfarm men. Based on the earnings and age profiles, earnings become greater as the education level raises and "… earnings increase with age through much of the working life" (Mincer 1974:65). It starts diminishing when the individual gets much older. Similarly, the earnings and experience picture showed a closely parallel result to the age. With this in mind, Mincer pointed out that the rate of earnings shows stronger influence in the earlier experience. Then, it becomes slower at the last parts of years of experience. On the other hand, using annual earnings, different profiles were captured for age and experience. Mincer argued that experience profiles show convergent result, whereas the age profiles present opposite result. Thus, the explanatory power of experience is higher than age to measure earnings.

Figure 3-2. Age and Experience Profiles Relative to Weekly Earnings of White Nonfarm Men (Mincer 1974:69)

AGE AND EXPERIENCE PROFILES OF RELATIVE WEEKLY EARNINGS OF WHITE, NONFARM MEN, 1959

NOTE: Figures on curves indicate years of schooling completed.
SOURCE: 1/1,000 sample of U.S. Census, 1960.
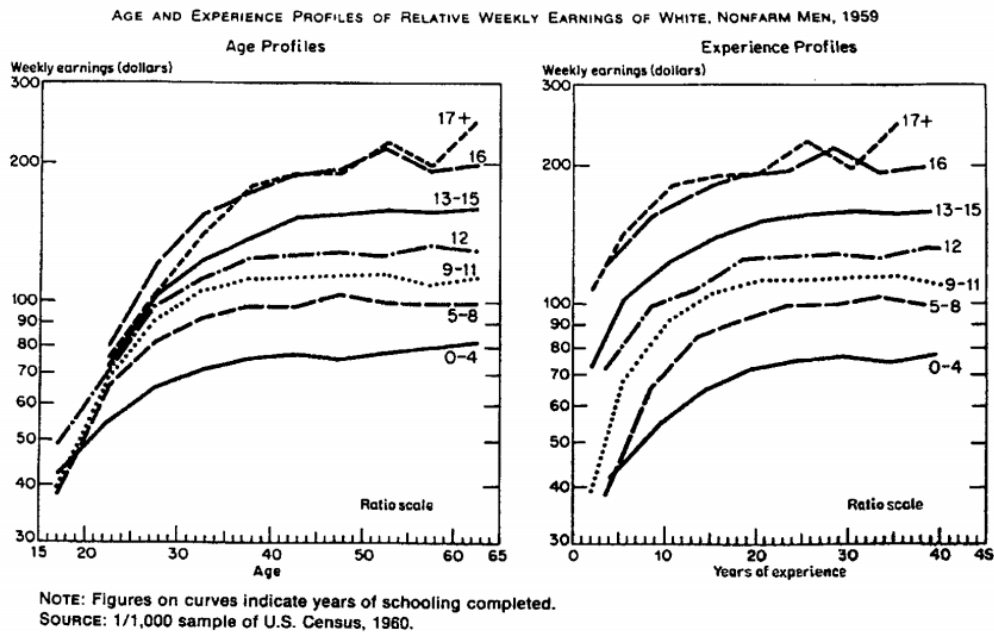
Source: Mincer in Schooling, Experience, and Earnings (1974:69)

Overall, the Mincer model of earnings has been the basic empirical model for studies on economic returns of education for several reasons. To begin with, Heckman (2003) pointed out that Mincer model schemes serve as the basis of estimating rate of return to education. In the second place, the model becomes the framework to estimate the relationship between experience in working and the gender earnings gap. Finally, it used data from various countries with different years.

Chapter 4
Data and Methodology

4.1 Data

SAKERNAS data from BPS will be used in this research. SAKERNAS is a survey data collected by BPS. The special thing of SAKERNAS is involves a large number of data. It consists of 200.000 household data of 20,000 census blocks from all districts (www.BPS.go.id). The households were randomly selected from every census block. BPS has conducted the survey every year since 1986. Since 2011, the survey has been held in three steps per year with 50,000 household data collected in every step.

The data include basic employment data, unemployment profile, and working age population who have other activities besides working. Basic employment data aim to see employment characteristics based on education, working hours, occupation, and sector classification of the worker, whereas the unemployment profile captures the effort of working age population in searching for a job. In addition to this, other activities are included in the survey for those who are in the working age, but they are still looking for a job. The activities are schooling, taking care of the household, and other similar activities. The respondents are working age society of 10 years and above. The working age population is categorized by the activities of the previous week as not workers and workers. For the latter, the respondents are characterized based on the type of employments namely "… salaried workers, self-employed (with or without assistance) or unpaid/family/casual workers" (Comola and Mello 2009:5).

SAKERNAS data of 2013[4] consist of data on education and employment of 495,080 individuals from 150,000 households of district level of all provinces in Indonesia. The information from SAKERNAS data encompasses the characteristic of individual information such as the relationship with the head of household, gender, age, marital status, and school participation. Furthermore, specific information on employment activities is divided into six blocks from VA to VF. Block VA covers information on education, for example level of education, major or field of study, and on the job-training practice. Subsequently, the previous week activities are covered in block VB. Main job activities and the second job or side job are in block VC and VD respectively. The information on workers who are looking for a job is available on block VE, while block VF consists of working experience.

This research on vocational secondary education will only focus on respondents with the highest level of vocational and general upper secondary school who have working activity in the previous week. Not only do this data set include full time workers (more than or equal to 35 hours per week), but also part time workers or underemployment (less than 35 hours per week). In these ways, the

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[4]Questionnaire of SAKERNAS 2013 is attached in the Appendix 1

age is limited to 18 years old, considering those who have just graduated with zero years of experience, to 64 years old, considering the oldest criteria for the working age population based on Labors Law No. 3 2003.

Furthermore, there are some excluded variables in this data set after cleaning. First, the marital status variable in the data set covers four types of status; married, not married, divorced, and widowed. Data with the last two status types are dropped because this research refers to the previous literatures in which the discussion is only limited to married and unmarried status. Finally, the majors of vocational upper secondary school are classified into four as mentioned in section 1.5. Unfortunately, the data set contains an unknown field of study with the classification code of 46. This code is dropped and followed by code of 50 which has no entry.

4.2 Variables

The variables included in the model are monthly earnings (in log form), tenure, tenure squared, and 7 dummy variables namely highly experienced, married, gender, urban, vocational, vocational related to occupation, and sector. The definitions of every variable are as follows.

1. Monthly earnings: Salary from main job obtained in the previous month (rupiahs).
2. Tenure   : Years of experience in the current occupation.
3. High experience: 1 = experience (age minus 12 minus 7) > 25 years and 0 = experience < 26 years.
4. Married   : 1 = married, and 0 = not married.
5. Gender: 1 = male, and 0 = females.
6. Urban: 1 = urban, and 0 = rural.
7. Vocational: 1 = vocational upper secondary high school graduates and 0 = general upper secondary high school graduates.
8. Vocational related to occupation (VOCR): 1 = vocational completers have major and occupational matching and 0 = secondary education completers with major and occupational not matching.
9. Sector   : classified to nine types of sectors based on Employment Classification of Indonesia (KLUI) 9.

The main variable of this research is VOCR. Neuman and Ziderman (1991) were the first who introduces this variable. It describes the vocational education graduates with major and occupational matching compared with either the vocational graduates with non-matching major and occupation or the general education graduates. They found significant result at 9% for direct matching and 8.1% for wider matching. On the other hand, Hotchkiss (1993) used ROCC variable. The ROCC variable is defined as "occupations for which relevant vocational education course are available" (Neuman and Ziderman 1999:410). After being criticized by Hotchkiss for their earlier paper (1991), in 1999 Neuman and Ziderman (1999) applied both ROCC and VOCR variables (known as VOCM.ROCC variable in their paper) and re-analysed the Israeli samples. As a result, using the VOCR variable is far more positive and significant than using ROCC variable. Thus, the VOCR variable is considered to be appropriate proxy for the matching.

The variable of VOCR is generated by matching the field of study of vocational graduates with occupation code. The occupation code is taken from KJI1982 variable regarding the detailed type of the job into three digits of classification. In this way, the code will minimize the biased of matching. The matching is classified as 'related' and not 'related'. The "related" classification contains a direct matching and a wider matching between major and occupation. For example, if he/she takes a field of study, number 44 (Fashion, Culinary Art, and Housekeeping) and works as a hair stylist, then it is included in directly matched. Another example, if he/she takes a field of study, number 45 (Hospitality, Tourism, and Nursing) and works as a nurse, it will be classified as a direct matching. Additionally, a wider matching puts someone with the major and occupation which are closely related (Neuman and Ziderman 1991). An example of this is someone with major number 42 (Electricity, Engineering, Graphics, Textile, Aviation) might become a production manager after certain years of working experience and tenure or someone with major number 44 (Fashion, Culinary Art, and Housekeeping) might become a manager of the meal preparation Economics. Due to this matching technique, Hawley stated that "the estimates of this model are overstating the benefits to be gained from matched employment" (Hawley 2008:197).

Besides main variable, there are some other variables included in the model. First, the variable of marital status influences earnings differently between married and not married. Gray (1997) argued that married has created men to be more productive as of getting higher earnings. In contrast, women lost their working hours after being married. This is a compensation of doing responsibility as a wife and mother. So, they spend fewer hours in the labor market and obtain fewer wages. Thus, the effect of being married on earnings is positive for male, but it shows negative sign for female.

Second, a dummy variable of high experience controls for the experience of workers after completing secondary education. The experience variable is measured by subtracting the age with 12 (number of years completing secondary education) and 7 (age starting the first class in basic education). The higher the experience, the greater the earnings obtained (Munasinghe *et al.* 2008). Next, tenure is the proxy for working experience in the current job. According to Purnastuti *et al.*, tenure is "… usually viewed as a measure of firm-specific training and knowledge" (Purnastuti *et al.* 2013:221). Similarly, Munasinghe *et al.* (2008) argued that tenure matters for investment in specific skills. An additional year of working experience in current occupation increases its return (Munasinghe *et al.* 2008) and its effect differs between male and female.

Furthermore, gender has a considerable effect on earnings. Gender discrimination leads to inequality in the labor market outcome. Knowles *et al.* (2002) emphasized that there is an imperfect substitution between men and women's participation in the labor market. In this way, not all types of jobs can be applied to both genders at the same level of education. Women tend to put a traditional woman's job as a priority to be chosen, for example secretary (Middleton *et al.* 1993). In fact, the job availability based on specialization is indeed limited

particularly for women (Deolalikar 1993). Therefore, female workers tend to have lower salary than male workers.

