



The Effect of Demographic Factors on Individual Tax Compliance in Duren Sawit (East Jakarta, Indonesia)

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Contents

<i>List of Tables</i>	<i>vi</i>
<i>List of Figures</i>	<i>vi</i>
<i>List of Appendices</i>	<i>vi</i>
<i>List of Acronyms</i>	<i>viii</i>
<i>Abstract</i>	<i>ix</i>
<i>Relevance to Development Studies</i>	<i>ix</i>
Chapter 1 Introduction	1
1.1 Background	1
1.2 Overview	6
1.2.1 Taxation System in Indonesia	6
1.2.2 Duren Sawit Demographic Condition	7
1.3 Research Problem	8
1.4 Research Question	9
1.4.1 Sub Research Question	9
1.5 Research Challenge and Limitation	9
1.5.1 Research Challenge	9
1.5.2 Limitation	10
1.6 Contribution to the Literature	10
1.7 Chapter Scheme of Research	10
Chapter 2 Theoretical Framework and Literature Review	11
2.1 Definition	11
2.1.1 Definition of Tax	11
2.1.2 Definition of Tax Compliance	11
2.1.3 Definition of Tax Morale	12
2.2 Theoretical Framework	13
2.3 Literature Review	14
2.3.1 Age	14
2.3.2 Gender	15
2.3.3 Previous Tax Return Submission	16
2.3.4 Sector	17
2.4 Empirical Evidence	18
2.4.1 Empirical Evidence in Indonesia	18
2.4.2 Empirical Evidence from outside Indonesia	18
Chapter 3 Data and Methodology	20

3.1 Data	20
3.1.1 General Information	20
3.1.2 Data Summary	20
3.1.2.1 The Dependent Variable	21
3.1.2.2 The Independent Variable	21
3.1.2.2.1 Gender	21
3.1.2.2.2 Age	21
3.1.2.2.3 Sector	21
3.1.2.2.4 Tax Return Status 2012	22
3.1.2.2.5 Tax Return Status 2011	22
3.2 Methodology	22
3.2.1 Logistic Regression	22
3.2.2 Probit Regression	24
3.2.3 Conclusion	24
Chapter 4 Empirical Result and Discussion	25
4.1 Specification Model	25
4.1.1 Variable "Comp" (Compliance in 2013)	25
4.1.2 Variable "Age" (Age of Taxpayers in 2013)	25
4.1.3 Variable "Gender" (Gender of Taxpayers)	26
4.1.4 Variable "Sector"	26
4.1.5 Variable "(Comp (t-1))" (Tax Return Status in 2011)	26
4.1.6 Variable "Comp (t-2)" (Tax Return Status in 2012)	26
4.2 Empirical Result	26
4.2.1 First Model	27
4.2.1.1 Data Description	27
4.2.1.2 Goodness of Fit Measures	27
4.2.1.3 Analysis of Coefficient	28
4.2.1.3.1 Analysis of Odds Ratio	29
4.2.1.3.2 Analysis of Coefficient	29
4.2.1.3.2.1 Gender	29
4.2.1.3.2.2 Age	30
4.2.1.3.2.3 Age Square	30
4.2.1.3.2.4 Sector	31
4.2.1.3.2.5 Report_2012	32
4.2.1.3.2.6 Report_2011	32

4.2.2 Second Model	32
4.2.2.1 Data description	32
4.2.2.2 Goodness of Fit Measures	32
4.2.2.3 Analysis of Coefficient	34
4.2.2.3.1 Analysis of Odds Ratio	34
4.2.2.3.2 Analysis of Coefficient	34
4.2.2.3.2.1 Gender	34
4.2.2.3.2.2 Age	34
4.2.2.3.2.3 Age Square	35
4.2.2.3.2.4 Sector	35
4.2.3 Conclusion of Analysis	36
4.2.4 Policy Recommendations	37
Chapter 5 Conclusion	38
<i>References</i>	<i>40</i>

List of Tables

Table 1. The Amount of Penalty for Not Submitting the Tax Return	16
Table 2. Data Summary of Dummy Variable.....	19
Table 3. Data Summary of Age Variable.....	20
Table 4. Regression Result of First Model.....	21
Table 5. Classification Table (The First Model).....	25
Table 6. Odds Ratio Table (First Model).....	26
Table 7. Regression Result of Second Model.....	27
Table 8. Classification Table (The Second Model).....	30
Table 9. Odds Ratio Table (Second Model).....	30

List of Figures

Figure 1 Tax Contribution on Domestic Income in Indonesia.....	1
Figure 2 ASEAN Countries' Tax Ratio.....	2
Figure 3 Taxpayers Composition in Indonesia	3
Figure 4 Individual Tax Compliance Ratio (National).....	4
Figure 5 Individual Tax Compliance Ratio (Duren Sawit).....	4
Figure 6 East Jakarta Population.....	7
Figure 7 East Jakarta Population Density (People/Km ²).....	8
Figure 8 Theoretical Framework of the Effect of Demographic Factors on Individual Tax Compliance.....	14

List of Appendices

Appendix 1. Age Square (Local Polynomial Graph).....	43
Appendix 2. Output Regression of First Model (Linear Regression).....	44
Appendix 3. Output Regression of First Model (Probit Regression).....	45
Appendix 4. Output Regression of First Model (Logit Regression).....	46
Appendix 5. Output Regression of First Model (Probit Marginal Effect).....	47
Appendix 6. Output Regression of First Model (Logit Marginal Effect).....	48
Appendix 7. Output Regression of First Model (Logistic Odds Ratio).....	49
Appendix 8. Output Regression of Second Model (Linear Regression).....	50
Appendix 9. Output Regression of Second Model (Probit Regression).....	51

Appendix 10. Output Regression Second Model (Logit Regression).....	52
Appendix 11. Output Regression Second Model (Probit Marginal Effect)..	53
Appendix 12. Output Regression Second Model (Logit Marginal Effect)....	54
Appendix 13. Output Regression Second Model (Logistic Odds Ratio).....	55

List of Acronyms

AR (Account Representative)

BPS Biro Pusat Statistik (Statistics Indonesia)

DGT (Directorate General of Taxes)

GDP (Gross Domestic Product)

KPP Kantor Pelayanan Pajak (Tax Office)

OECD (Organisation for Economic Co-operation and Development)

Abstract

This paper tries to analyse individual tax compliance problems faced by Indonesia using data of 2.383 taxpayers in fiscal year period 2013 in a district namely Duren Sawit. Moreover, the analysis is based on five explanatory variables consisting in two demographic factors: age level and gender of taxpayers, and three other explanatory variables: service-sector taxpayers, tax return status in 2011, and tax return status in 2012. Compared to previous studies, this research paper uses internal data obtained directly from Directorate General of Taxes (DGT) of Republic of Indonesia while most of prior studies used survey method. By comparing three statistical methods, which are Probit method, Logit method, and Linear Probability Method, the analysis of this paper is divided into two models based on the inclusion and exclusion of the previous tax return status. The first model finds that all explanatory variables are statistically significant in influencing individual tax compliance. However, in the second model, only service-sector variable demonstrates statistical significance in explaining individual tax compliance. In conclusion, sector of taxpayers has a significant correlation to individual tax compliance problems in Indonesia.

Relevance to Development Studies

A low tax compliance problem is related to low tax revenue of a particular country. This problem can impede domestic income in boosting the economic growth. Moreover, this research paper has a tight relationship with development studies in which taxation acts as a tool in fiscal policy to increase economic growth.

Furthermore, as a developing country, Indonesia depends on tax as a major source of national income. The analysis of this research problem might help government to boost Indonesia' tax performance. Thus, tax compliance as one of key performance could give significant contribution to Indonesian economy.

Keywords

Individual Tax Compliance, Demographic Factors, Indonesia, Internal Data

Chapter 1

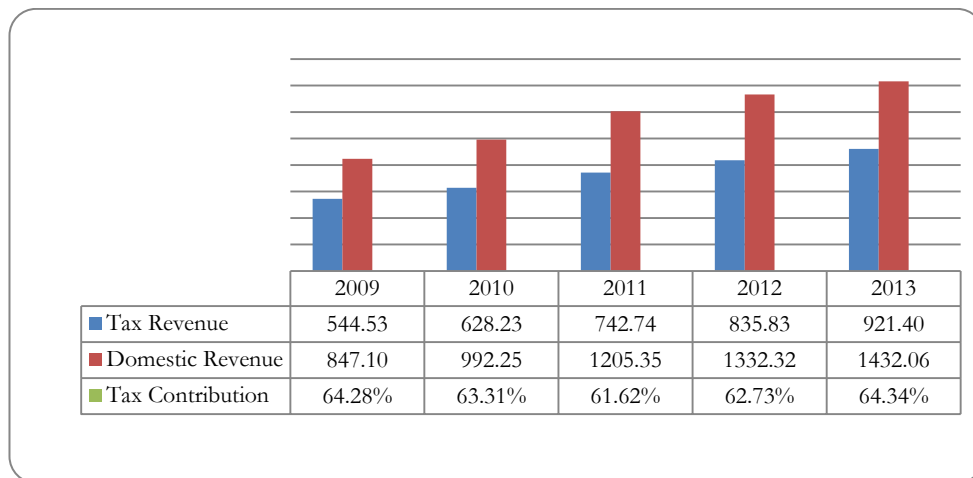
Introduction

1.1 Background

Tax is one of the major sources of government revenue for a country, collected from citizens, companies, and investors from outside and inside the country to generate economy. According to the Indonesian Tax Law no. 28/2007, tax refers to the revenue that is collected by the government to provide services and to support the development. Specifically, government utilizes tax proceeds to fund development programs, such as supplying public goods, defraying infrastructure cost, and creating a competitive trade and business regulation to assure social and economic maintenance. Thus, the role of tax in supporting the economy of a country is important.

In Indonesia, tax also becomes a major source of government revenue with a high significant contribution supporting domestic income. Based on the data of Ministry of Finance of The Republic of Indonesia from 2009 to 2013, the tax contribution on domestic income on average is around 63% (see figure 1).

Figure 1. Tax Contribution on Domestic Income in Indonesia



Source: Directorate General of Tax of Indonesia (2014) developed by author

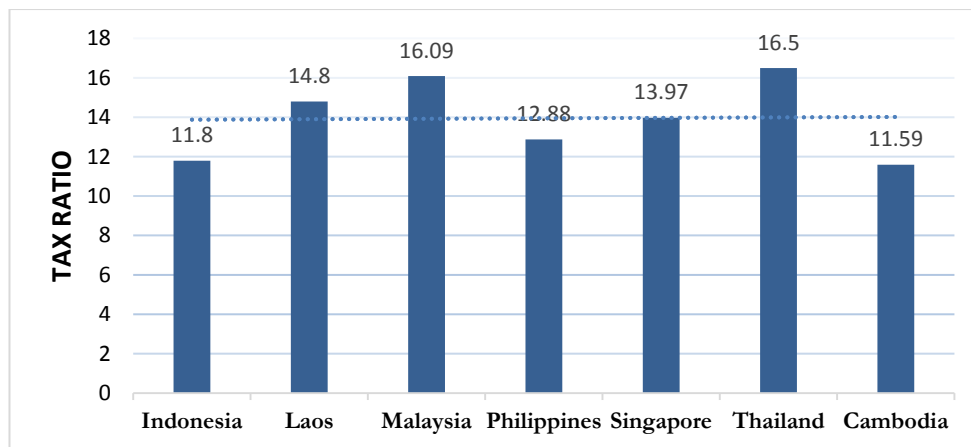
The graph shows that taxation has played as a significant role in contributing Indonesian government's revenue. More than 50% of total domestic income comes from tax revenue. In other words, the domestic income will face a big problem if tax revenue is not stable. Moreover, in the past five years, the contribution of tax on domestic income is stagnant in around 63%. However, to boost the economic growth and create macroeconomic stability, a big role of tax is needed. Thus, it needs a big extra effort by the government to increase tax contribution to domestic income.

Nevertheless, government faces a big obstacle which Indonesia's tax performance is not quite good to boost domestic income. According to Harahap (2004), tax performance of a country can be measured by tax ratio which based on the data of World Bank (2011), Indonesia's tax ratio is far from what was initially expected. However, after the 1998 financial crisis hit Indonesia and most of South East Asian countries, Indonesia's economy has recovered with a slight-

ly increased economic growth. In normal condition, the increasing of economic growth should give a positive impact on tax revenue, but in reality tax collection is still low resulting low tax ratio. It shows that an analysis about what happens in Indonesian tax performance is needed.

Compared to Indonesian neighbouring countries, which have similar Gross Domestic Product (GDP), Indonesia's tax ratio is below the average of South-East Asian countries' tax ratio. The low ratio of Indonesia's taxation can be clearly seen on figure 2 where Indonesia's tax ratio only sits above Cambodia's. In addition, Indonesia's tax ratio is not only lower than Malaysia's, Philippines', Thailand's, and Singapore's, but it is also lower than Laos' which has lower GDP than Indonesia (World Bank, 2011).

Figure 2. ASEAN Countries' Tax Ratio



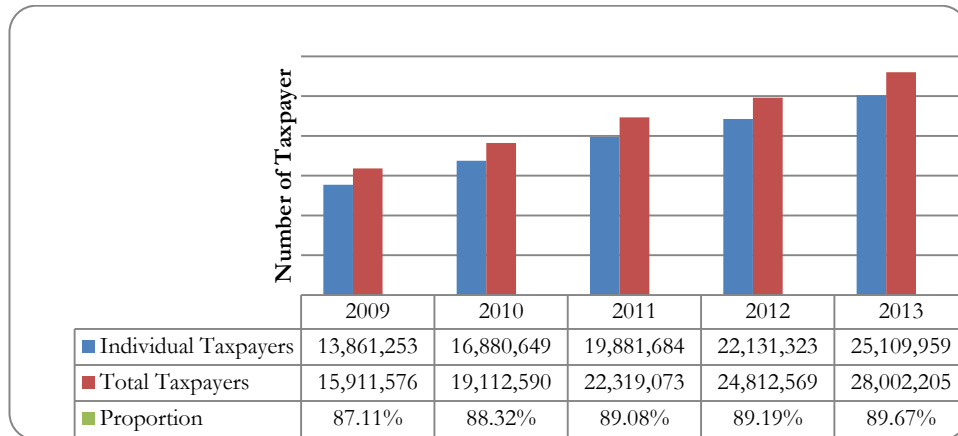
Source: World Bank (2011) developed by author

Moreover, to help Indonesia's tax performance, the awareness of all its citizen to fulfil their tax obligations is needed. Based on Martinez-Vazquez and Schneider (2004), taxation can only perform where there is a willingness to comply with a country's tax laws, even in a condition that some people do not like paying taxes. Taxation system adopting self-assessment system, like in Indonesia, can increase the number of taxpayers that fail to comply with a country's tax laws. Based on that notion, this non-compliance can be defined as a failure of taxpayers to fulfil their tax obligations and this may occur through: (i) failure of filing tax returns; (ii) low consciousness to submit their tax return; or (iii) an intentionality to under-report their taxable income (Kirchler, 2007). Thus, Indonesia's low tax ratio relates to the low tax compliance of its taxpayers, which then affects its tax performance. Focus of this study is to investigate what actually happens with the low tax compliance ratio in Indonesia, which results in unexpected low tax revenue.

