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Abstract

Since 1983, Indonesian tax policy has been the subject of ongoing reforms in order to replace the old colonial tax arrangements, reduce income dependency from oil and gas, decrease the government's foreign debt and maintain its fiscal sustainability. Nevertheless, after 25 years of reform, actual Indonesian tax performance is still far from what might have been expected as Indonesia have one of the lowest total tax ratios among the ASEAN countries. This research show that the most recent changes put in place may have reduced potential tax revenue from personal income but an increase in the compliance rate.
Keywords: personal income tax; microsimulation; Indonesia

Abstrak

Sejak 1983, kebijakan pajak Indonesia sudah beberapa kali mengalami reformasi untuk menggantikan aturan pajak peninggalan kolonial, mengurangi ketergantungan pada minyak dan gas, menurunkan hutang negara dan menjaga kestabilan fiskal. Walau demikian, setelah 25 tahun reformasi tersebut, pencapaian pajak Indonesia masih masuk kategori yang terendah di negara-negara ASEAN. Makalah ini menemukan bahwa perubahan saat ini justru mengurangi potensi penerimaan pajak dari pajak perseorangan namun ada sisi baik yang ditemukan yaitu peningkatan kepatuhan.
Kata kunci: *pajak perseorangan; mikrosimulasi; Indonesia*

JEL classifications: H20; H60

1. Introduction

Since 1983, tax has become increasingly important for the Indonesian economy. The plunge of the oil price in the 1980s prompted the Indonesian Government to fundamentally reform the tax system and replace the old colonial income tax law. The plunge in the oil price not only caused economic growth to fall sharply, it also considerably lowered government revenue. At the same time, an increasing proportion of the foreign debt required repay-

ment (Anwar et al. 1991; Hill 2000; Resosudarmo & Kuncoro 2006). These factors drove the need to increase revenue and push through the first major reform of Indonesian taxation in 1983. One of the major reforms was to apply a new self-assessment system replacing the official-assessment system that had been in place since the Dutch colonial era. At the same time, the reform also simplified both the personal and corporate tax rate, allowing a lower rate and broader tax base to be enforced with better tax administration systems (Heij 2001).

The 1983 tax reform was successful in increasing tax revenue and in becoming the key element in supporting the Indonesian government budget and

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maintaining Indonesian fiscal sustainability after the oil crisis (Ikhsan, Trialdi & Syahrial 2005). After the 1983 tax reform, and especially since the 1990s, further reforms of various types of taxes continued to aim for simpler and fairer tax laws (Heij 1993; Uppal 2003). Simplicity and fairness was achieved by reducing and simplifying the income brackets and rate progressivity, while neutral tax laws were achieved from the application of uniform tax rate. These gradual reforms provided a smooth shift from the old official-assessment system to the new self-assessment system (Directorate General of Taxes (DGT) 2007).

The latest in a string of tax reforms is the provision of Law no. 36 year 2008 and this study aims to examine the impact of this law. Specifically, the research questions that will be answered relate to the impact of the 2008 income tax reform on the main aims of the tax system in Indonesia — revenue and income distribution (Asher 1989; Gillis 1985; Heij 1993; Uppal 2003). There is another reason that assessment of the impact of the 2008 income tax reform is crucial. The reform came on the back of relatively succesful administrative reform (Le Borgne et al. 2008) as well as the application of tax amnesty, which was supposed to increase the number and compliance rate of individual taxpayers (Rizal 2011). Nevertheless, this did not seem to improve Indonesia's tax performance as the tax ratio fell (Arnold 2012) and no proven increase in revenue was recorded in regional tax offices (Prawira 2015). This assessment will provide some commentary on this issue as Indonesia plan to have further reform administratively.

Following this introduction, the second section will give an overview of Personal Income Tax (PIT) in Indonesia including its contribution to overall tax revenue and the reform that has occurred since 1983. This is followed by a section about the empirical framework used in this study. Section four presents and discusses the results of the empirical estimation and section five concludes the study.