In addition, the next variable is the region. It surely affects earnings whether people live in urban or rural area. The development in a country is mainly concentrated in the urban area. It is where many jobs are available; so many people would come to get better jobs and earnings. According to Purnasuti *et al.* (2013), the urban dummy variable is preferable than provincial dummy. Supporting this argument, they estimated the model using the provincial dummy variable and found that the provincial dummy has minor effects to the rate of returns to education.

Finally, the model uses sector classification for controlling the earnings across nine different sectors (KLUI9). Based on BPS catalogue survey, the sectors are:
1. Agriculture, Hunting, Forestry, and Fishery.
2. Mining and Quarrying.
3. Manufacturing industry.
4. Electricity, Gas, and Water.
5. Construction.
6. Wholesale Trade, Retail Trade, Restaurants, and Hotels.
7. Transportation, Warehousing, and Communication.
8. Insurance, Financing, Real Estate, and Economics Services.
9. Community, Social and Personal Services

Different sectors demonstrate different salaries. The industrial sector is more likely to have higher salary than other sectors, whereas the agricultural sector tends to have lower salary (Di Gropello *et al.* 2011).

The information of summary of the descriptive statistics of all variables is provided in Table 4-1. It separates the summary statistic of vocational and general upper secondary school between female and male. The vocational graduate samples are 33.32% where the sample of females counts 27% of it. From the table, we can see that overall, male workers have higher average levels of all variables than female workers. The average number of men and women with high experience in vocational education is smaller than those with low experience. This fact is similar to the married variable. There are more married women in the sample than married men though the number of married people than that of unmarried in total samples. Moreover, more than 60% of the samples live in the urban area. It is not surprising because the development of education in a country is mostly concentrated in the urban area. For the sector where they work, community, social and personal services and wholesale trade, retail trade, restaurants, and hotel sectors are the two top sectors where most vocational graduates on average are in the sample. The first sector is dominated by women, whereas men are concentrated in the latter sector.

Table 4-1. Descriptive Statistics of Variables (Standard Deviation in Parentheses)

Variables	Female		Male	
	Vocational Secondary High School	General Secondary High School	Vocational Secondary High School	General Secondary High School
Monthly earnings (log)	13.893 (0.804)	13.773 (0.832)	14.252 (0.704)	14.235 (0.728)
Experience	14.171 (10.645)	15.075 (9.897)	18.016 (11.185)	19.131 (10.121)
Tenure	6.109 (7.404)	5.798 (6.638)	7.888 (8.244)	8.323 (7.859)
Tenure squared	91.951 (199.687)	77.672 (171.472)	130.177 (238.814)	131.032 (222.044)
High Experience				
Low Experience	81.82%	82.64%	73.75%	72.01%
High Experience	18.18%	17.36%	26.25%	27.99%
Married				
Single	36.25%	29.48%	25.55%	19.68%
Married	63.75%	70.52%	74.45%	80.32%
Region				
Rural	25.65%	32.50%	30.38%	39.97%
Urban	74.35%	67.50%	69.62%	60.03%
Major related Occupation				
Not Related	63.77%		73.26%	
Related	36.23%		26.74%	
Sector				
1. Agriculture, Hunting, Forestry, and Fishery.	3.47%	5.95%	14.01%	22.08%
2. Mining and Quarrying.	0.32%	0.28%	2.71%	2.59%
3. Manufacturing industry.	17.25%	14.33%	18.32%	10.84%
4. Electricity, Gas, and Water.	0.43%	0.31%	1.61%	0.70%
5. Construction.	0.55%	0.45%	6.27%	5.41%
6. Wholesale Trade, Retail Trade, Restaurants, and Hotel	40.54%	39.49%	20.82%	20.30%
7. Transportation, Warehousing, and Communication.	2.06%	1.70%	7.56%	8.23%
8. Insurance, Financing, Real Estate, and Business Servi	4.20%	4.19%	5.20%	4.76%
9. Community, Social and Personal Services	31.18%	33.29%	23.49%	25.10%
Sample Size	4378	8467	11767	23838

4.3 Methodology

The estimation techniques for the return to education are varied. Two techniques mostly used are OLS estimation and a two-step Heckman procedure or binomial selection. Even though various methodologies have been applied by scholars in education research, Neuman and Ziderman (1999), Hotchkiss (1993), and Hawley (2008) used OLS estimation technique to estimate and find the effect of major-related job matching to earnings. Moreover, Comola and Mello (2009), Duflo (2001), Chen (2009), and Suryadarma and Newhouse (2011) applied Heckman self-correction mechanism to estimate the return to education. Meanwhile, Purnastuti *et al.* (2013) and Deolalikar (1993) applied both OLS and selection methods to estimate the rates of return to education and found that there is no significant difference in results between OLS estimation technique and selection bias technique.

As it was mentioned before, Comola and Mello (2009) uses a strong instrument to apply the selection correction technique. Moreover, finding a high potential probability instrument variable in SAKERNAS data is not easy due to the absence of family socioeconomic background and education exam score information. By applying Duflo's instrument, Comola and Mello (2009) generated "years of education by exposure to Sekolah Dasar INPRES, measured as the intensity of school construction in an individual's district of birth and his/her age when the program was launched" (Comola and Mello 2009:9). Surprisingly, in the end, both scholars found that the sensitivity of the results from OLS estimation method was not different from selection technique. Therefore, OLS becomes an appropriate technique to address the answers to the research questions.

Additionally, Neuman and Ziderman (1991 & 1999), Hotchkiss (1999), and Hawley (2008) observed the matching between vocational education field of study and occupation. They used OLS technique to find the correlation between vocational completers-occupation match and earnings in Israel, USA, and Thailand. Three types of matching were applied, namely direct matching, wider matching, and not matching. Hawley has ensured that the OLS technique is fitted by checking the White's standard errors. Similarly, Hotchkiss (1993) ran both models and found that there are no significant differences in the result. They found similar findings that vocational education and occupational matching increases earnings either in the OLS regression results or Heckman estimation results. It concluded with significant results and no biased findings.

Furthermore, Neuman and Ziderman (1991) estimated the relationship between earnings and major-occupational matching for male only in Israel. They used Mincer wage equation model as a basic empirical model. Neuman and Ziderman (1991) used monthly earnings as dependent variable. The education attainment is proxied by years of schooling. For the main variable, they have three independent variables namely VOC for vocational education graduates, and VOCM for matching between major and occupation. Besides main variables, other variables are used as controls such as experience and ethnics. Moreover, one interaction variable is included in the model, that is experience*years

of schooling. They also considered economic sectors and type of occupation as dummy variables.

A few years later, Hawley (2008) observed the similar topic in Thailand by adding gender differences as a focus. Based on the model used by Neuman and Ziderman (!999), Hawley modified the model by using employment in a matched occupation only as a main variable. This variable has a broad matching. He considered that the major codes generate incorrect matching, so he used the employment to match the students with the occupation. Due to the broad matching, he applied interaction variable between experience and matched occupation. He found that this interaction variable increased the significance of the main variable. He separated the estimation between female and male samples. For the broad matching, he produced a broader estimation for gender differences.

This research will follow the model from the previous literatures on vocational education and occupational matching applied by Neuman and Ziderman (1999). They argued that the VOCR variable shows more significant results because it used more categories of major and broader analysis of group of workers (up to 50 years old workers). Therefore, they confirmed that this detailed matching provides more supportive and strong results. As this research uses more detailed vocational majors and occupations, the VOCR variable is an appropriate approach. However, while Neuman and Ziderman (1990) separated the direct matching and wider matching analysis, this research defines VOCR variable as either direct matching or wider matching. As Hawley argued that "…narrower matching procedures provides smaller estimates of the value of completing a course of study and gaining employment in the same area" (Arriagada and Ziderman 1992, Neuman and Ziderman 1999 as cited by Hawley 2008:201).

Furthermore, it applies the Mincerian wage equation model to estimate the effect of vocational education on earnings. The Mincer wage equation model is more appropriate to estimate the rate of return to education by considering education attainment and working experience. There are two equation models used in this research. These models have been modified as follows:

Model 1
$$\text{Ln (monthly wage)}_i = \beta_0 + \beta_1 \text{ highexp}_i + \beta_2 \text{ tenure}_i + \beta_3 \text{ tenure}_i^2 + \beta_4 \text{ married}_i + \beta_5 \text{ voc}_i + \beta_6 \text{ urban}_i + \beta_7 \text{ sec}_i + \varepsilon_i$$
Model 2
$$\text{Ln (monthly wage)}_i = \beta_0 + \beta_1 \text{ highexp}_i + \beta_2 \text{ tenure}_i + \beta_3 \text{ tenure}_i^2 + \beta_4 \text{ married}_i + \beta_5 \text{ voc}_i + \beta_6 \text{ vocr}_i + \beta_7 \text{ urban}_i + \beta_8 \text{ sec}_i + \varepsilon_i$$

The regressions were divided into three steps. The first one is that model 1 and 2 were regressed to find the answer of the first research question. In this case, full samples were used in regression analysis. The analysis would be to find the effect of including the VOCR variable in model 2. Next, the analysis of gender differences was applied to the model 2. Female and male samples were analysed separately using each samples (subsamples). The VOCR variable would be the main target of estimation in this step. The final step is the cohort analysis. The second model was applied to this analysis. The cohorts are categorized

based on age, young cohort (18-23 years old), middle cohort (24-40 years old), and old cohort (41-64 years old). This division is intended to find out the effect of the policy (see section 1.1). Regarding the policy imposed by government in 2005, younger cohort is the group that should have the impact of the policy. The effect on each cohort is analysed based on the main variable coefficient and its trend from younger to oldest cohort. This last step is analysed by gender analysis as well. All regression steps are clustered by sector level as the sector is a control variable for the type of employment.

Finally, the equality test was conducted to analyse the differential coefficient. It is intended to interpret the significant difference between two coefficients from different regressions. The test was applied to each coefficient of variable in either model 1 or model 2 regressions and in female and male regressions.