Additionally, tax noncompliance is a phenomenon that impede tax revenue collection in both developing and developed countries (Alabede, Ariffin, and Idris, 2011). According to Wenzel (2005), issue of tax noncompliance becomes the main focus of policy makers in most developed and developing countries, due to the high responsibility of governments to prosper their people, which at the same times they are also pressured by financial distress. For this reason, tax noncompliance problem has been attracting many scholars to conduct extensive research in the past few decades (Tittle, 1980).

Furthermore, based on the Indonesian Tax Law no. 28/2007, taxpayers can be divided into two types: corporate taxpayers and individual taxpayers. This study focuses on the individual taxpayers rather than the corporate taxpayers. It is based on the significant composition of individual taxpayers, which according to annual report of Directorate General of Taxes (DGT) of The Republic of Indonesia in 2014, more than 85% of total taxpayers are individual taxpayers (see figure 3).

Figure 3. Taxpayers Composition in Indonesia

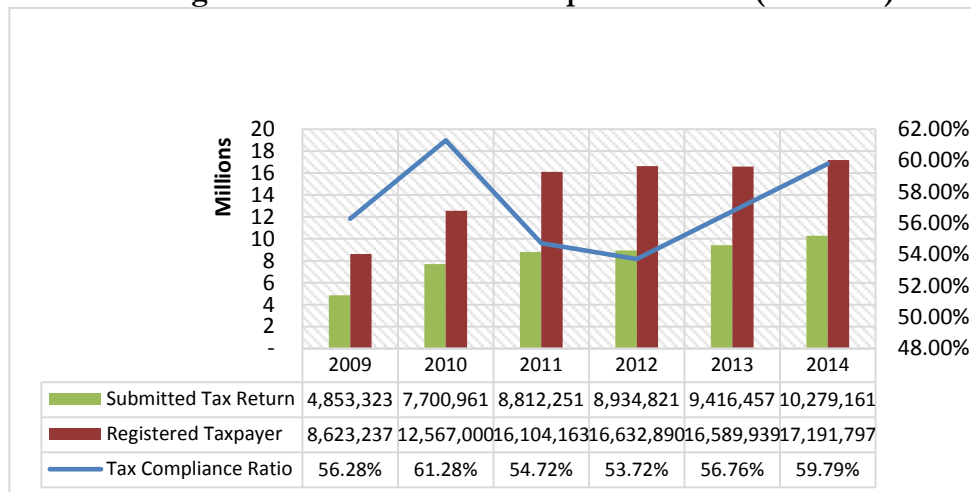


Source: Directorate General of Tax of Indonesia (2014) developed by author

From 2009 to 2013, the number of the individual taxpayers has been increasing with a significant contribution to tax revenue. Based on this notion, government has also launched many programs to reach more individuals obliged to pay and report their tax. One of the programs is a program namely national tax census that was held in 2012. However, the program was not fully successful, indicated by the increasing number of individual taxpayers from 2012 to 2013, which was only 0.5% of total individual taxpayers. Thus, a comprehensive investigation of the low individual tax compliance problem is needed.

In Indonesia, from 2009 to 2014, the individual tax compliance ratio fluctuated around 57% (see figure 4). This result shows that almost half of the individual registered taxpayers did not submit their tax return. Additionally, there was also no unexpected increase of tax compliance ratio in the last five years. The result also shows that compliance ratio is not stable due to the decreasing tax compliance ratio in fiscal year 2010 and 2011 which were 54.72% and 53.72% consecutively, compared to 61.28% in fiscal year 2009. This is because the effect of global financial crisis in 2009 that affected the stability of business industries in Indonesia, which in turn decreased their profit. Moreover, financial crisis also affected the amount of tax revenue and tax compliance ratio which reflected the unwillingness of majority of taxpayers to submit their tax return. Hence, this condition would be the biggest obstacle of the Directorate General of Taxes (DGT) as government representative to investigate tax obligation of taxpayers, includes to check whether they have correctly reported their tax or not. This condition also impedes DGT in collecting tax income to support domestic income.

Figure 4. Individual Tax Compliance Ratio (National)

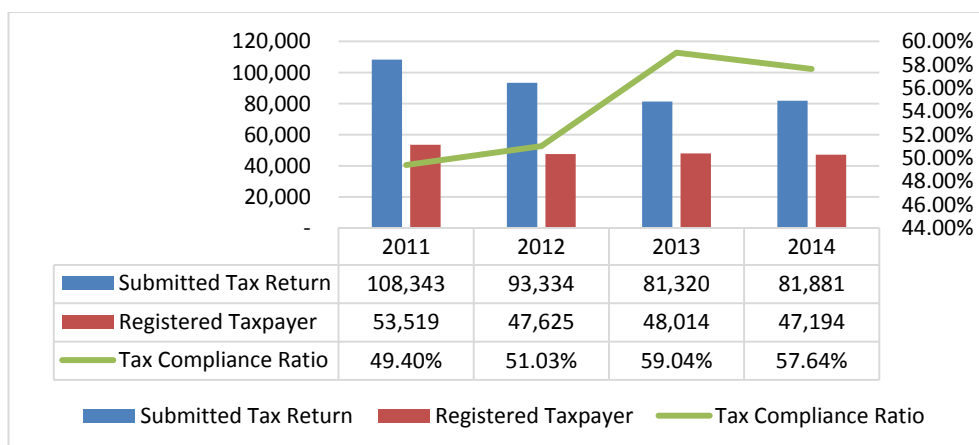


Source: Directorate General of Tax of Indonesia (2014) developed by author

Moreover, Jakarta as the capital city of Indonesia, the central of business, economy, and government, has a high number of taxpayers reaching 1.807.823 people in 2013 (DGT annual report, 2014). This number constitutes around 11.25% of total individual taxpayers in Indonesia. In addition, Jakarta region also gives a high contribution to national tax revenue by around Rp.110 trillion or 20% of national tax revenue (DGT financial report, 2014). However, Jakarta faces low tax compliance ratio, of which the individual compliance tax ratio is only 58% in 2014 (under national tax compliance ratio). To conclude, research in Jakarta region is sufficiently representative to observe the individual tax compliance ratio problem in Indonesia.

Furthermore, due to the limited time and access to data, this research paper will analyse tax compliance ratio problem in more depth in a district in East Jakarta regency, namely Duren Sawit with tax compliance ratio in 2014 (fiscal year 2013) is 57.64 %. This is below the national tax compliance ratio and the regional (Jakarta) tax compliance ratio (see figure5).

Figure 5. Individual Tax Compliance Ratio (Duren Sawit)



Source: Directorate General of Tax of Indonesia (2014) developed by author

From 2011 to 2014, the individual tax compliance ratio in Duren Sawit is only around 50%. In 2014, there are only 47.194 out of 81.881 taxpayers submitting their tax return, only 57.64% of total taxpayers. This result also shows that the individual tax compliance ratio of Duren Sawit is below the 59.79% national

tax compliance ratio. In future, it could be a big problem if the number of submitted tax return is below expectation. Thus, to investigate this underperforming individual tax compliance ratio, the factors affecting individuals to submit and pay their taxes are investigated.

There are some factors that can influence an individual to pay and report their tax, either internal or external factors (Fischer et al., 1992). Moreover, this research paper concentrates on the internal factors of individual taxpayers that motivate them to fulfil their tax obligations. Morality and ethics of taxpayers are considered as internal factors that can motivate them to obey tax laws. Furthermore, tax system in Indonesia that adopts self-assessment system can also create unstable tax consciousness among taxpayers. It depends on an internal factors referred as tax morality (Siahaan, 2010). Additionally, tax morality is correlated with tax ethics, which can be defined as a reflection of our thought regarding what we have to do and what we do not have to do. Tax ethics are also expressed as one of the aspects that requires citizen awareness, in terms of their tax obligation (Siahaan, 2010). Many scholars have shown that there are some variables that are influential to tax ethics, especially for individual taxpayers, such as gender and age level (Title, 1980).

Based on previous studies, gender and age level are the most important variables correlated to tax compliance. For example, in terms of tax consciousness to submit tax return, some studies found that female taxpayers have better tax awareness than male taxpayers (Torgler and Schneider, 2007). However, there are also contradicting studies showing that male taxpayers are more compliant than female taxpayers ((Friedlind, Maital and Rutenberg, 1978) and (Mason and Calvin, 1984)). Moreover, similar finding is also found on age level that shows older taxpayers have better tax awareness than younger taxpayers (Ruegger and King, 1992). On the contrary, another recent study shows that younger taxpayers are more compliant than older taxpayers (Torgler 2004). These different results are the reasons of this research to more investigate the relationship between demographic factors and tax compliance by using gender and age level variables in Indonesia.

Furthermore, besides those two variables, this study also investigates the taxpayers working in service sector who give high contribution to tax revenue, but their tax compliance ratio is very low. It is based on the data of DGT (2013) that the contribution of service-sector taxpayers in Duren Sawit is highly significant. In 2011, service-sector taxpayers contributed around Rp.120.953.156.504, which is 25% of total national tax revenue. In 2012, it increased to Rp.140.599.756.243 and slightly continued increasing in 2013 to Rp.166.031.424.579. Based on this data, the existence of taxpayers who are working in service sector is important. Moreover, their tax compliance performance also might affect total tax revenue. Thus, in this study, the tax compliance of service-sector taxpayers is considered in the analysis.

Moreover, compared to previous studies, this research paper tries to analyse different findings of prior studies by using internal data from DGT. This research paper uses two models in analyzing the problem based on the inclusion and exclusion of the previous tax return submission. The first model finds that all explanatory variables are statistically significant in explaining tax compliance. The findings are: firstly, female taxpayers are more compliant than male taxpayers. This result is also in line with prior research by Title (1980) and Torgler and Schneider (2007). Secondly, this research also finds that younger taxpayers are

more compliant than older taxpayers, which is contradictive to the research by Torgler (2004). However, in the second model, only sectors of taxpayers is statistically significant in describing the dependent variable. Thus, based on these two models, this paper resumes that taxpayers working in service sectors in Duren Sawit are less compliant than those working in other sectors. The implication of this finding to policy-making is focusing on how to triggers taxpayers in service sectors to be more compliant.

In conclusion, this research paper conducts an investigation of the effect of demographic factors on individual tax compliance in Indonesia that adopts self-assessment system as taxation system. Furthermore, what makes this research different from the previous studies is the data are internally obtained from Indonesian DGT while most of previous research used external data (such as survey method). The data in this study are retrieved from tax return file of 2.383 individual taxpayers in Duren Sawit over the fiscal year period of 2013. Additionally, the information from tax return is arguably more reliable than external data utilised by most of previous researchers. Summing up, this research tries to investigate low individual tax compliance ratio of the individual taxpayers in Duren Sawit district in East Jakarta, Indonesia.

1.2 Overview

1.2.1 Taxation System in Indonesia

Basically, Income Tax Policy in Indonesia is regulated based on Law No. 36/2008, the fourth amendment of Law No. 7/1983. At first, Indonesian taxation system was centralized, retaining full authority from central government to determine tax base and tax rate. Indonesian tax system was started with an official assessment system in which income tax was collected by tax officers. However, since 1983 the system was changed to self-assessment system, in which taxpayers have a full responsibility to fulfil their tax obligations by calculating, filling, and submitting their tax return by themselves.

Based on Law No. 36/2008, tax collection process is managed by Directorate General of Taxes (DGT) under The Ministry of Finance of The Republic of Indonesia. Moreover, the subordinate organizations that bear the responsibility to collect taxes are Tax Offices (KPP), which present in every district. Moreover, taxpayers are obliged to submit their tax return to KPP. The due date for submitting individual annual tax return of current fiscal year is on March 31st in the next year. For example, the due date of tax return of 2013 fiscal year, is on March 31st, 2014. Moreover, from the government side, the tasks of KPP are guiding and delivering services to taxpayers, in order to fulfil their tax obligations toward tax laws including administration and legal issues.

Furthermore, there has been a major change in taxation system in Indonesia since 2000. A tax reform started by implementing a modern taxation system. For example, services to taxpayers are given by a special unit of tax officers called Account Representative (AR). A major task of an Account Representative is guiding and monitoring tax obligations of taxpayers. Moreover, based on Income Tax Law No. 36/2008, if an individual taxpayer does not submit his/her tax return, AR will impose a fine as much as Rp. 100.000 (+/- 7 Euro). However, for corporate taxpayers, the fine is Rp. 1.000.000 (65 euro). Additionally, after

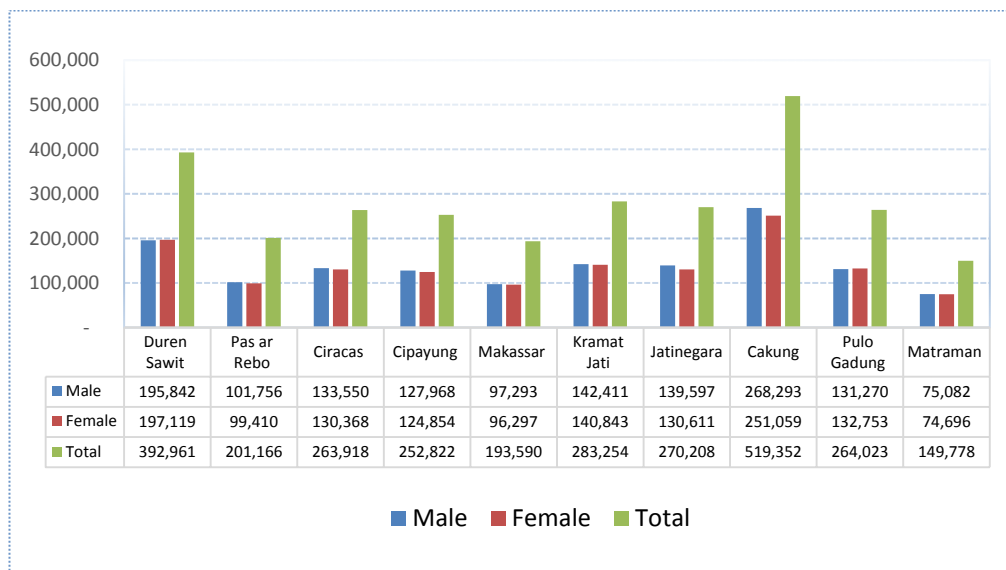
detecting a non-complying taxpayer, an Account Representative will send a letter to the taxpayer and then the taxpayer has to pay the fine in the bank. Summing up, by using data of taxpayers who fail in conforming their tax obligation in account representative dashboard, this study will try to investigate low individual tax compliance problems in Duren Sawit.