Chapter 5
Results and Analysis

Everybody is a genius. But if you judge a fish by its ability to climb a tree, it will live its whole life believing that it is stupid (Albert Einstein)

The sample distributions of the main variables (major and occupational matching-VOCR) between female and male are presented in Figure 5-1. These data are for vocational completers only. There are 9.81% of the vocational school graduates having an occupation related to the field of study of total samples. Since female and male have different favour of the field of study, they are concentrated in different matching between major and occupation. Female workers with the major of Economics, Bookkeeping, and Statecraft have more related occupations to their field of study. This condition is in line with the facts from Ministry of Man Power that approximately 56.45% of job vacancies in economic sectors have been filled by female workers (ILO Jakarta 2013). It means that they fit the criteria required by the firms. On the other hand, males mostly have an occupation matching with Electricity, Engineering, Graphics, Textile, and Aviation major. However, they also have matching in Economics, Bookkeeping, and Statecraft though the matching is still lower than females. Both genders have less matching jobs in Hospitality, Tourism, and Nursing, 11.61% of the total females enrolled and 3.84% of the total males enrolled.

There are two most related majors to occupation for men namely Electricity, Engineering, Graphics, Textile, and Aviation (35.21%) and Economics, Bookkeeping, and Statecraft (35.15%). This finding is in line with the data produced by Neuman and Ziderman (1999) that most of men with electricity and mechanics major have jobs related to their field of study.

Figure 5-1. Number of Major and Occupational Matching of Vocational Upper Secondary School Completers

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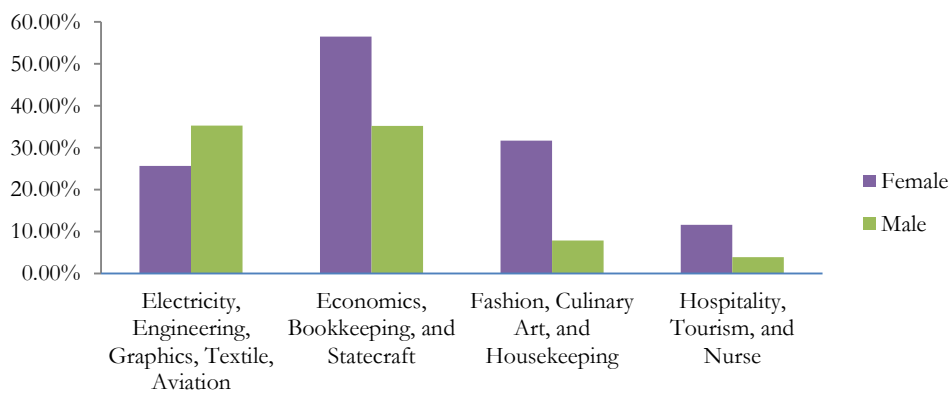
[5]Author's calculation based on SAKERNAS 2013 data

On the other hand, female workers are concentrated Economics, Bookkeeping, and Statecraft major. Approximately 56.61% of women have an occupation suited to the field of study. As this major is related to the clerical and office work, this type of job is a stereotype of women's job (Middleton *et al.* 1993). Therefore, women were found relatively dominating in this major. In fact, based on data from ILO (ILO Jakarta 2013), the increase of annual growth of services sector from 2004 to 2009 has increased female workers participation in the finance, real estate, and services sector. This is also followed by the increase of minimum nominal wages in this sector at the second highest wages among sectors (ILO 2013) which may attract female workers to remain in the job that fits their vocational major. Thus, their matching chances are much greater than men.

5.1 The Impact of Vocational School and Vocational Major-related Occupation on Earnings

The first step of analysis is regression of model 1 and 2 with a full sample. Both models apply Mincer model as a basic model. Model 1 shows the effect of vocational education on earnings, whereas Model 2 considers VOCR variable to see the effect of major and vocational matching of vocational completers on earnings. According to Neuman and Ziderman (1999), the model which consists of vocational education (voc) variable only generates either a small effect or insignificant result on earnings. Meanwhile, putting VOCR variable in the model reflects greater profiles on the impact of vocational education completers on the labor market outcome.

The regression result of the first analysis step is presented in the Table 5-1. After conducting the equality test for each variable in both models (the equality test result is attached in Appendix 5), the regression results are analysed as follows. First, workers with high experience have 5.1% higher earnings than those with low experience for additional increase of 1 year of experience. The result is statistically significant at the 10% confidence level. This condition does not change to model 2. Second, tenure and tenure squared have statistically significant at the 1% level) similar effects for both models. The working experience in the current occupation for secondary education completers has an impact of 38% on earnings for 10 years of experience. This result is twice higher than the regression result of tenure in Purnastuti *et al.* (2013). It is because they used IFLS data of all education levels, while this research is concerned with secondary education completers only. That is, tenure is more important for education graduates with specific skills to increase wages.

Table 5-1. Regression Results of Model 1 and Model 2 for Full Sample of Vocational and General Graduates Workers[6]

	Model 1	Model 2
highexp	0.051*	0.053**
	(0.022)	(0.023)
tenure	0.038***	0.038***
	(0.009)	(0.009)
tenure2	-0.000***	-0.000***
	(0.000)	(0.000)
married	0.138***	0.140***
	(0.036)	(0.035)
gender	0.348***	0.350***
	(0.038)	(0.037)
urban	0.194***	0.193***
	(0.015)	(0.015)
voc	0.029*	-0.013
	(0.014)	(0.010)
VOCR		0.135***
		(0.021)
_cons	13.177***	13.184***
	(0.136)	(0.134)
N	39281.000	39281.000

Notes: Robust standard errors are in parentheses
* significant at $\alpha = 10\%$
** significant at $\alpha = 5\%$
*** significant at $\alpha = 1\%$

Next, the variables married, gender, and urban variables affect earnings positively. A married worker earns 13.8% higher than an unmarried worker. After considering the VOCR variable, this result does not show much change. After that, gender is analysed as a variable in this step, but it is observed further in step two of regression. The result is that men obtain 34.8% higher salary than women. Fifth, it is urban variable. Workers living in the urban area earn 19.4% higher salary than those living in the rural area. Indeed, in the rural area, agricultural sector is the mainly focused working sector in Indonesia. This sector earns the lowest salary among others (ILO Jakarta 2013). Thus, workers living in the rural area earn less than those living in the urban area. The coefficients associated with married and urban are statistically significant at the 1 % level.

Lastly, it is the analysis of the voc and VOCR variables in Model 1 and Model 2. The variable of voc shows a small effect on the earnings. Although it has small influence on earnings, it shows Becker and Mincer theories that skills increase earnings. That is, the vocational education graduates earn 2.9% (statistically significant at the 10% level) higher wages than general education graduates. As predicted by Neuman and Ziderman (1999) that consider vocational variable only leads to a small effect result in earnings. The inclusion of VOCR variable in the model (Model 2) shows greater effect.

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[6]The regression results of sector variable, including full regression results, are attached in Appendix 2, 3, and 4

Moreover, having major and occupational matching for vocational education graduates affects their salary positively. It makes their salary 13.5% (statistically significant at 1%) higher than those with a mismatched between field of study and job. Neuman and Ziderman (1991) had the regression result of the vocational education variable and matched variable of 2.6% and 9.6% respectively. This is to indicate that the result of this paper shows similar effects. Thus, VOCR variable shows that vocational education graduates have better effect on earnings if they have matching major and occupation.

The second step of analysis focuses on gender. The regression results of model 2 are described in Table 5-2 and separated between female and male workers. Since previous table shows that model 1 and model 2 have no significantly different results in coefficient of variables, the gender differences is analysed only in model 2. The analysis focuses on the effect of having major and occupational matching on earnings. The full regression results of both models (inclusion of sector regression results) are attached in Appendix 3.

Table 5-2. Regression Results of Model 2 for Female and Male Sample of Vocational and General Graduates Workers[6]

```
---------------------------------------------
                  Female          Male
---------------------------------------------
highexp           0.072           0.038*
                 (0.082)         (0.017)
tenure            0.047**         0.032***
                 (0.017)         (0.006)
tenure2          -0.000          -0.000***
                 (0.000)         (0.000)
married          -0.021           0.231***
                 (0.048)         (0.031)
urban             0.270***        0.156***
                 (0.034)         (0.012)
voc               0.022          -0.027*
                 (0.017)         (0.014)
VOCR              0.135           0.129***
                 (0.085)         (0.026)
_cons            13.200***       13.517***
                 (0.137)         (0.083)
---------------------------------------------
N             11134.000       28147.000
---------------------------------------------
Notes: Robust standard errors are in parentheses
       *    significant at α = 10%
       **   significant at α =  5%
       ***  significant at α =  1%
```

The regression results of each variable are discussed by comparing male and female. Before doing the comparison, each variable is tested using equality test to check whether the coefficients are statistically different between female and male regression results. The results of the equality test are provided in Appendix 5. The first variable is high experience. A high experience gives positive and significant effect for males. The earnings of males with high experience (more than 45 years old) are 3.8% higher than those with low experience. Meanwhile, this is not significant for females though it shows higher magnitude and positive effect. The second variable is experience in the current job position,

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known as tenure. The results are not statistically different between men and women. After 10-year-tenure, the wages for female and male workers increase by 47% (significant at 5% level of confidence), while males earn only 32% (significant at 1% level of confidence) wage increase. The results show us that both experience and tenure increase labor market outcome.

Moreover, a marital status matters to get better earnings (Becker 1985 & Matthews 2000). From Table 5-2, a married woman earns 2.1% lower wages than an unmarried woman. In contrast, men obtain the benefit of being married. The earnings are 23.1% higher than those of unmarried men. These results are in line with the theory from Becker (1985) that women face many limitations after being married. They spend fewer hours in the labor market because of family reasons. Married women have the responsibility to take care their husband and children. Their time as workers in the labor market is reduced by their time of being a wife and mother. Thus, it generates the gender differences in getting earnings between male and female workers based on their marital status.

On the other hand, those living in the urban area attract more advantages to the labor market (Matthews 2000). The result from Table 5-2 is that workers who live in the urban area earn 27%, for female, and 15.6%, for male, higher wages than those who live in the rural area. After the equality test, female workers gain similar benefit of living in the urban area to male workers. Supporting these results, as the aforementioned argument, the services sector in Indonesia is indeed more concentrated in the urban area, while the rural area is dominated by agricultural sector. That is, the sector concentrated in the area influences the wages earned.

The VOCR variable has a positive effect on earnings for both female and male workers, although it is an insignificant effect for female workers. This variable in both female and male shows greater effects than the vocational education variable. A vocational education graduate earns if she/he has an occupation matching the major in vocational school. This benefit is compared to those with a mismatch between occupation and the field of study either for vocational school graduates or even for general school graduates. Female workers earn higher wages (13.7%) for this matching than male workers (12.9%). As a comparison, Neuman and Ziderman estimated this matching for male workers only in Israel and reported 9.5% matching in 1991 paper and 9.9% matching in 1999 paper, whereas Hawley (2008) reported 16.7% for female and negative and insignificant result for male workers in Thailand. Greater magnitude results in this research depict broader matching as argued by Hawley (2008). The result informs Neuman and Ziderman (1999) and Hawley (2008) that "… vocational education completers who worked in these training-related occupations, enjoyed a sizeable earnings advantage over their counterparts" (Neuman and Ziderman 1999:408).