1.2.2 Duren Sawit Demographic Condition

Based on the data from Statistics Jakarta (2014), East Jakarta region has population of 2,687,027 and becomes the most populous city in the whole Jakarta region. Jakarta region itself has total population around 9,588,198 people. Moreover, population of Duren Sawit district is 392.961 people which consist of 195.842 male and 197.119 female. Additionally, based on the age group, the number of people aged below 40 year old is 279.602 people, while the other 99.497 are above 40 year old. Compared to the total population of East Jakarta of 2.693.896 people, Duren Sawit population comprises 14% of East Jakarta population (Statistics Jakarta, 2014).

Moreover, compared to other districts in East Jakarta, Duren Sawit is the second most populous, slightly below Cakung with 519.352 people (see figure 6). It implies that Duren Sawit has a big population, which might become potential taxpayers, to help increase government revenue through their tax payment.

Figure 6. East Jakarta Population



Source: Statistics Jakarta (2014) developed by author

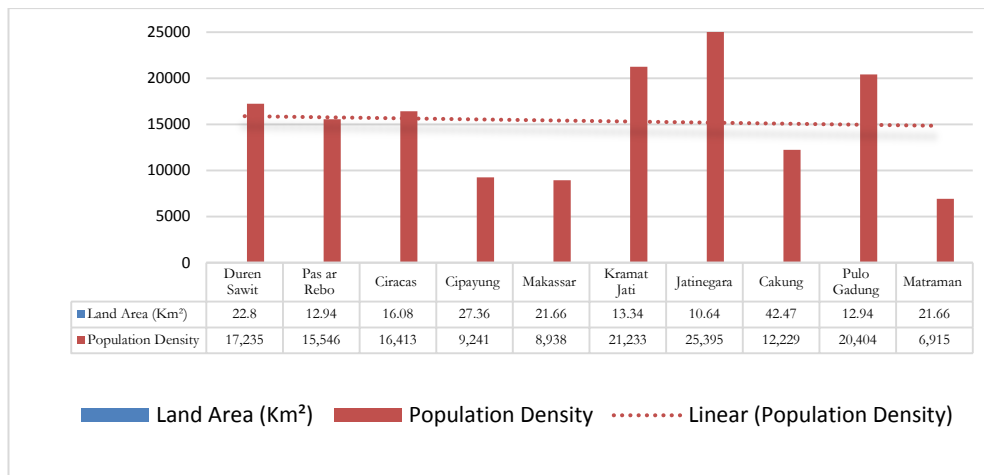
Moreover, based on the data from the municipality of East Jakarta, Duren Sawit land area is around 22.65 km². It is 12.04% of total land area of East Jakarta that stretches over 188.03 km² (Statistics Jakarta, 2014). Compared to the total land area of Jakarta which have 0.03% of total Indonesia land area, the land area of Duren Sawit which has 664.01 km² comprises 3.4% of Jakarta region's land area.

Furthermore, based on the number of population and the land area, population density of Duren Sawit is 17.235 people/km². It is above the average of population density of East Jakarta that have 14,745 people/km². Compared to other districts in East Jakarta, Duren Sawit population density is on the top four densely-populated districts. Its population density is only smaller than Kramat

Jati, Jatinegara, and Pulogadung districts (see figure 7). The high population density of Duren Sawit is triggered by its area which is mostly covered by housings and apartments. The location of Duren Sawit district that is near to the central business of Jakarta also attracts many people to live in this area.

Based on the study by Vinette and Yan (2004) in their research in Canada, population density has a tight relationship with tax compliance because it affects the tax base and influences the number of Canadians fulfilling their tax obligations. Other research by Chaudry and Munir (2010) and Mahdavi (2008) also show that a higher population density will lead to a lower tax ratio and low tax revenue. Thus, based on this research finding, the high population density of Duren Sawit might correlate with their tax compliance ratio performance. This also motivates this study to do an analysis of demographic condition in Duren Sawit in relation with its tax performance.

Figure 7. East Jakarta Population Density (People/Km²)



Source: Statistics Jakarta (2010) developed by author

1.3 Research Problem

High tax compliance ratio becomes a long term policy and strategy of the Directorate General of Taxes of The Republic of Indonesia, as stated in the Strategic Plan of Directorate General of Taxes (DGT Annual Report, 2013). Based on the evidence, tax compliance ratio of individual taxpayers in Indonesia is still in low level. This problem has become a major focus of DGT to support domestic income. Thus, this study attempts to investigate tax compliance problems through external factors, particularly focusing on demographic determinants of taxpayers such as gender and age level in submitting their annual tax return. Moreover, this study also tries to analyse tax compliance ratio of taxpayers working in service sectors. Furthermore, due to the limited time and accessible data, this study tries to investigate individual tax compliance in Duren Sawit by concentrating on the problem of low individual tax compliance ratio as its research problem.

1.4 Research Question

This study tries to analyse the research problems, which pays a particular attention to the low individual tax compliance ratio in Duren Sawit by focusing on demographic factors: gender and age level, determining tax compliance for service sector taxpayers, and considering their previous tax return submission.

The main question that seeks to answer is: to what extent do gender, age, the existence of service sector taxpayers, and the previous submission affect the voluntary tax compliance of individual taxpayers?

1.4.1 Sub Research Question

This study also tries to answers three related questions:

- a. Do gender significantly affect tax compliance? And who is more compliant between men and women?
- b. Do age significantly influence individual tax compliance? And who is more compliant between older taxpayers and younger taxpayers?
- c. Does the previous submission affect the tendency of taxpayers to submit their tax return in the following year?
- d. Do taxpayers who work in service sector have more compliance than those who work in other sectors?

1.5 Research Challenge and Limitation

1.5.1 Research Challenge

The research challenge of this study is on the data collection. Since the data of taxpayers is very sensitive, the use of the internal data becomes the barrier for the most researchers who involved on the research in this field. In the previous studies, most researchers use survey method (external data) because of the limited access to internal data of taxpayers. However, this study uses internal data of taxpayers which can only be accessed by the Directorate of Information and Technology of Directorate General of Taxes Indonesia. Tax return itself is covered by the Law No. 28/2007 that underlines that tax return is a secret document which is protected by the government.

However, the data can only be accessed by author by following some procedures in DGT which the tax id or name of taxpayers have to be hidden. It is based on **Article 34 (Tax Law No. 28 of 2007)** that states “every official shall be prohibited to give an unauthorized party any information known or provided to that official by a taxpayer in the course of his position or duties to implement taxation rules”. Thus, the data that are asked to be accessed have to be on anonymous or hidden identity. Additionally, even though this data is not available online and not easily accessed by some people, the data used in this research paper are legally accessed in terms of research interest.

Furthermore, the internal data that can be analysed is only those that available in the general information in individual annual tax return such as names, tax ids, ages, genders, addresses, and in which sectors taxpayers work. However, this study find difficulties to get more variables such as income level,

liabilities, and other assets information which are more personal. Summing up, this challenge in data observation becomes one of the distinct features from the previous studies.

1.5.2 Limitation

The tax noncompliance problems can be variously defined as taxpayers' failure to fulfil their tax obligation. For example, Allingham and Sandmo (1972) state that tax noncompliance problems can also be an under reporting taxable income of taxpayers in their tax return. Moreover, it can be defined as noncompliance in a case of submitting the tax return but not paying the taxes (Kirchler, 2007). Based on these various definitions, however, this study limits its research by focusing on the meaning of the tax compliance which is about the taxpayers who submit or do not submit their annual tax return.

In addition, most studies use normative approaches that point out taxpayers' awareness in fulfilling their responsibility to pay and report their tax. One of the proponents of this approach is Bird (1998) who claim that compliance has to be seen from normative side, so it can be defined as formal compliance, where the major task of taxpayers such as reporting their tax on time or calculating their tax obligation honestly have to be accomplished. Thus, to get more depth into the problems of individual tax noncompliance, this research paper limited on the study of tax noncompliance which differs between the submitted and non-submitted tax return.

1.6 Contribution to the Literature

Most of the previous studies analyse the effect of demographic factors on tax compliance by survey method. However, there is a drawback of survey method related to tax perceptions and attitudes of taxpayers. Based on a recent study by Kundt et al (2013), taxpayers might reluctant to answer the survey honestly due to threat in revealing their income. Thus, to cover this shortcoming, this study analyses internal data that are more reliable in analyzing the relationship between demographic factors and individual tax compliance.

Moreover, this research paper uses wider observations in 2.383 taxpayers over the fiscal year period of 2013. Finally, this paper focuses on a district namely Duren Sawit to analyse the research problems in more depth. In conclusion, the utilisation of more reliable data and wider observations hopefully can contribute to the literature of the individual tax compliance and demographic factors.

1.7 Chapter Scheme of Research Paper

This research is organized into five sections. The first section is the introduction that consists of background, overview of the taxation system in Indonesia, and Duren Sawit demographic condition. It also contains research problems, research questions, and research challenges. The second section discusses theories regarding tax compliance, theoretical framework, and demographic factors along with empirical evidence. The next section discusses the data and methodology to answer research objectives and questions. The fourth part presents re-

gression result and discusses its analysis. Finally, the last section presents the conclusions.

Chapter 2

Theoretical Framework and Literature Review

This chapter explains the theoretical framework and the previous studies of the relationship between tax compliance and demographic factors. It consists of three big parts. In the first part, this paper tries to figure out the meaning of tax, tax compliance, and tax morale. Moreover, by understanding the definition of taxes, this study describes the connection between tax compliance and demographic factors in a theoretical framework in the second part. This part also explains the flow of how demographic factors can affect tax compliance. Specifically, this part explains about the age and gender of taxpayers as demographic factors related to individual tax compliance. Finally, the literature review and empirical evidence in Indonesia and outside Indonesia are presented critically in the last part of this chapter.

2.1 Definition

2.1.1 Definition of Tax

There are various definitions of tax, but they all have the same purposes. For example, Sommerfield (1980) defines tax as an obligatory transfer of resources from private sectors to government without receiving any direct reward in order to fund public activities. Another definition of tax is described by an Indonesian researcher, Santoso (2007) who defines tax as a contribution to the country that impose in compulsory pays based on tax legislation without receiving any benefits, and it will be used to organize government budget.

According to these definitions, we can conclude that there are three characteristics of tax: At first, tax is the transfer resources from private sectors to government. In Indonesia, the authority to levy taxes can be divided into two levels: the regional government in provincial level and in city level (The Indonesian Tax Law no.28/2007). Secondly, the tax payment is incurred without direct and equal rewards from government. Finally, tax revenues will be used by the government for both regular and development expenditures.

2.1.2 Definition of Tax Compliance

Even though “tax laws are not precise”, it is generally believed that it is hard to persuade taxpayers to pay and report the tax return under tax laws (James and Alley, 2002:29). Moreover, tax is important for government to finance the development programs. Thus, the role of citizen is very important to support economic condition through paying taxes. In other words, the supports can be realized by high tax compliance. The high tax consciousness of citizen is a key point to boost tax revenue which then can help in increasing economic growth.

Additionally, there are various ways of defining tax compliance. For example, Andreoni, Erard, and Feinstein (1998) stating tax compliance as taxpayers’ willingness to adhere to tax laws in order to support national economy. Moreover, Song and Yarbrough (1978) propose a wider definition of tax compliance as taxpayers’ ability and willingness to comply with tax laws which are determined

by ethics, legal environment and other factors under a self-assessment system in The US. A similar definition of tax compliance is also defined by several tax authorities as the ability and willingness of taxpayers to abide by tax laws. However, Kirchler (2007) suggests a simpler definition of tax compliance that he describes tax compliance as taxpayers' willingness to pay and report their tax return to support the country.

A more specific definition of tax compliance has been viewed by some authors. According to a definition provided by Allingham and Sandmo (1972), tax compliance is a condition of taxpayers reporting their actual income where the self-assessment system that creates an uncertain condition would trigger a non-compliance behaviours. For example, there is a possibility of taxpayers enjoy tax savings by hiding their income, not reporting their tax income, and under-reporting their taxable income. This specific definition takes into account the possibility of intentionality of taxpayers to not obey the tax laws. Hence, this definition is not only related to tax obligations of taxpayers such as submitting tax return on time, but it also consider the possibility of tax frauds.

From all of the definitions above, it can be concluded that tax compliance is the degree when the tax behaviour of taxpayers is already appropriate to the country's tax laws including tax calculation and timely manners. Thus, tax compliance expected by government is not the compliance that is forced by government, but the voluntary tax compliance. Based on Organisation for Economic Co-operation and Development (OECD), in their practice note about the compliance measurement in 2008, tax compliance is divided into two categories: administrative compliance and technical compliance. Administrative compliance consists of reporting compliance and procedural compliance. Moreover, technical compliance explains material compliance which talks about the validity of calculating the tax payment.

Specifically, voluntary tax compliance is defined by James et al (2006) as compliant behaviours of taxpayers to fulfil their tax obligations based on tax laws without any forces from government such as fear of getting punishments. Thus, if all of taxpayers have high tax awareness, the tax gap will be smaller.

Furthermore, tax compliance issue has already become one of the important agendas in most developing countries. Tax system condition in most countries such as in Indonesia which adopts self-assessment system requires active taxpayers' consciousness. It is due to the system where taxpayers have to calculate, fill, and submit the tax return by themselves. Thus, high voluntary tax compliance is needed in order to reach government revenue target from tax sectors.

2.1.3 Definition of Tax Morale

The existence of tax morale is correlated to tax consciousness of taxpayers. Tax morale can be defined as a moral obligation to pay taxes, or a belief in contributing to society by paying taxes. It is also defined as an intrinsic motivation to pay and report the taxes without any pressure (Torgler, 2004). Furthermore, based on Torgler and Schneider (2007:10), the concept of tax morale can generally be understood as the moral principles of taxpayers in terms of paying their taxes. It is also closely linked to taxpayers' ethics related to their responsibilities.

Furthermore, a question has been raised in terms of relationship between tax morale and tax responsibilities: Why is it important to analyse taxpayer ethics

and tax morality? What is the correlation between them in boosting tax revenue? Based on Torgler and Schneider (2007), generally, even though people know that tax is important to build the country, nobody wants to pay taxes. The low awareness of taxpayers should be considered as the biggest factor causing low tax compliance. Furthermore, the willingness of taxpayers to fulfil their responsibility does not only come from good tax services by government, but it also comes from their self-consciousness that by paying taxes they can help the country financing development programs. Thus, to further examine tax compliance problems, it is not only by investigating tax structure or tax laws (external factors) that have always been focused by most of researchers, but also by analyzing tax ethics and tax morality of taxpayers (internal factors). Hence, the analysis of taxpayers' ethics towards their compliance could support the policy making in order to boost tax revenue.

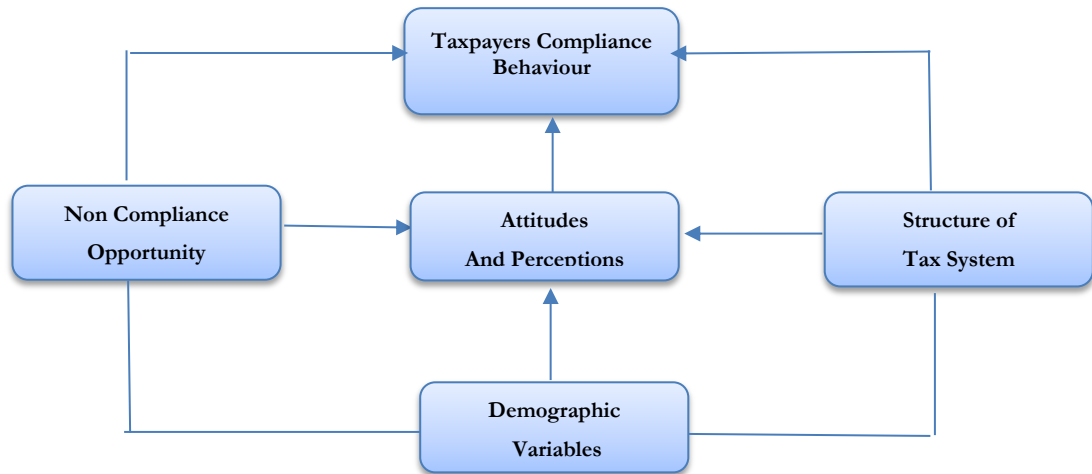
2.2 Theoretical Framework

According to Brooks (2001), the possibilities of a taxpayer to be high-compliant taxpayer can be influenced by some factors. It can be economic factors such as income level and tax rate in a country, psychological factors such as moral and attitudes of taxpayers, and demographic factors such as age and gender.

Furthermore, a comprehensive review of tax compliance literature by Jackson and Milliron (1986) have successfully identified 14 factors of tax compliance summarised from previous research. Moreover, these 14 factors are categorized by Fischer et al (1992) into 4 groups in a model named Fischer model: the first group is based on demographic factors such as age, gender, and education of taxpayers. The second group is based on noncompliance opportunities of taxpayers such as income level, income source, and occupation. The next group is based on attitudes and perceptions of taxpayers such as fairness of tax system. The last group is based on the tax system or tax structure such as complexity of tax system, probability of detection due to the amount of penalties and tax rates level (Fischer et al, 1992). In the end, Fisher model explains the relationship between tax compliance and demographic factors and combines all of the groups into a comprehensive one.

This Fischer model has been chosen in this study to explain the relationship between tax compliance and demographic factors. The framework of this relationship can be seen on figure 8 below.

Figure 8. Theoretical Framework of the Effect of Demographic Factors on Individual Tax Compliance



Source: Fischer et al (1992) developed by author

According to Title (1980), the relationship between demographic factors and tax compliance has been attracting many researchers' attention in the last few decades. Jackson and Milliron (1986) state that age, gender, and education as major demographic factors have an evidence on their relationship with tax compliance in which demographic factors affect tax compliance. They also claim that taxpayers' age as a common demographic variable. Based on Fischer et al (1992), demographic variables have an indirect effect on taxpayer compliance by their impacts on noncompliance opportunities and attitudes.

Fischer et al (1992) as described in Figure 8 states that the demographic variables such as age and gender will directly influence attitudes and perceptions of taxpayers. It can also affect attitudes and perceptions through a non-compliance opportunity which finally affect taxpayer compliance behaviours. At last, "willingness to obey the law" of taxpayers will be determined by demographic factors. Thus, the concentration of this paper in tax compliance problem is on the demographic factors which affect taxpayers' behaviours related to their tax responsibilities.

2.3 Literature Review

2.3.1 Age

There is a contradictive result of age related to non-tax compliance problems. Some researchers argue that older taxpayers are more acquiesce than younger taxpayers. It is in line with Jackson and Milliron (1986) who state that there is a positive relationship between age and taxpayers' compliance. Other scholars like Chung and Trivedi (2003) also posit similar positive association between old and young taxpayers which shows that older taxpayers are more compliant than younger taxpayers. On the contrary, Warneryd and Walerud (1982) and Wahlund (1992) state negative connection where older taxpayers are less compliant than younger taxpayers.

Furthermore, there is a serious problem with these arguments that due to different approach pursued in these research. For instance, Warneryd and Walerud (1982) who conduct a survey questionnaire in their analysis, highlight the level of tax knowledge of the participants. On the contrary, Chung and Trivedi (2003) conduct a survey with psychological questions titled “The Effect of Friendly Persuasion and Gender on Tax Compliance”. They analyse the responses based on ANOVA analysis technique. Specifically, both research use same technique by survey method. However, they use different questions (approach) in their survey. Chung and Trivedi use Psychological questions to know taxpayers’ attitudes and perceptions while Warneyd and Walerud (1982) ask the taxpayers about their tax knowledge.

Based on Torgler and Schneider (2007), attitudes and perceptions of taxpayers are more psychological (internal factor) than tax knowledge levels that are more of external factors such as tax training or education. In addition, Chung and Trivedi’s research is more connected to attitudes and perceptions of taxpayers related to their age and gender, different from Warneyd and Walerud’s who relate the varieties in the abilities of taxpayers with their tax knowledge levels. Based on this notion, the survey method of Warneryd and Walerud (1982) would have been more reliable if they had asked participants about their attitudes and perceptions related to their tax responsibilities. It can be concluded that the research by Chung and Trivedi (2003) is more reliable and more appropriate related to tax compliance problem and demographic factors.

Nevertheless, it is hard to determine the tax compliance level of a taxpayer based on their age level and gender in Warneryd and Walerud’s approach due to the various ability of tax knowledge levels between one taxpayer to another. According to a recent study by Kundt et al (2013), there is a possibility of the reluctance of taxpayers to answer the questionnaire honestly due to the threat of revealing their actual income. Thus, a survey method in analyzing tax compliance can hardly describe the actual condition of taxpayers. Hence, the using of internal data in our paper tries to cover the drawbacks from the previous studies.

2.3.2 Gender

Another factor investigated in this paper in terms of the effect of demographic factors on tax compliance is gender. The different characteristics of male and female have already known in many aspects of life such as in market, home, and charity event where they are differed in bargaining, decision making, and charitable giving. Moreover, based on Torgler and Valev (2006:5), there are possible differences in men and women due to criminological side such as drug abuse and car accident cases. In other aspects, gender differences of men and women also happen in corruption case. Based on Dollar et al (2001), the presence of female in parliament resulting a statistically negative significant impact on corruptions. Similar finding is also found by Swamy et al (2001) who claim that the higher the presence of women in parliament, the lower the corruption cases.

Even though, gender issue is still debatable until now, it can still be considered in tax compliance problem. In previous studies, a social psychological researcher, Tittle (1980) finds that females are more likely to abide by tax laws than males. Moreover, similar finding by Jackson and Milliron (1986:63) also points out that “Women have been identified with conforming roles, moral restraints and more conservative life pattern”. Moreover, in recent study, Torgler

(2004) state that the differences of tax morale levels between men and women may be due to different tax treatment or lower female labour participation rates. Then, this argument is supported by Torgler and Schneider (2007) stating that women are more compliant than men in fulfilling their tax obligations.

However, a contradictive result has been found in a recent study conducted by Houston and Tran (2001) who state that women have a tendency to do tax evasion than men. This finding supports the study by Friedland, Maital, and Rutenberg (1978) who have previously researched about tax compliance on 15 Israeli undergraduate students. They claimed that women have a tendency to not being compliant than men. This different result has attracted this paper to do more investigation whether gender affects the willingness to conform tax laws. Moreover, the contradictive result can be seen specifically in the subject of the research and the focus of study on both contradictive studies.

In the research conducted by Friedland, Maital, and Rutenberg (1978) on 15 Israeli students which consist of 7 men and 8 women, a simulation is held to test the students about tax knowledge concluded that female is less likely to obey tax laws than male. However, Jackson and Milliron (1986) conduct a survey method and use internal data from IRS and focus on federal income tax in The US. The few number of observations and also incapable participants in Friedland et al's research has ended in different result with Jackson and Milliron's. The subject of survey by Friedland et al (1978) who prefer to use students is probably less reliable since students do not earn any income and do not have any responsibilities to pay taxes. Thus, the Jackson and Milliron's research is more reliable to generate tax compliance based on gender approach. Similar to what Jackson and Milliron' did in their research, this paper also uses internal data from DGT and focus on analyzing tax compliance problems in Indonesia.

2.3.3 Previous Tax Return Submission

Beside the demographic factors, this research paper considers a previous tax return submission of taxpayers related to their tax compliance in the current year. It is related to the tendency of taxpayers to obey the law due to a sanction. Based on Allingham and Sandmo (1972) and Fischer et al (1992), the amount of penalties can affect a taxpayer to abide by tax laws. The theoretical economic model introduced by Allingham and Sandmo (1972) presents that the higher the penalty and the potential audit probability, the greater the discouragement for potential tax avoidance.

They proposed a model named A-S model to investigate taxpayers' behaviours. In the model, they assume that a person has a fixed endowment of income (I), and then he must report their tax income by declaring his income (D) which reported at tax rate (t). If it is unreported, so it will not be taxed. However, all of individuals have probability to be audited by government (p) and impose a fine (f) which is based on unreported income taxes. This framework can be described as: $D = D(I, t, f, p)$ (Allingham and Sandmo, 1972).

In the case of low tax compliance problem, it can be seen that the increase of the amount of declared income (D) will increase the probability of detection or to get penalty (f). However, the impact of tax (t) and Income (I) is also dependant on taxpayers' behaviours. Thus, the Bigger the unreported income, the higher the probability to be detected by the authority. Moreover, in terms of individual tax compliance context, taxpayers who have already got a fine have a

tendency to adhere to regulation. Therefore, in this study, the previous submission status is considered to be investigated.

Based on the data of DGT of The Republic of Indonesia, the Revenue Department of Thailand, Bureau of Internal Revenue of Philippines, and Inland Revenue Board of Malaysia (2015), the amount of penalty that is imposed on taxpayers if they do not submit their tax return is varied. This study compares the amount of penalty of Indonesia with its neighbouring countries which have similar GDP (see table 1).

Table 1. The Amount of Penalty for Not Submitting the Tax Return

Country	Amount of Fine	
Indonesia	Rp 100.000	7 Euro
Malaysia	1000 Euro (Intent to Evade)	235 Euro
Thailand	“Twice the amount of the tax due plus a surcharge of 1.5% per month of the tax due”	
Philippine	“25% of the tax amount due plus 20% interest per annum”	

Source: DGT Indonesia; Revenue Department of Thailand, Bureau of Internal Revenue of Philippines, and Inland Revenue Board of Malaysia (2015)

From table 1, it can be clearly seen that the amount of penalty in Indonesia is less powerful than other countries to force taxpayers to abide by tax laws. Compared to Malaysia's, which differentiates the intention of taxpayers to evade or not to evade tax obligations, the amount of penalty in Indonesia is 35% much lower than Malaysia's. Moreover, the amount of penalty in Indonesia also does not have enough power to make taxpayers to more acquiesce, compared to Thailand's and Philippine's. Thus, in this study, the previous tax return is being considered to examine the effectiveness of the amount of the penalty and also its relationship with tax compliance.

2.3.4 Sector

Based on the data of DGT of The Republic of Indonesia, the contribution of taxpayers working in service sectors to tax revenue in 2011 to 2013 is statistically significant. Specifically, in 2011, taxpayers who work in service sectors have contributed in around Rp.120.953.156.504 or 25% of total tax revenue in Indonesia. Moreover, in 2012, it increased to Rp.140.599.756.243 and it slightly continued increasing in 2013 by Rp.166.031.424.579. Based on this notion, the existence of taxpayers who work in service sector is important.

However, low tax compliance ratio of taxpayers working in service sector hampers tax revenue to boost domestic income. In Duren Sawit, the number of taxpayers working in service sector is 2.671 taxpayers. However, in 2010 the number of service-sector taxpayers reporting their tax return is only 322 people. It means only 12% of the total service-sector taxpayers who have a good tax awareness to obey tax laws. In 2011, it decreases to 9.6% where there are only 258 service-sector taxpayers reporting their tax return. It then slightly decrease in 2012 with 234 service-sector taxpayers and in 2013 with 209 service-sector taxpayers who abide by tax laws. This data shows that tax compliance ratio of service-sector taxpayers is very low. Since service-sector taxpayers have a big poten-

tial tax income, a further research about tax compliance problem in service sector is needed.

Furthermore, this study tries to examine some individuals working in service sector related to their tax compliance in order to support tax revenue. The result of this analysis is important for the policy makers to boost the tax performance from the tax payments. The appropriate policy to support tax revenue through better tax performance of individual taxpayers who are working in service sector hopefully will increase Indonesia's tax revenue.

2.4 Empirical Evidence

2.4.1 Empirical Evidence in Indonesia

The previous study conducted in Indonesia by Somnya and Tjaraka (2011) examined the relationship between tax morale and tax avoidance in Surabaya (East Java, Indonesia). Moreover, the focus of their research was on the effect of demographic variables such as age, gender, formal education, and informal education. The research method used in their study was the survey method by questionnaires on 165 taxpayers in all tax offices under the East Java Regional Tax Office. The result shows that the gender and informal education are statistically significant in affecting tax compliance while the age and formal education are not statistically significant in influencing tax compliance. The result also presents that male taxpayers are 3.8 percentage point more compliant than female taxpayers in adhering to tax laws. Moreover, the age variable shows that younger taxpayers are more compliant than older taxpayers. Furthermore, one question that needs to be asked in this research, however, is whether 165 taxpayers as their respondents are sufficient to cover the analysis of demographic factors on tax compliance. It is due to the focus of study on East Java Regional Tax that is too wide to use only 165 taxpayers as the respondents, who only represent less than 1% of total taxpayers in East Java Regional Tax Office (DGT annual report, 2014). Therefore, the research would have been more valid if a wider range of taxpayers had been explored. Compared to this paper, the analysis in this paper focuses on one district (one tax office) by using internal data of 2.383 taxpayers.