The insignificant result for female is due to the matching problem of the major of Economics, Bookkeeping, and Statecraft as this major is dominated by fe-

male workers. This major generates much broader matching. Neuman and Ziderman (1991) defined wider matching with higher job position, for example Manager. In this paper, broader matching is also defined as they did, but also it represents having an occupation that is closely related to the major. For example a vocational graduate with this major works as a sales promotion girl. The reason why this pair is categorized as matching is that economics and Bookkeeping majors in secondary education level have marketing as one of the subject. Therefore, this job considered matching the field of study. As Hawley (2008) argued about this broad matching, "… the estimates from this model are overstating the benefits to be gained from matched employment" (Hawley 2008:197). Thus, the VOCR variable produces insignificant result.

In contrast, matching procedures in the Electricity, Engineering, Graphics, Textile, and Aviation major are found less broad. The diversity of the occupations related to this major has less variety of broader matching. For example vocational graduates with this major have an occupation as a Production Manager or Technical Manager for wider matching and technicians, navigator, or machine operator for direct matching. Thus, the VOCR estimate of male workers who dominate in this major is estimated statistically significant.

The results reported that the greatest contribution to the matching for female workers is dominated by the major of Economics, Bookkeeping, and Statecraft. From Figure 1-4, it is indeed that the majority of vocational school women graduates tend to choose this major. In other words, women remain in the matching area in both education and labor market. From Germany experience, Witte and Kalleberg argued that, "Most importantly, lower upward mobility rates among women-regardless of whether they are due to weaker labour-force attachment among women or mistaken perception among employers that this is the case—are likely to mean that women are more likely to be found in jobs that fit their post-secondary training" (Witte and Kalleberg 1995:300). In view of this, a buzzword of "women's traditional works" seems appropriate to describe it. It is related to lower skill, nonphysical work, and less technological change. That is why Economics, Bookkeeping, and Statecraft major could be defined as women's traditional work. In low or initial level of occupation (entry level for secondary education graduates), these kinds of jobs involve office, typing, and clerical works of which low technical skill and less technology are used and even easy to do manually (Middleton *et al.* 1993). This is for sure in contrast to men's jobs.

The result for men does not have statistically significant difference from women, with a large size of earnings of 12.9% higher than non-matching groups and general graduates. The Electricity, Engineering, Graphics, Textile, and Aviation major has the highest contribution to this estimation. Mainly, male workers with this major work in industrial sector. Moreover, the sector has been dominated by male workers for more than 20 years (Figure 5-2). Thus, they match the criteria of the vacancy in this sector.

Figure 5-2. Share of Employees in Industrial Sector between Male and Female
Employment
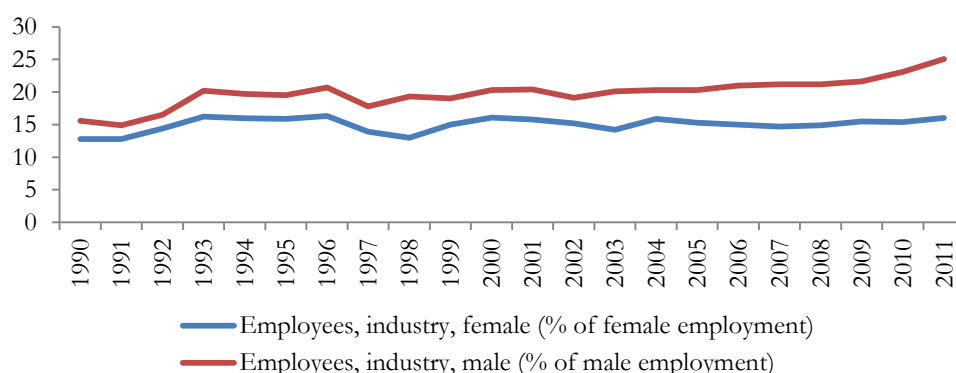
Source: World Bank Indicator (http://data.worldbank.org/country/indonesia, Accessed 11 July 2015)

The findings in this research support the vocational education literature. It shows the efficacy of vocational education through the matching between field of study and occupation. It is also noted that female workers earn more than male workers. However, in this case, the matching increases earnings of both workers. Thus, the vocational education gives benefit to its graduates.

5.2 The Cohort Effects on Impact of Vocational School and Vocational Major-related Occupation on Earnings

The effects of vocational major and job matching are observed for different groups of ages. Cohort 1 represents young cohort, middle cohort is presented by Cohort 2, and Cohort 3 shows the result for old cohort. The analysis was conducted separately between female and male workers for each cohort. The shares of VOCR variable for female regression are 18.5% for cohort 1; 13.8% for cohort 2; and 11.0% for cohort 3. Meanwhile, male workers with matching major and occupation are 15.7% in cohort 1; 9.5% in cohort 2; and 8.2% in cohort 3. The regression results of voc and VOCR variables are provided in Table 5-3. More specifically, the VOCR coefficients in each cohort are illustrated graphically in Figure 5-3.

Table 5-3. Regression Results of the Effect of Vocational Major-Related Occupation on Earnings for Different Age Groups[6]

	Female			Male		
	Cohort 1	Cohort 2	Cohort 3	Cohort 1	Cohort 2	Cohort 3
voc	0.073**	-0.036	-0.026	0.007	-0.029**	-0.040
	(0.031)	(0.042)	(0.039)	(0.033)	(0.011)	(0.028)
VOCR	0.046	0.246*	0.099**	0.160***	0.124***	0.134
	(0.089)	(0.113)	(0.039)	(0.034)	(0.018)	(0.073)
N	2984.000	5601.000	2549.000	3940.000	14709.000	9498.000

Notes: Robust standard errors are in parentheses
* significant at α = 10%
** significant at α = 5%
*** significant at α = 1%

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Vocational upper secondary education graduates enjoy higher earnings than general upper secondary education graduates for both female and male workers. This effect declines as the workers get older. Cohort 1 is a group of workers who graduated from secondary education with zero to five years of experience, which has been expanded by the government to minimize the risk of being unemployed through the policy. This group earns 7.3% for female significantly higher than general education group, while it affects insignificantly to male. The vocational policy affects positively to this cohort because it imposed strategy of expanding not only for the quality of the vocational school and its teachers, but also for the students. Thus, they earn higher salaries than other older cohorts which are not affected by the policy.

Figure 5-3. Graph Illustration of VOCR Coefficient in Each Female and Male Cohort
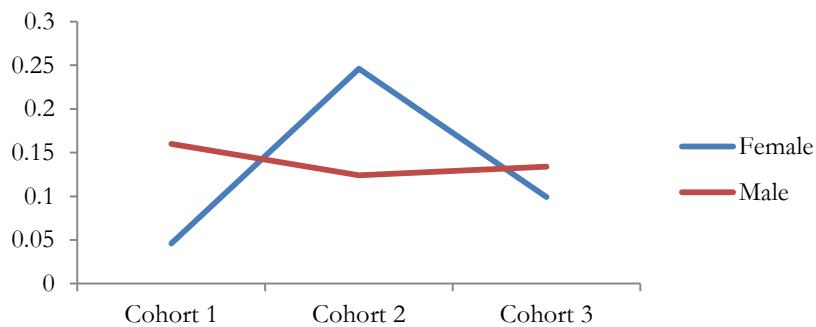
Furthermore, the VOCR variables on earnings in both sexes across all cohorts show positive impact on earnings, but they are different between female and male workers. As can be seen from Figure 5-3, the illustration graph of female workers is shaped inversely compared to that of male workers. More specifically, the youngest cohort of female regression result for vocational major-related occupation has insignificant result (4.6%). Next, the effects increase for the middle cohort. It is 24.6% higher than the mismatching groups. Then, the effect declines for the oldest cohort. In contrast, the impact for male workers starts with the highest earnings (16%) for very recent vocational graduates group. Next, the middle group has lower earnings. Finally, the impact increases slightly for the oldest cohort, but it is not significant.

More specifically, it is noted from female workers that the coefficient of VOCR variable in the middle cohort enjoys the highest wages among others. The plausible explanation of this is that female workers has low mobility rate allowing them to remain in one occupation (Munasinghe *et al.* 2008). After finding a matching occupation with their field of study, they are still found in the similar job for a few years of experiences. With respect to this, the labor market conditions influence their decisions (Middleton *et al.* 1993). The decisions of resigning from working and moving to another job do not ensure them to gain higher wages and better job. It is because the employer's perspective to female workers makes limited jobs availability for women as they are less productive worker (Middleton *et al.* 1993 and Witt and Kalleberg 1995), so their mobility to move out from the matching job is low. That is, "women who are employed in traditional female occupations are thus more likely to make use of their vocational education" (Witt and Kalleberg 1995:306).

Then, at the last stage of working age, the earnings decline sharply for the oldest cohort. Lower wages return may imply two contributing factors. The first one is that women tend to leave their job at this stage as they face many limitations particularly because of marital status (this cohort is dominated by married women). Women have greater risk of leaving their job as they have many restrictions in time, physical working, and other considerations such as having children (Middleton *et al.* 1993 and Witt and Kalleberg 1995). Second, as skilled workers, their skills are reduced gradually as they become older and reach the last stage of working age. They become less skilled because their abilities to adapt with new technology and new science decline. Thus, they could not enhance their skills and the possibility to be replaced by new entrant workers is higher. As argued by Witt and Kalleberg that "the skills acquired during one's vocational education may lose their value and relevance, particularly in the face of changing technology" (Witt and Kalleberg 1995:298). Therefore, their wages declines sharply.

On the contrary, the cohort analysis result for male workers is the inverse of the analysis result for female. At the early carrer in the labor market, male workers earn 16% higher wages than other cohorts. This result is in contrast to that of Neuman and Ziderman (1999), but it shows similar effect to Suryadarma and Newhouse (2011) and Witte and Kalleberg (1995). Neuman and Ziderman observed the effect in the Israel labor market which is considerably different from Indonesia labor market. Their high school completers have to attend military conscription for three years, so their youngest cohort in the labor market starts at the age of 25 years old with 3 years experiences. In Israel, the middle cohort enjoys more beneficial earnings for the matching. Meanwhile, Suryadarma and Newhouse and Witte and Kalleberg noted that the participation of the male youngest cohort for public vocational school is high, but it decreases gradually within longer career. Similarly, in this paper, the cohort effect for males participation declines when entering middle cohort.