Another research about the effect of demographic factors on tax compliance in Indonesia was conducted by Cahyonowati (2011) in Semarang, Central Java. She used the survey questionnaire method on 232 random taxpayers in Central Java Regional Tax Office. She investigated the effectiveness of the amount of penalty to taxpayers and the relationship between tax compliance and four demographic variables namely: age, gender, economy, and education. Then, the model was analyzed by PLS (Partial Least Square) method, resulting in insignificant effect of all demographic variables on tax compliance. However, the amount of penalty as another explanatory variable outside the demographic variables is statistically positively significant in affecting tax compliance. Summing up, similar to Lasmana's, this study would have been more valid if they had focused on a narrower area.

2.4.2 Empirical Evidence from outside Indonesia

Furthermore, the prior research from out of Indonesia was conducted by Engida and Baisa (2014) in Ethiopia. They claim that younger taxpayers are also

more compliant than older taxpayers. This research also find that female taxpayers are more adherent to tax laws than male taxpayers in fulfilling their tax responsibilities. Specifically, Engida and Baisa (2014:442) used 9 tax compliance determinants in Ethiopia namely “the probability of being audited, perceptions of government spending, perceptions of fairness, penalties, financial constraints, changes to current governmental policies, the impact of referral groups, the role of the RCA and tax knowledge”. Moreover, they used the cross-sectional survey method on 102 taxpayers. The findings were analyzed by Ordered Logistic Regression method, resulting in the gender and compliance status are statistically negatively significant in explaining tax compliance. It also means that the result rejects the hypothesis and it also shows that male taxpayers are less likely to abide the laws than female taxpayers. Additionally, the result also presents that the probability of female taxpayers to abide tax law is 1.92 percentage point more compliant than male ones. Based on age levels, the result exhibits that younger taxpayers are 0.25 percentage point more likely to comply with tax laws than older taxpayers. On the other hand, the other control variables such as sales income and education do not have significant relationship with tax compliance.

Another research by Alabede (2014) analyzed individual taxpayers’ compliance behaviour using ANOVA technique based on the data from a survey in 332 taxpayers in Nigeria. He used demographic variables such as age, income level, employment sector, and ethnicity in analyzing tax compliance problems. He suggests that the demographic factors such as age and employment status are statistically significant in affecting taxpayers’ compliance behaviour in Nigeria. However, his result displays that gender and education are not statistically significant in influencing tax compliance. The result shows that older taxpayers are 6.8 percentage point more compliant than younger taxpayers. Moreover, their result also exhibits that taxpayers who have higher income level are more compliant than those who have lower income level. Additionally, taxpayers who are already settled with their job have better tax awareness than those who are unemployed. Finally, the research claims that education and religion are not statistically significant with tax compliance status.

To fill the gap with the previous studies that mostly used the survey method, this paper uses the quantitative method by using internal data directly from Directorate General of Taxes (DGT) which are described in the Individual Income Annual Tax Return and the taxpayer’s registration form. By focusing on the demographic factors of taxpayers such as gender and age, this paper tries to examine the relationship between demographic factors and tax compliance. This research paper also takes into account the previous year’s submission status which, in Indonesian context, is important to test the consistency of taxpayers in reporting their tax return. Occupation sectors of taxpayers are also examined in this study to know their effect on tax compliance and help in policy making to raise tax revenue.

Chapter 3

Data and Methodology

This chapter tries to describe data and methodology that are used in analyzing the effect of demographic factors on individual tax compliance. In addition, this chapter is divided into two parts: the first part describes the general information of data including the type and the summary of data. The second part explains the methodology that is appropriate in assessing the model using the quantitative method. This last part also illustrates on how the dependent variable can be explained by the explanatory variables under three statistical methods: Probit method, Logit method, and Linear Probability Method (LPM). Specifically, this last part explains the difference between logistic regression and Linear Probability method in analyzing a categorical dependent variable.

3.1 Data

3.1.1 General Information

The unit analysis of this research paper is individual taxpayers in Duren Sawit. This study involves 2.383 people who are still active taxpayers. Moreover, taxpayers who are analyzed in this study have already registered before 2010. The data are also taken randomly in various ages, genders, and also sectors.

Furthermore, the data are divided into two types: (i) the secondary data of Duren Sawit demographic condition that are based on Statistics Indonesia and Statistics Jakarta. This type of data present the land area, number of population, ages, and taxpayers' characteristics in Duren Sawit district. Another secondary data are the overview of Indonesia' tax performance such as the amount of total tax revenue in Indonesia from 2009 to 2013, the number of registered taxpayers including both corporate and individual taxpayers, the ratio of individual tax compliance, and the performance of Duren Sawit Tax Office. These secondary data are taken from published data by Directorate General of Taxes of Republic of Indonesia. (ii) The internal data present the personal information of individual taxpayers consisting of tax ids, names, ages, genders, addresses, the amount of taxes paid, the sector where taxpayers work, and the date of tax return submission. Moreover, these internal data are taken from Directorate of Information and Technology of Directorate General of Taxes Indonesia.

3.1.2 Data Summary

The internal data used in this study are taken randomly, which are characterized as cross sectional data. Then, these data are specifically classified based on ages, genders, sectors where taxpayers work, and the status of previous tax return submission in 2012 and in 2011. Finally, these data can be summarized in table 2 and table 3 below.

Table 2. Data Summary of Dummy Variable

No	Variable	Description (Dummy Variable)	Frequency
1	Compliance	Compliant (1)	277
		Not Compliant (0)	2,106
2	Gender	Male (1)	1,475
		Female (0)	908
3	Sector	Service Sector (1)	1,639
		Non-Service Sector (0)	744
4	Report_2012	Submit Tax Return (1)	275
		Not Submit (0)	2,108
5	Report_2011	Submit Tax Return (1)	261
		Not Submit (0)	2,122

Table 3. Data Summary of Age Variable

No	Variable	Max Age	Min Age	Mean	Std. dev	Median
1	Age	82	19	49.68359	11.54318	50

3.1.2.1 The Dependent Variable

The dependent variable in this study is tax compliance that is described as the compliance of taxpayers who submit their tax return in 2013. This study employs the binomial variable for this dependent variable where the value of 1 is for those who submit their tax return, while 0 is for others. Moreover, the sample presents that 2.106 taxpayers out of 2.383 did not report their tax return to the tax office in 2013. In short, it portrays as much as 88.56% of the total sample in this analysis.

3.1.2.2 The Independent Variables

There are four independent variables that are classified as categorical variables: gender, sector, tax return in 2012, and tax return in 2011. Another variable, age level, is classified as numerical variable.

3.1.2.2.1 Gender

In this research, gender is classified as binomial variable. The value of 1 is for taxpayers who are male, while 0 is for others. The sample shows that 61.90% of taxpayers which is around 1.475 taxpayers are male while the other 908 are female.

3.1.2.2.2 Age

In this study, age is classified as numerical variable. Moreover, the maximum age of taxpayers in this sample is 82 years old while the minimum age of taxpayers is 19 years old. On average, age of taxpayers in whole sample is 49 years old from total 2.383 taxpayers.

3.1.2.2.3 Sector

Sector is described as the sector where taxpayers work. In this research, the sector is divided into those who work in service sector and others. Moreover, this study also applies dummy variables to explain tax compliance of those who are employed in service sector compared to others. Value 1 is those who work in service sector while 0 is for others. Moreover, data summary shows that there are 1.639 service-sector taxpayers, which is 68.78% of the total sample.

3.1.2.2.4 Tax Return Status in 2012

In this study, the status of tax return submission in 2012 is considered as the categorical variable. This variable is divided into those who submitted and did not submit their tax return in 2012. Value 1 is applied for those who submit their tax return, while 0 is for others. The sample shows that 2.108 taxpayers out of 2.383 did not report their tax return, which means around 88.45% of the total sample.

3.1.2.2.5 Tax Return Status in 2011

The tax return status in 2011 is taken as one of independent variable to examine taxpayers' compliance level. It is based on fluctuated tax compliance ratio in Duren Sawit to test the tendency of taxpayers in submitting their tax return. Thus, tax return submission in 2011 is taken into account in the analysis. This variable also utilises categorical variable where 1 is stand for those who reported their tax return in 2011 while 0 is for others. The data summary presents that 2.122 taxpayers did not report their tax return which means 89% of the total sample.

3.2 Methodology

In this study, this paper applies the quantitative method by comparing three statistical methods: Linear Probability Model (LPM), Probit method, and Logit method. Furthermore, the analysis is conducted by using a statistical software namely STATA. Additionally, there are various methods in analyzing quantitative data. Moreover, this study utilizes a categorical variable as its dependent variable that is treated specially.

The linear probability model underlines that the relationship between independent and dependent variables is in linear condition. This condition can be described as the increase of each unit in the independent variables would result in a change of some units in the dependent variable. Moreover, this condition can also be applied if the dependent variable is numerical variable.

However, if we use a linear regression in a categorical condition, such as tax compliance case either a taxpayer is compliant or not compliant, it will lead to biased estimates and the assumptions might be violated (Hanushek and Jackson, 1977). The solution for this problem is by using probit or logistic regression which can be used for binary classification (binomial variable) or multi classification (multinomial logistic regression).

3.2.1 Logistic Regression

According to Gujarati (2003), the logistic regression is a non-linear regression model where its dependent variables are categorical. The categorical varia-

ble represents a value whose minimum value is 0 while the maximum is 1. Moreover, the value represents a certain category of probability that a condition can be categorized. For example, tax compliance can be divided into two categories: compliant taxpayers and non-compliant taxpayers. The value of compliant as described by reporting tax return can be categorized as 1 while others are 0. The value of the dependent variable whether it is compliant or not is decided by the explanatory variables. In addition, the basic function of the probability in linear regression can be described as $1-P_i$ for probability of 0 while P_i is for probability of 1.

Based on Gujarati (2003), the logistic regression is usually used for categorical data, for example, to diversify compliant taxpayers and non-compliant taxpayers. Moreover, the determination of tax compliance is based on the independent variables which can also be nominal, ordinal, and ratio. Furthermore, Gujarati also states that the logistic regression model comes from the differential of the probability of categorical variables. In short, Gujarati states that probability equation can be expressed mathematically as:

$$P_i = E(Y = 1) | X_i = \frac{1}{1 + e^{\beta_1 + \beta_2 X_i}} \quad \dots (1.1)$$

Moreover, this equation can be simplified by assuming $(\beta_1 + \beta_2 X_i)$ as Z_i . The equation will be resulted in the following equation.

$$P_i = \frac{1}{1 + e^{-Z_i}} = \frac{e^{Z_i}}{1 + e^{Z_i}} \quad \dots (1.2)$$

From the equation (1.2) it can be clearly seen that Z_i is in the interval $-\infty$ to $+\infty$ where P_i is in the interval 0 to 1. Moreover, P_i have non-linear relationship with Z_i .

The nonlinear relationship of P_i is not only with X , but it also with β . Thus it will be a problem if we conduct an analysis by Ordinary Least Square (OLS) regression (linear regression). To solve the problem, it is possible to linearize the (1.1) equation by applying the neutral logarithm to category 0 as follow.

$$1 - P_i = \frac{1}{1 + e^{Z_i}}$$

This equation can be substitute with the (1.2) equation, and it will be

$$\frac{P_i}{1 - P_i} = \frac{1 + e^{Z_i}}{1 + e^{-Z_i}}$$

This $\frac{P_i}{1 - P_i}$ equation can be called as “odds ratio” of category with value 1 which in this case, probability of taxpayer to submit their tax return (compliant). Thus, if P_i is equal with 0.8, the tendency of a taxpayer to comply is higher.

Moreover, the next step is by applying neutral logarithm to odds ratio. Then, it will result in an equation as follow:

$$Li = \ln\left(\frac{P_i}{1 - P_i}\right) = Z_i = \beta_1 + \beta_2 X_i$$

In the equation, Li is log of odds ratio which it is not only linear to X but it also linear to β (Gujarati, 2003). Moreover, β_1 is the intercept of the model. It means if the independent variables are zero, the probability to submit tax return

is as much as $\beta 1$. Moreover, the positive value of $\beta 2$ means that if $\beta 2$ increase, it will raise the probability to submit tax return. However, the negative value means that if $\beta 2$ increase, it will decrease the probability to abide by tax laws.

3.2.2 Probit Regression

Another model that expects a categorical variable could be changed in linear condition is Probit Model. Based on Gujarati (2003), this model can be used if the error term of the model can be normally distributed. The error term itself is the difference between the estimated dependent variable and its real value. Thus, a model is called a probit model if the function is normally distributed. Based on Gujarati (2003), mathematically, it can be described as follow:

$$Y_i = \beta X_i + U_i : \text{where } U_i \sim N(0,1)$$

In this equation, error will follow normal distribution with the average value is 0. Moreover, it also in constant variance where the value of independent variable is 1 (Gujarati, 2003).

3.2.3 Conclusion of Methodology

To sum up, Logistic and Probit model can be used to explain the categorical dependent variable. Statistically, both of these models can linearize the non-linear dependent variable. Therefore, the relationship between independent and dependent variables can be successfully explained in the model. In this study, the independent variables are used to explain tax compliance that acts as the dependent variable. Furthermore, Linear Probability Model will also be used to examine in what method the result is more appropriate in explaining the effect of independent variables on tax compliance.

Hence, in this study, the first analysis is by examining the appropriateness of each model to decide which model is the more suitable one. Then, it compares the regression results of sample by using Probit method, Logistic method, and Linear Probability Method in a statistical software namely STATA.

Chapter 4

Empirical Result and Discussion

This chapter tries to answer the research questions by analyzing the empirical result of the effect of demographic factors on individual tax compliance. This chapter also discusses the correlation between dependent and independent variables using three statistical methods: Probit method, Logit method, and Linear Probability Method (LPM), processed through a statistical software namely STATA. Finally, this chapters concludes the analysis and recommends some policies related to individual tax compliance based on the analysis of empirical result.

Furthermore, the results are expected to help policy makers in increasing tax revenue. For example, if the results show that older taxpayers are more compliant than younger taxpayers, the policy will focus on tax compliance of younger taxpayers related to their perceptions and attitudes, such as providing free tax training in campus to increase their tax awareness. In terms of gender, if female taxpayers are less likely to comply than male taxpayers, policy makers will concentrate on how to facilitate females in reporting their tax return. Similar policy will be imposed on sector variable that if service-sector taxpayers are less compliant than other sectors, policy makers will intensify on programmes that boost service-sector tax revenue, such as facilitating service-sector taxpayers in using, calculating, and reporting their tax return. Finally, if the results present that taxpayers who did not report their tax return in last year are less compliant than those who did, policy makers will focus on how to formulate an appropriate amount of penalty to force taxpayers to obey tax laws.

4.1 Specification Model

In this research, the model used to examine the effect of demographic factors (age and gender), sector where taxpayers work, and also the previous tax return submission on individual tax compliance is as follows:

$$\text{Comp}_i = a_1 + a_2 \text{Age}_i + a_3 \text{Gender}_i + a_4 \text{Sector}_i + a_5 \text{Comp}_{i(t-1)} + a_6 \text{Comp}_{i(t-2)} + e_i$$

Where “ i ” shows an individual taxpayer in Duren Sawit in 2013 ($i=1,2,3,\dots$, and N) and “ t ” presents fiscal year period of 2013. Based on the statistical model above, the characteristics of variables can be elaborated as follows:

4.1.1 Variable “ Comp_i ” (Compliance in 2013)

This variable acts as dependent variable presenting the tax return submission in 2013 that is focused on those who submit or did not submit their tax return.

4.1.2 Variable “ Age_i ” (Age of Taxpayers in 2013)

This variable refers to the age of taxpayers in 2013. Moreover, a_2 is the coefficient of age explaining the probability to submit tax return between older

taxpayers and younger taxpayers towards their tax obligations. Furthermore, \mathbf{a}_2 as the coefficient of age is expected to be positive. In Indonesian context where ethics play a major role, the function of older people in society is important where they will act as role model and it will trigger them to be more compliant than younger taxpayers.

4.1.3 Variable “ Gender_i ” (Gender of Taxpayers)

This variable refers to the gender of taxpayers divided into men and women where \mathbf{a}_3 is the coefficient that will explicate the probability of being the law-abiding taxpayers between male and female. Moreover, the sign of \mathbf{a}_3 as the coefficient of gender is expected to be negative. It is based on the condition where in most Eastern countries, especially in Indonesia, female taxpayers are very aware towards punishments. Thus, tax compliance of women is expected to be positive.

4.1.4 Variable “ Sector_i ” (Sector of Taxpayers in 2013)

This variable reflects the sector of taxpayers related to their tax compliance. Moreover, \mathbf{a}_4 is the coefficient of variable “Sector” that points out the probability to adhere to tax laws between service-sector taxpayers and those working in other sectors. In addition, the sign of \mathbf{a}_4 is expected to be positive. It is due to the potential tax income from service-sector taxpayers that their contribution is significant in boosting tax revenue. Therefore, the positive relationship between service-sector taxpayers and their tax compliance ratio can help the government in raising domestic income.

4.1.5 Variable “ $\text{Comp}_{i(t-1)}$ ” (Tax Return Submission in 2012)

This variable presents the tax return submission in 2012. Additionally, \mathbf{a}_5 is the coefficient of tax return submission status in 2012 ($\text{Comp}_{i(t-1)}$). Moreover, it explains the probability of taxpayers to report their tax return in 2013 based on their tax compliance status in 2012. In addition, the sign of \mathbf{a}_5 as the coefficient of previous tax return submission is expected to be positive. It implies whether the amount of penalty is already effective to trigger taxpayers in abiding by tax laws.

4.1.6 Variable “ $\text{Comp}_{i(t-2)}$ ” (Tax Return Submission in 2011)

This variable represents the tax return submission in 2011. Moreover, \mathbf{a}_6 is the tax return submission status in 2011. In addition, it shows the probability of taxpayers to report their tax return in 2013 based on their tax compliance status in 2011. The sign of \mathbf{a}_6 is similar to \mathbf{a}_5 that is expected to be positive in examining the amount of penalty whether it is already effective in forcing taxpayers to submit their tax return.

4.2 Empirical Result

A positive coefficient for a given independent variable in the model indicates that it increases the probability to submit tax return, resulting in a higher

tax compliance ratio which can boost domestic income. Since the dependent variable is a categorical variable, the ascertain effect on the explanatory variables can be analyzed by calculating the marginal effects which depend on the level of all variables. Moreover, the marginal effects have been computed at the mean values of all variables (Gujarati, 2013).

The empirical result is divided into two models: (i) The first model includes the variable of previous tax return submission in figuring out the effect of demographic factors on individual tax compliance. (ii) The second model excludes the variable of previous tax return submission in investigating the effect of demographic factors on tax compliance. Moreover, these two different models will be analyzed under three statistical methods, which are: Probit method, Logit method, and Linear Probability Model (LPM).

4.2.1 First Model (Including Previous Tax Return Submission)

4.2.1.1 Data Description

$$Comp_i = a_1 + a_2 Age_i + a_3 Gender_i + a_4 Sector_i + a_5 Comp_{i(t-1)} + a_6 Comp_{i(t-2)} + e_i$$

In the first model, all included explanatory variables are to be investigated. Moreover, analysis is held by comparing three statistical methods: Probit method, Logit method, and LPM. The regression result of the first model can be seen in table 4.

Table 4. Regression Result of First Model

Variable	Probit Marginal Effect	Logit Marginal Effect	Linear Regression Coefficient
Gender	- 0.022 *** (0.006)	- 0.023 *** (0.007)	- 0.023 *** (0.007)
Age	- 0.003 *** (0.001)	- 0.003 *** (0.001)	- 0.004 *** (0.002)
Age_sq	0.000 *** (0.000)	0.000 ** (0.000)	0.000 *** (0.000)
Sector	- 0.022 *** (0.007)	- 0.020 *** (0.007)	- 0.024 *** (0.008)
Report_2012	0.136 *** (0.011)	0.119 *** (0.010)	0.658 *** (0.053)
Report_2011	0.067 *** (0.012)	0.059 *** (0.011)	0.222 *** (0.053)
Number of Obs.	= 2383		
Prob > Chi2	= 0.000	Prob > F = 0.000	Prob > F = 0.000
Pseudo R ²	= 0.686	Pseudo R ² = 0.682	R-square = 0.723

Significant in 10%= *; in 5%= **; in 1%= ***

In Parenthesis = Standard Error

Source: Author computation using STATA 13 (2015)

4.2.1.2 Goodness of Fit Measures

The best method in analyzing the model can be chosen based on goodness of fit measures. Moreover, the goodness of fit measures that is used in this paper

is R-Square and classification model. From the result in table 4, Likelihood Ratio of Probit method shows that the P-value is less than 0.005, meaning that the model rejects hypothesis where all explanatory variables can explain the dependent variable. It also means that the model can be used to assess tax compliance. Moreover, based on Gujarati (2003), another measurement of explaining the relationship between dependent variable and explanatory variables is by examining R-square.

Moreover, in Probit and Logit method, R-square is replaced by Pseudo R-Square. Furthermore, Pseudo R-Square of Probit method shows that tax compliance can be described 68.67% by explanatory variables (age, gender, sector, and previous tax return) while the other 31,33% can be explained by other variables that are not included in the model.

In Logit method, Likelihood Ratio also presents that the P-value is 0.000 (less than 0.005) meaning that all independent variables can describe the dependent variable. Pseudo R-Square of logit model also exhibits that dependent variable can be explained 68.18% by explanatory variables. A larger result occurs by using LPM that 72.92% of tax compliance can be described by independent variables (age, gender, sector, report in 2012, and report in 2011).

Furthermore, for logistic regression, the goodness of fit measures of the model can also be examined by the classification of the empirical data. Based on the classification table, the model also successfully predicts as much as 96.68% of actual condition. This result also indicates that the model can be described in almost similar situation to actual condition (see table 5).

In conclusion, based on Pseudo R-Square and R-Square values of these three methods, the highest value is 72.92% reached by LPM. Thus, LPM can be chosen as the best method to analyse tax compliance related with age, gender, sector, and previous tax submission.

Table 5. Classification Table of Logistic Regression

Sensitivity	83.39%
Specificity	98.43%
Positive predictive value	87.50%
Negative predictive value	97.83%
----- -----	
False + rate for true ~D	1.57%
False - rate for true D	16.61%
False + rate for classified +	12.50%
False - rate for classified -	2.17%
----- -----	
Correctly classified	96.68%

Source: author computation by STATA 13 (2015)

4.2.1.3 Analysis of Coefficient

In this paper, the analyses of all three statistical methods will be presented. Furthermore, the analysis of the magnitude of variables is different between LPM and the logistic regression. For LPM, it can be analyzed directly from the

coefficient. However, for Logit and Probit method, the coefficient can only be analyzed by the odds ratio and marginal effect.

The regression result shows that the P-value of all independent variables in all three methods are statistically significant in describing dependent variable. These three methods also show that the difference magnitude of one method to others is quite small. Moreover, there is no significant differences between linear regression and logistic regression. Furthermore, the analysis of coefficient in Probit and Logit method can be drawn in two ways:

4.2.1.3.1 Analysis of Odds Ratio

Odds ratio in this analysis is defined as the ratio of two probabilities: probability to comply or probability to do not comply with tax laws. Moreover, negative value of odds ratio shows that independent variables have negative relationship with dependent variable. However, the odds ratios of all variables in table 6 present positive value. It means that the increase of all explanatory variables will raise individual tax compliance level.

Based on table 6, the odds ratio of male taxpayers to submit their tax return in 2013 is 0.42 times smaller than female taxpayers. Moreover, odds ratio of age level shows that the odds of older taxpayers to obey tax laws is 0.86 times smaller than younger taxpayers. Additionally, odds ratio of taxpayers who are working in service sector is 0.46 smaller than taxpayers who are working in other sectors. For the previous tax return status, odds of those who submitted their tax return in 2012 is 84.90 larger than those who did not submit their tax return on the same year. Similar result also occurs on odds ratio of those who submitted tax return in 2011 which is 9.17 larger than those who did not report their tax return on the same year.

Table 6. Odds Ratio Table (The First Model)

Logistic Regression			
Variable	Odds Ratio	Z	P - Value
Gender	0.42 (0.114)	-3.17	0.001
Age	0.86 (0.061)	-2.09	0.032
Age_sq	1.00 (0.000)	1.88	0.061
Sector	0.46 (0.124)	-2.85	0.003
report_2012	84.90 (30.805)	12.24	0.000
report_2011	9.177 (3.664)	5.55	0.000
_cons	2.049 (3.571)	0.41	0.655

Source: author computation by STATA 13 (2015)

4.2.1.3.2 Analysis of Coefficient

4.2.1.3.2.1 Gender

The result of the logit approach indicates marked differences between male and female taxpayers related to their tax compliance. Based on the result of

Logit method, gender variable has a statistically negative significant marginal effects. The probability of male taxpayers to submit their tax return in 2013 is 2.3 percentage point less likely than female taxpayers. Compared to the result of Logit method, the result of Probit method and LPM is almost similar to Logit method where the coefficient has negative sign in which female taxpayers has 2.21 percentage point (Probit method) and 2.35 percentage point (LPM) more likely to comply by abiding tax laws than male taxpayers.

These results are consistent with the view that female taxpayers are more compliant in reporting the tax return to tax office than male taxpayers by Jackson and Milliron (1986) and Torgler and Schneider (2004). This finding also has similar vein with study by Manaf, Hasseldina and Hodges (2005) in Malaysia. Moreover, in Indonesia, the Ministry of Finance of The Republic of Indonesia has facilitated female taxpayers to fulfil their tax obligation since 2000 based on Law no.9/2000 to make sure the right of female taxpayers is already equal with male taxpayers. Specifically, one of the articles states that a wife has a right to separate her assets from her husband in their tax return. Thus, this result also points out that the policy of DGT to raise female taxpayer's compliance is already effective.

4.2.1.3.2.2 Age

The results of logit method show that age is statistically significant in explaining tax compliance. The result underlines negative correlation between age and tax compliance that older taxpayers are less likely to comply by 0.39 percentage point than younger taxpayers. Moreover, this result also has similar result by using Probit and LPM method, showing the probability of younger taxpayers is 0.39 percentage point (Probit method) and 0.46 percentage point (LPM) more likely to submit their tax return than older taxpayers. This result is in line with the research conducted by Torgler (2004) and Mason and Calvin (1978) who state that older taxpayers have a tendency to be less compliant than younger taxpayers in terms of submitting their tax return. However, the interpretation of magnitude of age is more suitable in age square due to parabolic shape of age that has turning point in a certain level of age.

In Indonesia, DGT has already launched tax classes and free courses for younger taxpayers. Moreover, a policy by DGT in terms of promoting the important of tax in schools namely "tax goes to campus" has been successfully launched to educate young taxpayers since two years ago (DGT Annual Report, 2014). Thus, the regression results, under three statistical methods, support the notion that government policies have already effective in increasing younger taxpayers' tax awareness.

However, this result indicates that there might be some other factors that make older taxpayers have less tax awareness than younger taxpayers. The factors might be: the location of tax office that is quite far from Duren Sawit area, the complexity in calculating taxes, and the lack skill of using technology where DGT have already launched e-submission program to help taxpayers in submitting their tax return. Thus, it needs an intensive investigation to help older taxpayers in fulfilling their tax responsibilities.

4.2.1.3.2.3 Age_Sq (Age Square)

Turning Point

Additionally, since age has a parabolic shape, it has a turning point that the interpretation of relationship between age and tax compliance can be explained in age square. Based on the polynomial graph of age (see appendix 1.), tax compliance starts to progressively decrease as people become older and they might not be so healthy to do activities as before. Moreover, older taxpayers' difficulties in calculating complex taxable incomes might cause low tax compliance. Finally, at some point tax compliance does not grow as older taxpayers would be retired and have no tax responsibilities. Hence, the relationship between tax compliance and age is portrayed as life cycle effect.

Based on Wooldridge (2012), in Logistic Regression under linear and quadratic terms, if linear coefficient is β_1 and quadratic coefficient is β_2 , the turning point of the probability is at $-\beta_1/(2\beta_2)$. Therefore, in this first model, linear coefficient of age is 0.0039 using Probit method and Logit method. Additionally, it is 0.0046 by using LPM. Moreover, quadratic coefficient of age using Probit method is 0.00003. In addition, by using Logit method, quadratic coefficient of age is also 0.00003 while it is 0.00004 by using LPM.