Moreover, the decline may be due to the high mobility of male workers to move out from the job after a few years of experience (Witt and Kalleberg 1995). In this case, looking back to Indonesia labor market, the shift of Indonesian economy from industry to services sector in recent years may attract male workers to move out from the industrial job to services occupation which does not fit their field of study. The growth of services sector has been higher than that of industry for the last 10 years. It requires more demand of labor. Since men fit the labor market in the technical and industrial major, the wage in the matching variable decreases due to their moving to other occupations. Unfortunately, the mobility of male workers to other sectors requires stronger evidence that this research does not provide specifically. Supporting evidence can be resulted by estimating the longitudinal data from cohort analysis during certain period of economic condition in Indonesia. The estimation will provide supporting evidence of trend of the cohort overtime to see their mobility across employment and occupation. Next, the oldest cohort shows insignificant effect though it gives positively higher magnitude. As a result of the men cohort analysis, early career contributes higher wages to the efficacy of vocational education.

Meanwhile, the cohort analysis shows that the vocational policy may result in inefficiency to give advantages to the vocational graduates. The greatest benefit of the matching has been experienced by the female middle cohort who has graduated from vocational school before the vocational policy's imposition. If the government is not concerned yet about the vocational education, the jobs availability in the labor market may give higher possibility for the vocational graduates to find the right job matching their major. On the contrary, the youngest cohort felt the impact of the policy, but it failed to give more advantages in labor market outcome. As the number of vocational graduates increase, it is not supported by the labor market in terms of job availability. Nevertheless, the male workers still enjoy the benefit at their early career because the government sets industrial sector as their target strategy. Thus, the benefit goes to men who mostly fit their major. This result indicates that the policy fails to impartially support gender discrimination.

Overall, the consequences in the labor market after cohort analysis imply some policy recommendations for the government as a reflection in expanding vocational education graduates in the labor market. First, expanding vocational graduates' policy is indeed appropriate to reduce the risk of the graduates being unemployed, but without considering enhancement of the job availability in the labor market, it would generate inefficiency of vocational education graduates. In this case, the government should identify the coherence between the strategy of expanding school and the forecast of future labor market needs for both women and men.

Moreover, matching the skills with the labor market needs requires cooperation between the government represented by the Ministry of Education and Ministry of Manpower and Transmigration and employers. The Ministry of Education should update the vocational education curriculum relevance to the firm's job requirements followed by gender occupation analysis as this has not become the focus yet. This is already done by Ministry of Industry in improving SAKMA vocational graduates in the labor market (see section 2.2). This aims to create the link between learning in school and application in the labor market. It also creates the link between the field of study expanded and the more detailed needs of employment through the economic condition (World Economic Forum 2014) considering different concentrated employment of male and female workers. Meanwhile, the Germany experience and World Bank report suggest that the vocational graduates should be equipped strongly with general skills before entering the labor market as this skill becomes their weakness in the labor market (Witte and Kalleberg 1993 and Di Gropello *et al.* 2011). Thus, the Ministry of Manpower and Transmigration could improve the skill of vocational graduates by providing a free training which should not distinguish the gender stereotype.

Second, due to the mobility, the Ministry of Manpower and Transmigration should encourage the firms to provide on-the-job training for both female and male workers to increase the efficacy in the long term. As cited by Witte and Kalleberg (1993) from Blossfeld, (1991) that "opportunities for intra-and inter-firm mobility, and the degree to which employers view them as committed

employees" (Witte and Kalleberg 1993:300). Less mobility may show high commitment to the firms. As a result, they will have better match by having on-the-job training and more attachment in the current job. Based on Mincer (1974), on-the-job training increases the wages of skilled workers. Higher wages will surely attract them to remain in the jobs and reduce the mobility. However, the policy should be formulated by considering that women have similar opportunities to improve their skills though they face limitations. In view of this, the implementation may be followed by the regular monitoring by the government. That is, the gender discrimination is expected to decrease.

Chapter 6
Conclusion

This research attempts to observe the effect of vocational education on earnings. It also tries to estimates the efficacy of vocational education through the matching between vocational major and occupation and its relationship to earnings. Further, the gender differences in earnings are analysed with respect to the efficacy of vocational education. Using SAKERNAS 2013 data from BPS, the estimation method follows Mincer model as a basic model to find the relationship between education and earnings, particularly for skilled workers. The main targets are vocational education variable and the matching variable (VOCR) which are analysed separately between male and female workers followed by the cohort analysis across gender.

The results in this research contribute to the vocational education literature in Indonesia through the new findings related to the efficiency of vocational education graduates in the labor market. First, the efficacy of vocational graduates surely increases earnings by matching its field of study with the occupation. The vocational education per se shows only a small impact on earnings, but the impact could be raised through the matching. The impact is similar to both male and female workers as they have different concentration in the field of study. Therefore, they have been concentrated in different occupations and employment. Unfortunately, these differences generate different wages across different groups of working age. This becomes another new finding in this research. The cohort's analysis of each gender for the matching variable produces a contrasting result for male and female workers. The matching gives more advantage in higher earnings on middle cohort, while early participation of male workers in the labor market obtains this advantage more than other cohorts. These two new findings are expected to enrich the vocational literature in Indonesia and give input to the government as the consideration to create new policy related to the vocational education.

Furthermore, the essential implication of the results from cohort analysis between male and female workers generates some consequences to labor market in Indonesia. First, the vocational policy has succeeded in increasing the wages of vocational graduates for female workers though relatively with a small impact. Further, its efficacy through the matching between major and occupation is higher for male workers than female workers at the early stage of their careers in the labor market. Second, although the policy was imposed after the workers have graduated from vocational schools, the efficacy is higher for women after five years of experience, but it is lower for men. The mobility may cause different effect on each gender in this cohort. The reasons of the mobility are different between men and women. Finally, although the oldest cohort has higher experience in the labor market, their skills become obsolete. Thus, their wages decrease as they are less adapting to the new technology.

The overall analysis generates two main issues that need to be raised by some scholars related to the vocational education research. First, the results imply

that the mobility of vocational graduates become the issue to be focused on as the labor market provides little support on the jobs availability particularly for women. As argued by Middleton (1993) that the limitation should not be considered by the firms to give similar chances to women to be out of the traditional box. This may increase their labor market outcome. Second, taking on-the-job or off-the-job training may give long term benefit to the vocational graduates either after they have graduated or during their participation in the labor market (Munasinghe *et al.* 2008). As technology has kept increasing rapidly, this training should be updated simultaneously to obtain the long term benefit. This becomes problematic for government and the firms in providing the training.

To sum up, the evidence in this research yields policy conclusions for vocational expansion strategy. The results show that there is an imbalance support between education and the needs of the labor market. Vocational schooling should be considered the labor market conditions to reach the right target in the future as their policy is the long term strategic plan. Next, there is still gender inequality in the employment in vocational labor market. The gender stereotype discriminates women to experience better earnings. The government should monitor their policy implementation to ensure an impartial treatment for all genders. Finally, to have the right profile of the labor market condition in Indonesia for vocational education, the data should be equipped with complete information on more detailed major (not group of major classification), education history background, and family education background as these information may influence the earnings (Neuman and Ziderman 1991). As Indonesia has a population of more than 200 million people and it consists of more than 17,000 islands, it becomes a big challenge for the government to have an impartial policy either in education or employment opportunities.

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Appendices

Appendix 1

SAKERNAS 2013 Questioner

BADAN PUSAT STATISTIK

SURVEI ANGKATAN KERJA NASIONAL 2013
KETERANGAN RUMAH TANGGA

RAHASIA   **TRIWULAN** ☐

	I. PENGENALAN TEMPAT		
1.	PROVINSI		☐☐
2.	KABUPATEN/KOTA *)		☐☐
3.	KECAMATAN		☐☐☐
4.	DESA/KELURAHAN *)		☐☐☐
5.	KLASIFIKASI DESA/KELURAHAN	PERKOTAAN -1 PERDESAAN -2	☐
6.	NOMOR BLOK SENSUS		
7.	NOMOR KODE SAMPEL SAKERNAS TRIWULANAN		☐☐☐☐☐☐
8.	NOMOR URUT RUMAH TANGGA SAMPEL {SAK13.DSRT BLOK III KOLOM (1)}		☐☐
9.	NAMA KEPALA RUMAH TANGGA		
10.	HASIL KUNJUNGAN	1. BERHASIL 2. MENOLAK 3. TIDAK DAPAT DITEMUI	} BLOK III, STOP ☐

	II. RINGKASAN		
1.	JUMLAH ANGGOTA RUMAH TANGGA		☐☐
2.	JUMLAH ANGGOTA RUMAH TANGGA YANG BERUMUR 10 TAHUN KE ATAS		☐☐

	III. KETERANGAN PETUGAS		
1.	A. KODE PENCACAH:	☐☐☐	
	B. NO. HP PENCACAH:	☐☐☐☐☐☐☐☐☐☐☐☐	
2.	NAMA PENCACAH:	TANGGAL PENCACAHAN:	TANDA TANGAN: ....
3.	A. NAMA PENGAWAS:	TANGGAL PEMERIKSAAN:	TANDA TANGAN: ....
	B. NO HP PENGAWAS:	☐☐☐☐☐☐☐☐☐☐☐☐	

*) Coret yang tidak perlu

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Appendix 1 (continued)

IV. KETERANGAN ANGGOTA RUMAH TANGGA						
					HANYA UNTUK ART 10 TAHUN KE ATAS	
No. urut	Nama anggota rumah tangga	Hubungan dengan kepala rumah tangga (kode)	Jenis kelamin Lk - 1 Pr - 2	Umur (tahun)	Status perkawinan (kode)	Partisipasi sekolah (kode)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1		☐	☐	☐☐	☐	☐
2		☐	☐	☐☐	☐	☐
3		☐	☐	☐☐	☐	☐
4		☐	☐	☐☐	☐	☐
5		☐	☐	☐☐	☐	☐
6		☐	☐	☐☐	☐	☐
7		☐	☐	☐☐	☐	☐
8		☐	☐	☐☐	☐	☐
9		☐	☐	☐☐	☐	☐
10		☐	☐	☐☐	☐	☐
11		☐	☐	☐☐	☐	☐
12		☐	☐	☐☐	☐	☐
13		☐	☐	☐☐	☐	☐
14		☐	☐	☐☐	☐	☐
15		☐	☐	☐☐	☐	☐

Kode Kolom (3):
Hubungan dengan kepala rumah tangga

1. Kepala rumah tangga
2. Istri/suami
3. Anak
4. Menantu
5. Cucu
6. Orang Tua/Mertua
7. Famili Lain
8. Pembantu Rumah Tangga
9. Lainnya

Kode Kolom (6):
Status perkawinan

1. Belum kawin
2. Kawin
3. Cerai hidup
4. Cerai mati

Kode Kolom (7):
Partisipasi sekolah

1. Tidak/belum pernah bersekolah
2. Masih bersekolah di jenjang pendidikan formal
3. Masih bersekolah di jenjang pendidikan non formal
4. Tidak bersekolah lagi

1. SETIAP SELESAI MENCATAT SEMUA ART DI KOLOM (2) DAN KOLOM (3) TANYAKAN SEKALI LAGI APAKAH ADA ART LAIN SEPERTI PEMBANTU RUMAH TANGGA, SOPIR, TUKANG KEBUN, PENGASUH ANAK/ORANG TUA DAN YANG SEJENISNYA YANG TINGGAL BERSAMA DALAM RUMAH TERSEBUT. JIKA ADA, MASUKKAN DALAM DAFTAR.

2. TANYAKAN PULA APAKAH ADA NAMA-NAMA YANG TERLEWAT SEPERTI BAYI YANG BARU LAHIR DAN ART YANG SEMENTARA BEPERGIAN. JIKA ADA, MASUKKAN KE DALAM DAFTAR.

3. SEMENTARA ITU, UNTUK ART YANG BEPERGIAN KURANG DARI 6 BULAN TETAPI DENGAN TUJUAN PINDAH ATAU AKAN MENINGGALKAN RUMAH SELAMA 6 BULAN ATAU LEBIH TIDAK DIANGGAP SEBAGAI ART, KELUARKAN DARI DALAM DAFTAR.

4. URUTKAN KEMBALI KE NOMOR URUT YANG ADA DI KOLOM (1).

Appendix 1 (continued)

V. KETERANGAN ANGGOTA RUMAH TANGGA YANG BERUMUR 10 TAHUN KE ATAS

NAMA: .... NO. URUT ART: ....

PEMBERI INFORMASI : ....

V.A. PENDIDIKAN

1.a. Apakah ijazah/STTB tertinggi yang dimiliki (NAMA) ?

Tdk/blm pernah sekolah	**1**	SMA/Aliyah	**8**
Tdk/blm tamat SD	**2**	SMK	**9**
SD/Ibtidaiyah	**3**	Paket C	**10**
Paket A	**4**	Diploma I/II	**11**
SMP/Tsanawiyah	**5**	Diploma III	**12**
SMP Kejuruan	**6**	Diploma IV/Universitas	**13**
Paket B	**7**	S2/S3	**14**

R1.c

b. Jurusan pendidikan/bidang studi: *DIISI PENGAWAS*

....

c. Apakah (NAMA) pernah mendapatkan pelatihan kerja dan memperoleh **sertifikat**?

YA   1   TIDAK   2 ➞ *SUB BOK V.B*

d. Sebutkan dua jenis pelatihan kerja yang utama? *DIISI PENGAWAS*

1. ....

2. ....

V.B. KEGIATAN SEMINGGU YANG LALU

2.a. Selama seminggu yang lalu: YA   TIDAK

1. Apakah (NAMA) bekerja ?   1   2
2. Apakah (NAMA) sekolah ?   1   2
3. Apakah (NAMA) mengurus rumah tangga? 1   2
4. Apakah (NAMA) melakukan kegiatan
   lainnya, **selain** 'kegiatan pribadi' ?   1   2

JIKA KEGIATAN 1 s.d 4 BERKODE "2" LANJUTKAN ke R3

b. Dari kegiatan 1 s.d 4 yang menyatakan **"Ya"** di atas, kegiatan apakah yang menggunakan waktu terbanyak selama seminggu yang lalu?

1 ⟶ **R4**   2   3   4

(JIKA R2.a.1=1, LANJUTKAN KE R4)

3. Apakah (NAMA) mempunyai pekerjaan/usaha, tetapi sementara tidak bekerja[1] selama seminggu yang lalu?

YA   1   TIDAK   2

4. Apakah (NAMA) sedang mencari pekerjaan?

YA   1   TIDAK   2

5. Apakah (NAMA) sedang mempersiapkan usaha baru?

YA   1   TIDAK   2

DITANYAKAN JIKA R4 = 2 DAN R5 = 2

6. Apakah alasan utama (NAMA) tidak mencari pekerjaan/ mempersiapkan usaha baru?

Putus asa: Merasa tidak mungkin mendapatkan pekerjaan [2]	1
Sudah diterima bekerja, tapi belum mulai bekerja	2
Sedang bersekolah	3
Mengurus rumah tangga	4
Sudah mempunyai pekerjaan/usaha	5
Merasa sudah cukup	6
Tidak mampu melakukan pekerjaan	7 ➞ R.23
Lainnya (....)	8

TULISKAN

7. Jika ada penawaran pekerjaan, apakah (NAMA) masih mau menerima?

YA   1   TIDAK   2

(JIKA R2.a.1 = 2 dan R3 = 2, LANJUTKAN KE SUB BLOK V.E)

R8 s.d R18 HANYA UNTUK ART YANG BEKERJA (R2.a.1=1 ATAU R3=1)

8.a. Berapa jumlah hari kerja **seluruh pekerjaan** selama seminggu yang lalu? ...... hari

b. Berapa jumlah jam kerja dari **seluruh pekerjaan** setiap hari selama seminggu yang lalu?

Sen	Sel	Rab	Kam	Jum	Sab	Ming	Jmlh

V.C. PEKERJAAN UTAMA

9. Apakah lapangan usaha/bidang pekerjaan utama dari tempat bekerja (NAMA) selama seminggu yang lalu?

DIISI PENGAWAS

....

....

(TULIS SELENGKAP-LENGKAPNYA)

10. Apakah jenis pekerjaan/jabatan dari pekerjaan utama (NAMA) selama seminggu yang lalu?

DIISI PENGAWAS

....

....

(TULIS SELENGKAP-LENGKAPNYA)

11. Berapakah jumlah jam kerja (NAMA) pada pekerjaan utama selama seminggu yang lalu?

.... jam

12. Apakah status/kedudukan (NAMA) dalam pekerjaan utama selama seminggu yang lalu?

Berusaha sendiri	1
Berusaha dibantu buruh tidak tetap/ buruh tak dibayar	2
Berusaha dibantu buruh tetap/ buruh dibayar	3 } R14
Buruh/karyawan/pegawai	4
Pekerja bebas di **pertanian**	5
Pekerja bebas di **non pertanian**	6
Pekerja keluarga/tak dibayar	7 ➞ R15

13. Berapakah **upah/gaji/pendapatan** bersih yang diterima (NAMA) **selama sebulan** yang lalu dari pekerjaan utama baik berupa uang maupun barang?

Uang:

Rp ....

Barang:

Rp ....

[1] Sementara tidak bekerja: Jika R3 = 1 maka R12 tidak boleh berkode 5 atau 6 atau 7.
[2] Rincian 6 kode 1: Alasan bagi mereka yang berkali-kali mencari pekerjaan tetapi tidak berhasil mendapatkan pekerjaan sehingga ia merasa tidak mungkin mendapatkan pekerjaan atau mereka yang merasa karena situasi/kondisi/iklim/musim, tidak mungkin mendapatkan pekerjaan yang diinginkan.

DITANYAKAN JIKA R12 = 1,2,3 ATAU 4

14. Sudah berapa lama (NAMA) bekerja di pekerjaan utama sekarang?

.... TAHUN ☐☐ .... BULAN ☐☐

15. a. Dimanakah lokasi tempat kerja (NAMA) selama seminggu yang lalu?

Provinsi : .... ☐☐ } *DIISI PENGAWAS*
Kabupaten/Kota* : .... ☐☐

(JIKA PROP & KAB/KOTA = R1 & R2 BLOK I, LANJUTKAN KE R16.a)

b. Apabila di luar kabupaten/kota tempat tinggal, apakah (NAMA) pergi dan pulang ke/dari tempat kerja setiap hari, setiap minggu atau setiap bulan?**

Setiap hari 1 *Setiap minggu* 2 *Setiap bulan* 3

(JIKA R15.b = 2 ATAU 3, LANJUTKAN KE R16.a)

c. Berapa jarak tempuh dari rumah ke tempat kerja?

< 10	Km	1	> 30 Km	3
10 – 29	Km	2	TT	4

d. Berapa lama perjalanan dari rumah ke tempat kerja?

≤ 30	Menit	1	61 - 120 Menit	3
31 - 60	Menit	2	> 120 Menit	4

e. Apakah jenis transportasi yang biasanya digunakan (NAMA) untuk pergi dan pulang ke/dari tempat kerja?

Transportasi umum 1 *Transportasi pribadi* 3
Transportasi bersama 2 *Jalan kaki* 4

16. a. Kapankah (NAMA) pertama kali mulai bekerja/berusaha?

lebih dari setahun yang lalu 1 → **R17**

setahun terakhir 2

b. Berapa lama (NAMA) mencari pekerjaan/mempersiapkan usaha?