According to Wooldridge (2012), the extremum point of age using Probit method can be calculated as $(-(-0.0039)/(2 * 0.00003))$ where it will be 59 years old. Furthermore, by using Logit method, the result is similar to Probit method where the extremum point is 59 years old. In addition, by using LPM, the extremum point $(-(-0.0046)/(2 * 0.00004))$ will be 57.5 years old.

Specifically, this extremum point interprets that tax compliance reaches its maximum point as taxpayers' age is 59 years old by using Probit and Logit Method and 57.5 years old by LPM. Then, it starts to decrease as they become older.

Based on Wooldridge (2012), to interpret the change of age of taxpayers on tax compliance can be formulated as follows:

$$\Delta Comp \approx (\beta_{age} + 2\beta_{agesq}X)\Delta x \quad ; \text{Where } X \text{ is age variable.}$$

Suppose, this paper will compare 20-year-old taxpayers with 64-year-old taxpayers with $\Delta x = 1$ by using Probit and Logit method. Thus, for X is 20 years old ($\Delta Comp \approx (0.0039 - 2*0.00003*20)1 \approx 0.0027$) and for X is 64, $\Delta Comp \approx (0.0039 - 2*0.00003*64)1 \approx -0.00006$. Moreover, by using LPM, for X is 20 years old ($\Delta Comp \approx (0.0046 - 2*0.00004*20)1 \approx 0.0030$) and for X is 64 years old, ($\Delta Comp \approx (0.0046 - 2*0.00004*64)1 \approx 0.00052$)

From the formula above, it can be concluded that by using LPM, when a taxpayer is 20 years old, increasing 1 year of age ($\Delta x = 1$) will increase the probability to submit tax return by 0.30 percentage point (holding the dependent variable is fixed). However, when he/she is 64 years old, the effect of increasing 1 year of age is lower than when he/she is 20 years old. Specifically, 64-year-old taxpayers are less likely to submit by 0.052 percentage point than younger taxpayers (holding the dependent variable fixed). Thus, it can be seen that the probability of submitting tax return is diminished.

4.2.1.3.2.4 Sector

Variable sector is considered to explain the importance of service-sector taxpayers related to their tax compliance. The regression result by using Logit method shows that sectors in which taxpayers work is statistically significant in depicting tax compliance.

Moreover, the result shows that those who are working in service sector are less likely to submit their tax return by 2.04 percentage point than those who are working in other sectors. The similar result also occurs on Probit method that shows service-sector taxpayers are less likely to comply by 2.23 percentage point than others. LPM method presents the largest result that service-sector taxpayers are less compliant than others by 2.42 percentage point.

This result highlights that government's policies should put more focus on service sector where this sector has contributed significant tax revenue to domestic income. Some policies that can be implemented such as providing facilities and services to service sector taxpayers to raise their tax consciousness.

4.2.1.3.2.5 Report_2012 (Tax Return Status in 2012)

The result of Logit method shows that the tax return's report status in 2012 has a statistically significant marginal effect on tax compliance in 2013. Moreover, compared to other independent variables, Report_2012 variable has the highest P-value with positive association to tax compliance. The result shows that the probability of those who submitted the tax return in 2012 is 11.98 percentage point more likely to submit their tax return in 2013 than those who did not report their tax return in 2012.

Based on Probit method, the result presents that taxpayers who submitted their tax return in 2012, have a probability to report their tax return in 2013 by 13.69 percentage point more likely than those who did not report the tax return. The biggest result is obtained by LPM method where the compliant taxpayers have a probability to submit tax return in 2013 by 65.88 percentage point more likely than those who did not submit tax return in 2012.

Moreover, this result also points out that those who did not submit the tax return in 2012 have a low probability to submit in 2013. It means that most of taxpayers are not discouraged from penalty imposition by tax office. In other words, it can also be said that the amount of sanctions probably might not be relevant to trigger taxpayers to obey tax laws.

4.2.1.3.2.6 Report_2011 (Tax Return Status in 2011)

The regression result of tax return submission in 2011 is also considered in this research to evaluate the individual tax compliance ratio. The result of logit method shows that this variable has statistically significant to individual tax compliance. Moreover, the result presents that taxpayers who submitted their tax return in 2011 has a probability to submit their tax return in 2013 by 5.98 percentage point. Probit method also has similar result to Logit method that probability of those who submitted their tax return in 2011 is 6.77 percentage point more likely to submit in 2013 than those who did not submit their tax return in 2011. The largest probability in abiding by tax laws occurs using LPM that the compliant taxpayers in 2011 have a probability to submit in 2013 by 22.2 percentage point more likely than those who did not submit their tax return in 2011.

This result is similar to the result of "Report_2012" variable, where taxpayers who did not report their tax return in 2011 have a low probability to submit in 2013. It means that the amount of penalty for those who did not adhere to tax laws might be not quite significant to make taxpayers comply with tax laws.

In conclusion, in this first model, the best method in describing tax compliance is LPM. Moreover, the empirical result also shows that all of independent variables are statistically significant in explaining individual tax compliance.

4.2.2 Second Model ((Excluding Previous Tax Return Submission))

4.2.2.1 Data Description

$$Comp_i = a_1 + a_2Age_{it} + a_3 Gender_i + a_4Sector_i + e_i$$

In the second model, the tax return submission status in 2012 and 2011 are excluded to test the effect of these variables on tax compliance. Moreover, the regression result shows that gender and age are not statistically significant in explaining tax compliance, while sector of taxpayers is statistically significant in affecting tax compliance.

Furthermore, the analysis of second model is conducted by comparing three statistical methods: Probit method, Logit method, and LPM method. The regression result is as follows:

Table 7. Regression Result of Second Model

Variable	Probit	Logit		Linear Regression	
	Marginal Effect	Marginal Effect		Coefficient	
Gender	- 0.003 (0.013)	-0.004 (0.013)		-0.004 (0.013)	
Age	- 0.0006 (0.003)	-0.0009 (0.003)		-0.0009 (0.003)	
Age_sq	3.80e-06 (0.000)	6.13e-06 (0.000)		6.54e-06 (0.000)	
Sector	- 0.109 *** (0.012)	- 0.109 *** (0.013)		-0.123 *** (0.016)	
Number of Obs.	= 2383				
Prob>Chi2	= 0.000	Prob>Chi2	= 0.000	Prob > F	= 0.000
Pseudo R2	= 0.042	Pseudo R2	= 0.042	R-square	= 0.032

Significant in 10%= *; in 5% = **; in 1% = ***

Source: Author computation using STATA 13 (2015)

4.2.2.2 Goodness of Fit Measures

From the result in table 7, the Likelihood Ratio that described by P-value shows that the model can be used to assess tax compliance using three statistical methods: Probit method, Logit method, and LPM. Similar to the first model, the result shows that it rejects hypothesis, meaning that all of independent variables can explain the dependent variable. Moreover, the Pseudo R-Square of the model tells that tax compliance can be described only 42% by the explanatory variables (age, gender, sector, and previous tax return), while the other 58% can be explained by other variables that are not included in the model. Moreover, by using Logit method, pseudo R-square also shows that tax compliance can only be explained 42% by independent variables. The lower result is obtained by using LPM that the dependent variable can only be described 32% by explanatory variables. Based on Pseudo R-square and R-square result, the highest value is

41% by Probit and Logit method. Thus, logit method can be chosen as the best method to explain tax compliance.

To check the logistic method whether it is already successfully predicted, table 8 displays that the model is quite good in predicting the relationship between dependent variable and independent variables. The model has successfully predicted 88.38% of the actual condition (see table 8).

Table 8. Classification Table (the Second Model)

Sensitivity	0.00%
Specificity	100.00%
Positive predictive value	.%
Negative predictive value	88.38%
False + rate for true ~D	0.00%
False - rate for true D	100.00%
False + rate for classified +	.%
False - rate for classified -	11.62%
Correctly classified	88.38%

Source: Author computation by STATA 13 (2015)

4.2.2.3 Analysis of Coefficient

4.2.2.3.1 Analysis Odds Ratio

In the second model, the odds ratios of all variables in table 9 present positive values. It means the increase of all explanatory variables will raise individual tax compliance level.

According to table 9, the odds of male taxpayers to submit this tax return in 2013 is 0.95 times smaller than female taxpayers, but the P-value highlights that it is not statistically significant in influencing tax compliance. Moreover, odds ratio of age level presents that the odds of older taxpayers to obey tax laws is 0.99 times smaller than younger taxpayers. However, similar to gender variable, age level is not statistically significant in describing dependent variable. The contradictory result occurs where sector of taxpayers is statistically negative significant in affecting individual tax compliance. The odds ratio of those who are working in service sector is 0.33 times smaller than those who are working in other sectors.

Table 9. Analysis of Odds Ratio (the Second Model)

Logistic Regression			
Variable	Odds Ratio	Z	P - Value
Gender	0.95 (0.127)	-0.33	0.738
Age	0.99 (0.036)	-0.24	0.807
Age_sq	1.00 (0.000)	0.17	0.863
Sector	0.33 (0.043)	-8.45	0.000

_cons	0.346 (0.324)	-1.13	0.257
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Source: author computation by STATA 13 (2015)

4.2.2.3.2 Analysis of Coefficient

4.2.2.3.2.1 Gender

The result of Probit approach indicates that gender is not statistically significant in explaining individual tax compliance. The marginal effect presents that probability of male taxpayers is 0.33 percentage point less likely to submit the tax return in 2013 than female taxpayers.

By using Logit method, the probability of men to comply is 0.44 percentage point less likely than women. Similar result is also obtained by LPM method which the probability of male taxpayers to report his tax return is 0.46 percentage point less likely than female taxpayers.

4.2.2.3.2.2 Age

According to table 7, the result of three statistical methods in the second model shows that age is not statistically significant in describing individual tax compliance.

The magnitude of the marginal effect presents that older taxpayers are less likely to comply with tax laws by 0.09 percentage point than younger taxpayers using logit method. By using Probit method, the probability to submit tax return of older taxpayers is 0.06 percentage point less likely than younger taxpayers. Moreover, LPM regression result points out that probability of older taxpayers to abide by tax laws is 0.09 percentage point less likely than younger taxpayers. To conclude, there is no significant difference between one statistical methods to others in age level.

However, the interpretation of age is more appropriate in age square due to parabolic shape of age that has an extremum point in a certain level of age.

4.2.2.3.2.3 Age_sq (Age Square)

Turning point

Similar to the first model, the turning point of the probability of age related to tax compliance is at $-\beta_1/(2\beta_2)$ (Wooldridge, 2012). Based on table 7, linear coefficient of age is 0.0006 using Probit method. By using Logit method, linear coefficient of age is 0.0009. In LPM, it also has similar value where linear coefficient of age is 0.0009. Moreover, quadratic coefficient of age using Probit method is 0.0000038. By using Logit method, quadratic coefficient of age is 0.0000061 while it is 0.0000065 by using LPM.

According to these linear and quadratic coefficient, the extremum point of age using logit method can be calculated as $(-(-0.0006/(2 * 0.0000038)))$ where the turning point is 79 years old. Logit method, however, has the extremum point $(-(-0.0009/(2 * 0.0000061)))$ in 74 years old. Moreover, by using LPM, the extremum point will be $(-(-0.0009/(2 * 0.0000065)))$ 69 years old

To interpret the result, this study uses an approximation based on Wooldridge (2012):

$$\Delta Comp \approx (\beta_{age} + 2\beta_{agesq}X)\Delta x \quad ; \text{ Where X is age variable.}$$

Suppose, by using Logit method, this paper will compare 20-year-old taxpayers with 80-year-old taxpayers with $\Delta x = 1$. Thus, for X is 20 ($\Delta Comp \approx (-0.0009 + 2*0.0000061*20)1 \approx 0.00065$) and for X is 80, $\Delta Comp \approx (0.0009 - 2*0.0000061*80)1 \approx 0.000076$.

From the formula above, it concludes that when a taxpayer is 20 years old, increasing 1 year of age ($\Delta x = 1$) will raise the probability to submit tax return by 0.065 percentage point (holding the dependent variable fixed). However, when a taxpayer is 80 years old, the effect of increase 1 year of age is lower than a level when a taxpayer is 20 years old. Thus, it can be seen that the probability of submitting tax return is diminished when a taxpayer is already above 80 years old. Specifically, 80-year-old taxpayers are less likely to submit their tax return by 0.0076 percentage point than younger taxpayers (holding the dependent variable fixed).

4.2.2.3.2.4 Sector

In this second model, the regression result of three statistical methods shows that sector of taxpayers is the only variable that statistically significant in explaining individual tax compliance where specifically, it has negative association with tax compliance.

Moreover, the result of logit method presents that those who are working in service sector are less likely to submit their tax return by 10.9 percentage point than those who are working in other sectors. Similar result occurs by using Probit method that the probability of service-sector taxpayers is 10.99 percentage point more likely to comply than other sectors. Moreover, the largest probability is obtained by using LPM where the probability of service-sector taxpayers is 12.39 percentage point more likely to report their tax return than others.

In conclusion, in this second model, the demographic variables are not statistically significant in explaining tax compliance. However, sector variable is the only explanatory variables that is statistically significant in describing tax compliance. Moreover, the best method in explaining tax compliance is obtained by using Logit Method. Specifically, the results of each independent variables show that the probability to submit tax return in 2013 is varied under three statistical methods.

4.2.3 Conclusion of Analysis

There is a different conclusion between the first and second model. Based on the goodness of fit measures, the best method that can be assessed in the first model is the Linear Probability Method. Moreover, the analysis of the first model also points out that all explanatory variables are statistically significant in explaining individual tax compliance. This research paper also finds that even though LPM, theoretically, could not assess the categorical dependent variable, it could give a better result than Logistic regression.

However, in the second model, the best method that can assess the model is the Logit method. Furthermore, the regression result of the second model underlines that only variable sectors that are statistically significant in describing the dependent variable. This result also shows that previous tax return status provides positive significant relationship to all explanatory variables. However, when it is excluded from the model, it makes the other independent variables do not significant in affecting tax compliance, except service-sectors taxpayers.

From these two results, it can be concluded that only variable sector that are statistically significant in both first and second models. It means that the service-sector taxpayers are important in policy making. Thus, the government should put more focus on the service-sector taxpayers who are less compliant than taxpayers working in other sectors. A more appropriate policy can increase their tax awareness resulting in higher tax revenue.