LAMANYA: .... BULAN ☐☐

V.D. PEKERJAAN TAMBAHAN

17. Apakah (NAMA) selama seminggu yang lalu mempunyai pekerjaan tambahan?

YA 1 TIDAK 2 → **SUB BLOK V.E**

18. Apakah lapangan usaha/pekerjaan tambahan utama (NAMA)?

.... *DIISI PENGAWAS*
.... ☐☐☐☐
(TULIS SELENGKAP-LENGKAPNYA)

V. E. KEGIATAN MENCARI PEKERJAAN/ MEMPERSIAPKAN USAHA

R19 s.d R22 DITANYAKAN JIKA R4 = 1 ATAU R5 = 1

19. Apakah alasan utama (NAMA) mencari pekerjaan/ mempersiapkan usaha baru?

Tamat sekolah/tidak bersekolah lagi	1
Tanggung jawab mencari nafkah/membantu ekonomi rumah tangga atau keluarga	2
Menambah penghasilan	3
Pekerjaan yang ada kurang sesuai	4
PHK	5
Usaha terhenti	6
Lainnya (......................................)	7
TULISKAN	

20. Upaya apa sajakah yang pernah dilakukan (NAMA) ketika mencari pekerjaan/mempersiapkan usaha baru?

	YA	TIDAK
1. Mendaftar pada bursa kesempatan kerja	1	2
2. Menghubungi perusahaan/kantor	3	4
3. Melamar dengan memanfaatkan iklan	1	2
4. Menghubungi keluarga/kenalan	3	4
5. Mengumpulkan modal/perlengkapan	1	2
6. Mencari lokasi/tempat usaha	3	4
7. Mengurus surat perizinan usaha	1	2
8. Lainnya (..........................)	3	4
TULISKAN		

21. Sudah berapa lama (NAMA) mencari pekerjaan atau mempersiapkan usaha baru?

.... TAHUN ☐ .... BULAN ☐☐

22. Pekerjaan yang dicari/usaha yang sedang dipersiapkan:

Pekerjaan purna waktu (*Full time*)	1
Pekerjaan paruh waktu (*Part time*)	2

V.F. PENGALAMAN KERJA

23. Apakah (NAMA) pernah mempunyai pekerjaan/usaha sebelumnya?

YA 1 TIDAK 2 → STOP

24. Apakah (NAMA) berhenti bekerja/pindah pekerjaan selama setahun terakhir?

YA 1 TIDAK 2 → STOP

25. Alasan utama (NAMA) berhenti bekerja/pindah pekerjaan selama setahun terakhir:

PHK	1
Usaha terhenti (bangkrut)	2
Pendapatan kurang memuaskan	3
Tidak cocok dengan lingkungan kerja	4
Habis masa kerja/kontrak	5
Lainnya (....)	6
TULISKAN	

26. Apakah lapangan usaha/pekerjaan (NAMA) sebelum berhenti bekerja/pindah pekerjaan terakhir?

.... *DIISI PENGAWAS*
.... ☐☐☐☐☐
(TULIS SELENGKAP-LENGKAPNYA)

27. Apakah status/kedudukan (NAMA) sebelum berhenti bekerja/pindah pekerjaan terakhir?

Berusaha sendiri	1
Berusaha dibantu buruh tidak tetap/buruh tak dibayar	2
Berusaha dibantu buruh tetap/buruh dibayar	3
Buruh/karyawan/pegawai	4
Pekerja bebas di **pertanian**	5
Pekerja bebas di **non pertanian**	6
Pekerja keluarga/tak dibayar	7

*).Coret yang tidak perlu
**). Bila responden bukan kepala rumah tangga maka tidak boleh berkode 2 atau 3.

Appendix 2

STATA Regression Results of Model 1 and Model 2

Model 1

```
Linear regression                               Number of obs =   39281
                                                F(  6,     8) =       .
                                                Prob > F      =       .
                                                R-squared     =  0.2230
                                                Root MSE      =  .68283

                                 (Std. Err. adjusted for 9 clusters in sector)
------------------------------------------------------------------------------
             |              Robust
      lnwage |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     highexp |   .050668   .0219794     2.31   0.050    -.0000165    .1013525
      tenure |   .038188   .0091389     4.18   0.003     .0171136    .0592623
     tenure2 | -.0003016   .0000476    -6.34   0.000    -.0004113    -.000192
     married |  .1378587   .0356432     3.87   0.005     .0556652    .2200522
      gender |  .3478454   .0381929     9.11   0.000     .2597723    .4359184
       urban |  .1944259   .0148834    13.06   0.000     .1601048     .228747
         voc |  .0285737   .0141384     2.02   0.078    -.0040295    .0611768
        sec2 |  .8316272   .0180423    46.09   0.000     .7900216    .8732327
        sec3 |  .3054474   .0185154    16.50   0.000     .2627509     .348144
        sec4 |  .3330732   .0167242    19.92   0.000     .2945072    .3716392
        sec5 |  .2582904   .0044982    57.42   0.000     .2479176    .2686632
        sec6 |  .2124668   .0398669     5.33   0.001     .1205337       .3044
        sec7 |  .1638358    .006199    26.43   0.000     .1495409    .1781306
        sec8 |  .3502808   .0263823    13.28   0.000     .2894432    .4111185
        sec9 |  .1275965   .0112097    11.38   0.000     .1017468    .1534463
       _cons |  13.17691   .1363262    96.66   0.000     12.86254    13.49128
------------------------------------------------------------------------------
```

Model 2

```
Linear regression                               Number of obs =   39281
                                                F(  7,     8) =       .
                                                Prob > F      =       .
                                                R-squared     =  0.2253
                                                Root MSE      =  .68182

                                 (Std. Err. adjusted for 9 clusters in sector)
------------------------------------------------------------------------------
             |              Robust
      lnwage |     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     highexp |  .0526801    .022701     2.32   0.049     .0003315    .1050287
      tenure |  .0377048   .0090853     4.15   0.003      .016754    .0586555
     tenure2 | -.0002907   .0000455    -6.38   0.000    -.0003957   -.0001857
     married |  .1397618   .0354339     3.94   0.004     .0580511    .2214725
      gender |  .3500308   .0372613     9.39   0.000     .2641061    .4359555
       urban |   .192659   .0148176    13.00   0.000     .1584897    .2268284
         voc | -.0135684   .0103761    -1.31   0.227    -.0374958     .010359
        VOCR |  .1371821   .0210875     6.51   0.000     .0885543    .1858099
        sec2 |  .8149274   .0180421    45.17   0.000     .7733222    .8565326
        sec3 |  .2966843   .0179699    16.51   0.000     .2552456     .338123
        sec4 |  .3094672   .0164768    18.78   0.000     .2714718    .3474627
        sec5 |  .2571747   .0043312    59.38   0.000     .2471869    .2671625
        sec6 |  .2041079   .0393085     5.19   0.001     .1134623    .2947535
        sec7 |  .1633632   .0061855    26.41   0.000     .1490993    .1776271
        sec8 |  .3417087   .0259114    13.19   0.000     .2819568    .4014606
        sec9 |  .1190968   .0109087    10.92   0.000     .0939413    .1442522
       _cons |  13.18396   .1344047    98.09   0.000     12.87402     13.4939
------------------------------------------------------------------------------
```

Appendix 3

STATA Regression Results of Model 2 Female and Male

Model 2 Female

```
Linear regression                              Number of obs =   11134
                                               F(  6,      8) =      .
                                               Prob > F       =      .
                                               R-squared      = 0.1952
                                               Root MSE       = .73948

                              (Std. Err. adjusted for 9 clusters in sector)
-------------------------------------------------------------------------------
             |               Robust
      lnwage |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+-----------------------------------------------------------------
     highexp |   .0722734   .0824075     0.88   0.406    -.1177588    .2623055
      tenure |   .0466017   .0167589     2.78   0.024     .0079556    .0852478
     tenure2 |  -.0001196   .0003099    -0.39   0.710    -.0008342     .000595
     married |  -.0210167   .0477716    -0.44   0.672    -.1311782    .0891448
       urban |   .2704756   .0338046     8.00   0.000     .1925219    .3484292
         voc |   .0210382   .0171936     1.22   0.256    -.0186104    .0606867
        VOCR |   .1368008   .0833069     1.64   0.139    -.0553051    .3289068
        sec2 |   .8572363   .0495675    17.29   0.000     .7429335    .9715391
        sec3 |    .315903   .0181328    17.42   0.000     .2740888    .3577172
        sec4 |   .5203213   .0346985    15.00   0.000     .4403063    .6003362
        sec5 |   .6177222   .0244185    25.30   0.000     .5614131    .6740313
        sec6 |    .177579   .0241378     7.36   0.000     .1219172    .2332407
        sec7 |    .404317   .0246668    16.39   0.000     .3474353    .4611987
        sec8 |   .3819909   .0181252    21.08   0.000     .3401941    .4237877
        sec9 |   -.021824   .0298936    -0.73   0.486    -.0907588    .0471108
       _cons |   13.19968    .136802    96.49   0.000     12.88422    13.51515
-------------------------------------------------------------------------------
```

Model 2 Male

```
Linear regression                              Number of obs =   28147
                                               F(  6,      8) =      .
                                               Prob > F       =      .
                                               R-squared      = 0.1856
                                               Root MSE       = .64939

                              (Std. Err. adjusted for 9 clusters in sector)
-------------------------------------------------------------------------------
             |               Robust
      lnwage |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+-----------------------------------------------------------------
     highexp |   .0385286   .0168857     2.28   0.052    -.0004099     .077467
      tenure |   .0321326   .0064127     5.01   0.001     .0173448    .0469204
     tenure2 |  -.0002545   .0000581    -4.38   0.002    -.0003885   -.0001206
     married |   .2310094    .031012     7.45   0.000     .1594955    .3025232
       urban |   .1557028   .0119109    13.07   0.000     .1282363    .1831694
         voc |  -.0275723   .0139988    -1.97   0.084    -.0598537    .0047091
        VOCR |   .1303136   .0264613     4.92   0.001     .0692938    .1913334
        sec2 |   .8162309   .0214907    37.98   0.000     .7666732    .8657887
        sec3 |   .2958168   .0102306    28.91   0.000     .2722249    .3194086
        sec4 |   .3001736   .0074342    40.38   0.000     .2830302    .3173169
        sec5 |   .2606698   .0080673    32.31   0.000     .2420665    .2792731
        sec6 |   .2155679   .0225181     9.57   0.000     .1636411    .2674948
        sec7 |   .1531535   .0076727    19.96   0.000     .1354602    .1708467
        sec8 |   .3314565   .0205831    16.10   0.000     .2839917    .3789213
        sec9 |   .1886363   .0156547    12.05   0.000     .1525365    .2247362
       _cons |   13.51727   .0830992   162.66   0.000     13.32564    13.70889
-------------------------------------------------------------------------------
```