4.2.4 Policy Recommendations

According to the analysis of the result, the government also has to put more attentions on service-sector taxpayers. The result shows that the probability of service-sector taxpayers to report their tax return is less than taxpayers working in other sectors. The government can implement some policies such as giving a private tax tutorial or providing an extra tax training on how to fill and to calculate tax return to service-sector taxpayers. Moreover, the government can also give extra facilities to service-sector taxpayers such as a priority service in tax offices and giving rewards for those who report their tax return before the due date. Furthermore, the government can also support service-sector taxpayers by issuing a pro service-sector taxpayers regulation. It could be a low tax rate of their special transaction.

Furthermore, some other policy recommendations can also be applied that tax policies might support older taxpayers. For example, the using of e-submission that launched by DGT have to put extra attention on older taxpayers. Older taxpayers usually are not familiar with recent technology. Thus, an intensive training about e-submission is important in helping older taxpayers to calculate and report their tax return. Another factor such as the distance between the district area and tax office also needs further investigation.

Moreover, another policy recommendation can be implemented about the amount of penalty for those who do not submit their tax return. A low amount of penalty in Indonesia compared to neighbouring countries should be considered as one of the factors causing the deficiency in individual tax compliance in Indonesia. However, the formula of the amount of penalty should consider the Macroeconomic conditions that tax as a tool of fiscal policy will influence many aspects of life.

In conclusion, all of the recommendations will be implemented in more appropriate way through a deep investigations and intensive studies. Finally, it would help the policy makers to increase tax compliance ratio resulting a better tax performance and economics condition.

Chapter 5

Conclusion

This paper provides evidence about the effect of demographic factors on tax compliance in East Jakarta, Indonesia. This study tries to analyse the low individual tax compliance problem faced by Indonesia that results low tax revenue. Moreover, this study focuses on internal factors of taxpayers related to their willingness to report their tax return.

The internal factors of taxpayers considered in affecting their tax compliance are based on five independent variables. The first two explanatory variables are demographic variables: age level and gender of taxpayers. Moreover, the other three explanatory variables that are taken into account in analyzing the problem are: service-sector taxpayers, tax return submission in 2012, and tax return submission in 2011.

Furthermore, these five explanatory variables are analyzed based on three statistical methods to examine their relationship to tax compliance level. These three statistical methods are: Probit method, Logit method, and Linear Probability method. Moreover, this study tries to resolve the problem by dividing the model into two types: the first model includes all explanatory variables and the second model excludes the previous tax return submission in 2012 and 2011.

The result of the first model shows that all explanatory variables are statistically significant in explaining individual tax compliance. Specifically, the result presents that female taxpayers, older taxpayers, and non-service sector taxpayers are more likely to submit their tax return than others. Moreover, the result also underlines that those who submitted their tax return in 2012 and 2011 have a high probability to submit their tax return in 2013.

The different result occurs in the second model where the previous tax return status in 2012 and 2011 are excluded from the model. The demographic variables: age level and gender of taxpayers are statistically not significant in influencing individual tax compliance while service-sector taxpayers is statistically significant in affecting tax compliance with negative relationship. This result shows that government should put more focus on this sector since this sector has already given high contribution to tax revenue. Thus, an appropriate policy to support service-sector taxpayers in fulfilling their tax obligations is important.

Some policy recommendations can be applied to individual taxpayers such as giving extra services to service-sector taxpayers. The extra services would be an intensive training on how to fill and calculate their taxes by Account Representative. Moreover, government can issue a pro service-sector regulation, for example, by giving some facilities such as priority tax service or by giving reward to those who submit a month before the due date. Thus, it can trigger them to increase their tax awareness in fulfilling their tax obligations.

Another suggestion is the importance of an intensive study about the amount of penalty for those who do not submit tax return. It can be analyzed based on the amount of penalty that implemented by neighbouring countries considering the global economic condition. An appropriate amount of penalty can be implemented to increase tax compliance.

Finally, this research paper does not cover all questions about individual tax compliance. This study has limited the discussion on either submit or do not submit tax return. A wider research focus can give different options in boosting tax performance such as the timeliness of tax return submission and the unreportable taxable income. Moreover, this study only uses two demographic factors: age level and gender of taxpayers due to limited access and limited time. A more extensive study would be powerful in explaining individual tax compliance, for example, by using wider explanatory variables such as income level or education level of taxpayers.

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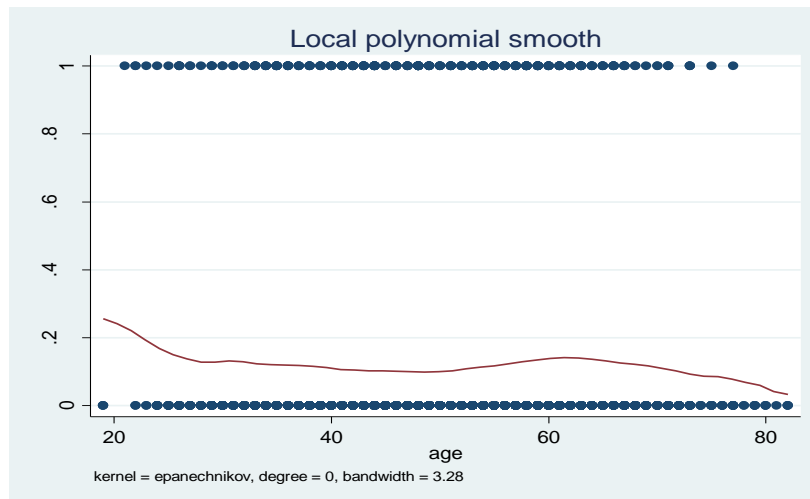
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Appendices

Appendix 1. Age Square (Local Polynomial Graph)



Source: Author Computation by Stata 13 (2015)

Appendix 2. Output Regression of First Model (Linear Regression)

```

Linear regression                               Number of obs =   2383
                                                F(   6,  2376) =  346.23
                                                Prob > F       =   0.0000
                                                R-squared      =   0.7292
                                                Root MSE      =   .16704

```

compliance	Robust					
	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
gender	-.0235107	.0071399	-3.29	0.001	-.0375117	-.0095097
age	-.0046062	.0025781	-1.79	0.074	-.0096617	.0004492
age_sq	.0000403	.0000239	1.69	0.091	-6.49e-06	.0000872
sector	-.0241136	.008994	-2.68	0.007	-.0417506	-.0064766
report_2012	.6588823	.0532318	12.38	0.000	.5544967	.763268
report_2011	.2221342	.0537259	4.13	0.000	.1167797	.3274887
_cons	.1709322	.0698349	2.45	0.014	.0339885	.3078758

Source: Author Computation by Stata 13 (2015)

Appendix 3. Output Regression of First Model (Logit Regression)

```

Logistic regression               Number of obs   =       2383
                                LR chi2(6)         =      1167.76
                                Prob > chi2         =       0.0000
Log likelihood = -272.49157       Pseudo R2        =       0.6818

```

compliance	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
gender	-.8540335	.2678719	-3.19	0.001	-1.379053	-.3290142
age	-.1477988	.0687902	-2.15	0.032	-.2826251	-.0129724
age_sq	.0013144	.0007022	1.87	0.061	-.0000618	.0026906
sector	-.7583209	.2527759	-3.00	0.003	-1.253753	-.2628893
report_2012	4.441517	.3215464	13.81	0.000	3.811298	5.071737
report_2011	2.216704	.3404271	6.51	0.000	1.549479	2.883928
_cons	.7173862	1.606922	0.45	0.655	-2.432123	3.866896

Source: Author Computation by Stata 13 (2015)

Appendix 4. Output Regression of First Model (Probit Regression)

Probit regression	Number of obs = 2383
	LR chi2(6) = 1176.21
	Prob > chi2 = 0.0000
Log likelihood = -268.26628	Pseudo R2 = 0.6867

compliance	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
gender	-.3873045	.1205861	-3.21	0.001	-.6236489	-.1509601
age	-.0696076	.0314463	-2.21	0.027	-.1312413	-.007974
age_sq	.0006032	.0003211	1.88	0.060	-.000026	.0012325
sector	-.38974	.1155551	-3.37	0.001	-.6162239	-.1632562
report_2012	2.393288	.1702975	14.05	0.000	2.059511	2.727065
report_2011	1.183735	.1789608	6.61	0.000	.8329785	1.534492
_cons	.1423121	.7368379	0.19	0.847	-1.301864	1.586488

Source: Author Computation by Stata 13 (2015)

Appendix 5. Output Regression of First Model (Logit Method / Marginal Effect)

Average marginal effects Number of obs = 2383
Model VCE : OIM

```
Expression      : Pr(compliance), predict()
dy/dx w.r.t.   : gender age age sq sector report 2012 report 2011
```

	Delta-method					
	dy/dx	Std. Err.	z	P> z	[95% Conf. Interval]	
gender	-.0230505	.0074511	-3.09	0.002	-.0376544	-.0084466
age	-.0039891	.001883	-2.12	0.034	-.0076797	-.0002986
age_sq	.0000355	.0000192	1.85	0.064	-2.06e-06	.0000073
sector	-.0204672	.0070023	-2.92	0.003	-.0341915	-.0067429
report_2012	.1198773	.0100691	11.91	0.000	.1001422	.1396123
report_2011	.0598292	.0097277	6.15	0.000	.0407631	.0788952

Source: Author Computation by Stata 13 (2015)

Appendix 6. Output Regression of First Model (Probit Method / Marginal Effect)

Average marginal effects Number of obs = 2383
Model VCE : OIM

```
Expression      : Pr(compliance), predict()
dy/dx w.r.t.   : gender age age_sq sector report_2012 report_2011
```

	Delta-method					
	dy/dx	Std. Err.	z	P> z	[95% Conf. Interval]	
gender	-.0221649	.0070947	-3.12	0.002	-.0360704	-.0082595
age	-.0039836	.0018224	-2.19	0.029	-.0075555	-.0004116
age_sq	.0000345	.0000185	1.86	0.063	-1.83e-06	.0000709
sector	-.0223043	.006787	-3.29	0.001	-.0356065	-.0090021
report_2012	.1369648	.0119643	11.45	0.000	.1135151	.1604144
report_2011	.0677437	.0109341	6.20	0.000	.0463132	.0891741

Source: Author Computation by Stata 13 (2015)

Appendix 7. Output Regression of First Model (Logistic Odds Ratio)

Logistic regression	Number of obs = 2383
	LR chi2(6) = 1167.76
	Prob > chi2 = 0.0000
Log likelihood = -272.49157	Pseudo R2 = 0.6818

compliance	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interval]	
gender	.4256944	.1140316	-3.19	0.001	.251817	.7196328
age	.8626047	.0593388	-2.15	0.032	.7538023	.9871114
age_sq	1.001315	.0007031	1.87	0.061	.9999382	1.002694
sector	.4684523	.1184134	-3.00	0.003	.2854317	.768827
report_2012	84.90367	27.30047	13.81	0.000	45.20908	159.451
report_2011	9.17703	3.12411	6.51	0.000	4.709016	17.88439
_cons	2.04907	3.292697	0.45	0.655	.0878501	47.7938

Source: Author Computation by Stata 13 (2015)

Appendix 8. Output Regression of Second Model (Linear Regression)

Linear regression	Number of obs = 2383 F(4, 2378) = 14.91 Prob > F = 0.0000 R-squared = 0.0324 Root MSE = .31561
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compliance	Robust					[95% Conf. Interval]	
	Coef.	Std. Err.	t	P> t			
gender	-.0046919	.0133384	-0.35	0.725	-.030848	.0214642	
age	-.0009641	.0039652	-0.24	0.808	-.0087396	.0068114	
age_sq	6.54e-06	.0000381	0.17	0.864	-.0000681	.0000812	
sector	-.1239882	.0161483	-7.68	0.000	-.1556544	-.092322	
_cons	.2353158	.1015009	2.32	0.021	.0362763	.4343552	

Source: Author Computation by Stata 13 (2015)

Appendix 9. Output Regression of Second Model (Probit Regression)

Probit regression	Number of obs	=	2383
	LR chi2(4)	=	71.70
	Prob > chi2	=	0.0000
Log likelihood = -820.52	Pseudo R2	=	0.0419

compliance	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
gender	-.0179617	.0707032	-0.25	0.799	-.1565375	.1206141
age	-.003693	.0202879	-0.18	0.856	-.0434566	.0360705
age_sq	.0000202	.000202	0.10	0.920	-.0003756	.0004161
sector	-.5860397	.0696186	-8.42	0.000	-.7224896	-.4495898
_cons	-.6943921	.495369	-1.40	0.161	-1.665298	.2765133

Source: Author Computation by Stata 13 (2015)

Appendix 10. Output Regression of Second Model (Logit Regression)

Logistic regression	Number of obs = 2383
	LR chi2(4) = 71.72
	Prob > chi2 = 0.0000
Log likelihood = -820.51064	Pseudo R2 = 0.0419

compliance	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
gender	-.0444984	.1335796	-0.33	0.739	-.3063095	.2173128
age	-.0090758	.0377101	-0.24	0.810	-.0829863	.0648347
age_sq	.0000617	.0003739	0.16	0.869	-.0006712	.0007945
sector	-1.09949	.1304211	-8.43	0.000	-1.35511	-.8438691
_cons	-1.059729	.9243018	-1.15	0.252	-2.871328	.7518689

Source: Author Computation by Stata 13 (2015)

Appendix 12. Output Regression of Second Model (Probit Method / Marginal Effect)

Average marginal effects Number of obs = 2383
Model VCE : OIM

Expression : Pr(compliance), predict()
dy/dx w.r.t. : gender age age_sq sector

	Delta-method					
	dy/dx	Std. Err.	z	P> z	[95% Conf. Interval]	
gender	-.0033695	.0132637	-0.25	0.799	-.0293659	.022627
age	-.0006928	.0038059	-0.18	0.856	-.0081522	.0067667
age_sq	3.80e-06	.0000379	0.10	0.920	-.0000705	.0000781
sector	-.1099363	.0130157	-8.45	0.000	-.1354466	-.084426

Source: Author Computation by Stata 13 (2015)

Appendix 13. Output Regression of Second Model (Logistic Odds Ratio)

Logistic regression	Number of obs	=	2383
	LR chi2(4)	=	71.72
	Prob > chi2	=	0.0000
Log likelihood = -820.51064	Pseudo R2	=	0.0419

compliance	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interval]	
gender	.9564772	.1277658	-0.33	0.739	.7361587	1.242733
age	.9909653	.0373694	-0.24	0.810	.9203638	1.066983
age_sq	1.000062	.0003739	0.16	0.869	.999329	1.000795
sector	.333041	.0434356	-8.43	0.000	.2579188	.4300434
_cons	.3465495	.3203164	-1.15	0.252	.0566237	2.12096

Source: Author Computation by Stata 13 (2015)