Appendix 4

STATA Regression Results of Model 2 Female and Male Cohorts

Model 2 Cohort 1 Female

```
Linear regression                               Number of obs =    2984
                                                F(  5,     8) =       .
                                                Prob > F      =       .
                                                R-squared     =  0.2237
                                                Root MSE      =  .60981

                                   (Std. Err. adjusted for 9 clusters in sector)
--------------------------------------------------------------------------------
               |               Robust
        lnwage |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
---------------+----------------------------------------------------------------
       highexp |          0  (omitted)
        tenure |   .0912478   .0280145     3.26   0.012     .0266464    .1558493
       tenure2 |  -.0072013   .0044101    -1.63   0.141     -.017371    .0029685
       married |  -.0221273       .0305    -0.73   0.489    -.0924605     .048206
         urban |   .2718492   .0740332     3.67   0.006     .1011284    .4425699
           voc |   .0706646   .0319805     2.21   0.058    -.0030826    .1444118
          VOCR |   .0509037   .0903682     0.56   0.589    -.1574859    .2592932
          sec2 |   .5541631   .0483969    11.45   0.000     .4425598    .6657665
          sec3 |   .2619259   .0410134     6.39   0.000     .1673489    .3565029
          sec4 |   .1919502   .0612779     3.13   0.014     .0506431    .3332573
          sec5 |   .4513895   .0483395     9.34   0.000     .3399184    .5628607
          sec6 |   -.011615     .055896    -0.21   0.841    -.1405115    .1172815
          sec7 |   .0750322    .053487     1.40   0.198    -.0483091    .1983734
          sec8 |   .1600833   .0529334     3.02   0.016     .0380187     .282148
          sec9 |  -.4969334   .0299767   -16.58   0.000    -.5660598   -.4278069
         _cons |   13.40011   .0098211  1364.42   0.000     13.37747    13.42276
--------------------------------------------------------------------------------
```

Model 2 Cohort 1 Male

```
Linear regression                               Number of obs =    3940
                                                F(  5,     8) =       .
                                                Prob > F      =       .
                                                R-squared     =  0.1089
                                                Root MSE      =  .60598

                                   (Std. Err. adjusted for 9 clusters in sector)
--------------------------------------------------------------------------------
               |               Robust
        lnwage |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
---------------+----------------------------------------------------------------
       highexp |          0  (omitted)
        tenure |   .0530668     .01888     2.81   0.023     .0095294    .0966042
       tenure2 |  -.0042311   .0018399    -2.30   0.050    -.0084739    .0000116
       married |   .0646211   .0185609     3.48   0.008     .0218195    .1074226
         urban |   .1566237   .0278735     5.62   0.000     .0923472    .2209002
           voc |   .0069289   .0328726     0.21   0.838    -.0688754    .0827333
          VOCR |   .1608904   .0347877     4.62   0.002     .0806698    .2411109
          sec2 |   .5370719   .0104272    51.51   0.000     .5130267    .5611171
          sec3 |   .2029214   .0189735    10.70   0.000     .1591685    .2466743
          sec4 |   .1448082   .0169107     8.56   0.000      .105812    .1838044
          sec5 |   .1123644   .0136365     8.24   0.000     .0809185    .1438103
          sec6 |   .0374196   .0187001     2.00   0.080    -.0057029    .0805421
          sec7 |   .0158597    .012733     1.25   0.248    -.0135027    .0452222
          sec8 |   .1312337   .0162171     8.09   0.000      .093837    .1686304
          sec9 |  -.2637689      .0127   -20.77   0.000    -.2930552   -.2344826
         _cons |   13.65502   .0233853   583.92   0.000     13.60109    13.70895
--------------------------------------------------------------------------------
```

Appendix 4 (continued)

Model 2 Cohort 2 Female

```
Linear regression                               Number of obs =    5601
                                                F(  5,     8) =       .
                                                Prob > F      =       .
                                                R-squared     =  0.1444
                                                Root MSE      =   .7501

                                 (Std. Err. adjusted for 9 clusters in sector)
------------------------------------------------------------------------------
             |               Robust
      lnwage |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     highexp |          0  (omitted)
      tenure |   .0638799   .0111549     5.73   0.000     .0381566    .0896032
     tenure2 |  -.0016089   .0001046   -15.38   0.000    -.0018502   -.0013677
     married |   -.007526   .0540395    -0.14   0.893    -.1321412    .1170892
       urban |   .3061955   .0431104     7.10   0.000     .2067828    .4056082
         voc |  -.0362213   .0411561    -0.88   0.404    -.1311274    .0586849
        VOCR |   .2453442   .1104047     2.22   0.057    -.0092495     .499938
        sec2 |   .9205634   .0101429    90.76   0.000     .8971739    .9439529
        sec3 |   .2336367   .0224848    10.39   0.000     .1817868    .2854867
        sec4 |   .4797937   .0424247    11.31   0.000     .3819621    .5776253
        sec5 |   .5188412   .0189298    27.41   0.000     .4751891    .5624933
        sec6 |    .115779   .0219924     5.26   0.001     .0650645    .1664935
        sec7 |   .4022508   .0188383    21.35   0.000     .3588097    .4456919
        sec8 |   .2920081   .0225303    12.96   0.000     .2400532     .343963
        sec9 |  -.1498763    .018236    -8.22   0.000    -.1919286    -.107824
       _cons |   13.23956   .1077949   122.82   0.000     12.99098    13.48813
------------------------------------------------------------------------------
```

Model 2 Cohort 2 Male

```
Linear regression                               Number of obs =   14709
                                                F(  5,     8) =       .
                                                Prob > F      =       .
                                                R-squared     =  0.1304
                                                Root MSE      =  .63484

                                 (Std. Err. adjusted for 9 clusters in sector)
------------------------------------------------------------------------------
             |               Robust
      lnwage |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     highexp |          0  (omitted)
      tenure |   .0501212   .0071026     7.06   0.000     .0337427    .0664998
     tenure2 |  -.0012891   .0003356    -3.84   0.005    -.0020631   -.0005151
     married |   .1962955   .0319567     6.14   0.000     .1226031    .2699878
       urban |   .1925619   .0252932     7.61   0.000     .1342356    .2508882
         voc |  -.0296468   .0107348    -2.76   0.025    -.0544014   -.0048923
        VOCR |   .1254518   .0177208     7.08   0.000     .0845876     .166316
        sec2 |   .7866645   .0148379    53.02   0.000     .7524482    .8208807
        sec3 |   .2233015   .0074983    29.78   0.000     .2060103    .2405926
        sec4 |   .2139436   .0079921    26.77   0.000     .1955138    .2323735
        sec5 |   .2122155   .0074769    28.38   0.000     .1949739    .2294572
        sec6 |   .1633633   .0088646    18.43   0.000     .1429216    .1838051
        sec7 |   .1038216   .0041129    25.24   0.000     .0943373    .1133059
        sec8 |   .2730723   .0138928    19.66   0.000     .2410356    .3051091
        sec9 |   .0697403   .0068044    10.25   0.000     .0540493    .0854313
       _cons |   13.55167   .0869904   155.78   0.000     13.35107    13.75227
------------------------------------------------------------------------------
```

Appendix 4 (continued)

Model 2 Cohort 3 Female

```
Linear regression                               Number of obs =     2549
                                                F(  6,     8) =        .
                                                Prob > F      =        .
                                                R-squared     =   0.2731
                                                Root MSE      =  .79196

                               (Std. Err. adjusted for 9 clusters in sector)
------------------------------------------------------------------------------
             |               Robust
      lnwage |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     highexp |    .07412   .0413621     1.79   0.111    -.0212611    .1695011
      tenure |  .0581501   .0179985     3.23   0.012     .0166455    .0996547
     tenure2 |  -.000549   .0003142    -1.75   0.119    -.0012736    .0001757
     married |  .2029049   .0876639     2.31   0.049     .0007517    .4050581
       urban |  .1515511   .0351599     4.31   0.003     .0704723    .2326299
         voc | -.0268364   .0396643    -0.68   0.518    -.1183023    .0646296
        VOCR |  .0994373   .0380775     2.61   0.031     .0116305    .1872441
        sec2 |  .0160382   .1468925     0.11   0.916    -.3226966    .3547729
        sec3 |  .1808005    .018756     9.64   0.000     .1375492    .2240519
        sec4 |  .8555349   .0723526    11.82   0.000     .6886894     1.02238
        sec5 |  .7279326   .0204602    35.58   0.000     .6807513    .7751139
        sec6 |  .2904869   .0298025     9.75   0.000     .2217621    .3592116
        sec7 |   .686242   .0259756    26.42   0.000     .6263421    .7461418
        sec8 |  .6390498   .0265082    24.11   0.000     .5779218    .7001777
        sec9 |  .4621514   .0514188     8.99   0.000     .3435795    .5807232
       _cons |  12.75441   .2417623    52.76   0.000      12.1969    13.31191
------------------------------------------------------------------------------
```

Model 2 Cohort 3 Male

```
Linear regression                               Number of obs =     9498
                                                F(  6,     8) =        .
                                                Prob > F      =        .
                                                R-squared     =   0.1691
                                                Root MSE      =  .67107

                               (Std. Err. adjusted for 9 clusters in sector)
------------------------------------------------------------------------------
             |               Robust
      lnwage |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     highexp |  .0171421   .0138378     1.24   0.251    -.0147679    .0490521
      tenure |  .0200934   .0034051     5.90   0.000     .0122413    .0279456
     tenure2 |  .0000355   .0001812     0.20   0.850    -.0003822    .0004532
     married |  .2883217    .055781     5.17   0.001     .1596904    .4169529
       urban |  .0963051   .0267193     3.60   0.007     .0346904    .1579199
         voc | -.0405202   .0275954    -1.47   0.180    -.1041552    .0231148
        VOCR |  .1358379   .0721824     1.88   0.097     -.030615    .3022908
        sec2 |   .935825   .0317588    29.47   0.000     .8625892    1.009061
        sec3 |  .3929048   .0131373    29.91   0.000     .3626101    .4231995
        sec4 |  .4809162   .0111016    43.32   0.000     .4553159    .5065165
        sec5 |  .3733647   .0164747    22.66   0.000      .335374    .4113554
        sec6 |  .3198065   .0270877    11.81   0.000     .2573422    .3822709
        sec7 |   .252999   .0159932    15.82   0.000     .2161187    .2898794
        sec8 |  .4648585   .0193906    23.97   0.000     .4201437    .5095733
        sec9 |  .4549344   .0184066    24.72   0.000     .4124887    .4973801
       _cons |  13.45654   .0613957   219.18   0.000     13.31496    13.59812
------------------------------------------------------------------------------
```

Appendix 5

Results of Equality Test

Equality Test of Model 1 and Model 2

Variable	Result	α	Analysis
highexp	0.0004	0.05	Significantly not different
tenure	0.0000	0.05	Significantly not different
tenure2	0.0003	0.05	Significantly not different
married	0.0001	0.05	Significantly not different
urban	0.0000	0.05	Significantly not different

Equality Test of Model 2 Female and Model 2 Male

Variable	Result	α	Analysis
highexp	0.2834	0.05	Significantly different
tenure	0.0001	0.05	Significantly not different
tenure2	0.0000	0.05	Significantly not different
married	0.3217	0.05	Significantly different
urban	0.0000	0.05	Significantly not different
voc	0.0534	0.05	Significantly different
VOCR	0.8088	0.05	Significantly different