2. Literature Review

2.1. The PIT in Indonesia

Indonesian tax revenue increased sharply during the two decades after the first major reform took place, from only 39.5 per cent in the 1980s to be at an average of 70 per cent of total government domestic revenue from 2005 to 2009. Despite this achievement, Indonesia still suffers from ineffective tax collection and low tax payer compliance (Ikhsan, Trialdi & Syahrial 2005).

Although ineffective tax collection and low compliance are common problems for fiscal environments in developing countries (Gandullia, Iacobone & Thomas 2012), the problem in Indonesia is considered larger than is the case in neighbouring developing countries. Looking at how much tax is collected compared with Gross Domestic Product (GDP), Figure 1 shows that Indonesia had the lowest total tax ratio to GDP compared with the other Association of South East Asian Nations (ASEAN) countries. Of the 10 ASEAN countries, the Indonesian tax ratio of 13.04 per cent shared the fourth lowest position above Laos (12.10%) in 2008. Only Cambodia (10.56%) and Myanmar (5%) had lower tax ratios than Indonesia. Brunei (36.44%), Vietnam (26.43%), Thailand (16.45%), Singapore (14.99%) and Malaysia (14.66%) all had higher tax ratios among the ASEAN countries.

Ironically, even with the low tax ratio, the contribution of income tax in Indonesia is smaller than in other ASEAN countries with higher tax ratios. Figure 2 shows that income tax makes up at least 50 per cent of the total tax collected in Malaysia and Thailand (Revenue Directorate (RD) Thailand 2008; Treasury Malaysia 2008). Although not as high as
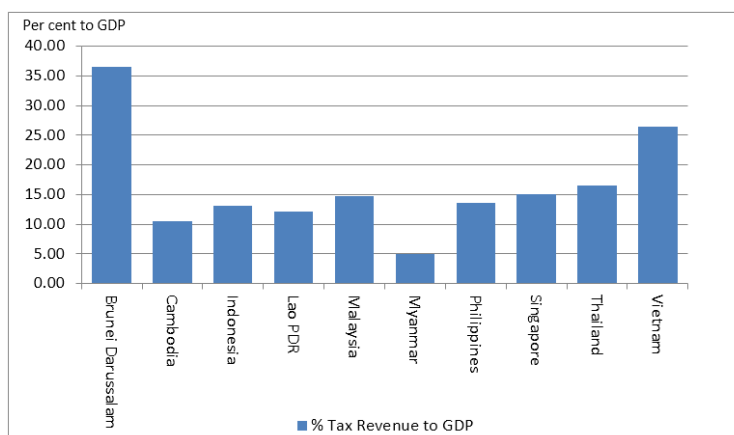
Figure 1: Tax as a percentage of GDP: ASEAN countries, 2008

those two countries, Singapore and Vietnam still have around 40 per cent of their tax revenue coming from income tax (GSO Vietnam 2010). Therefore, the contribution of income tax at around 25 per cent in Indonesia can be considered very small even without taking into account that the tax ratios of the other countries are higher than Indonesia's tax ratio. Most of the income tax in these countries (an average of 33 per cent of their total tax) comes from corporate income tax (CIT) while PIT only accounts for 15.40 per cent of their domestic tax revenue (GSO Vietnam 2010; RD Thailand 2008; Treasury Malaysia 2008).

This is in contrast to conditions in developed and more advanced economies. In the Organisation for Economic Cooperation and Development (OECD) countries, PIT share dominates with an average of 25–32 per cent from total tax revenue since the 1960s. Meanwhile, these OECD countries' average CIT share has been constant at around 9 to 10 per cent. Enforcement is the main problem in developing countries. The much lower contribution of PIT is also linked to the size of the informal economy in developing countries. The median size of the informal economy among developing countries is 37 per cent of GDP. This is much larger than the estimated size of the informal sector in OECD countries which

is 15 per cent of GDP (Gordon & Li 2009).

In Indonesia, PIT contributed around 20 per cent of the 41.2 per cent total revenue that came from the non-oil and gas sector in 2009. This means PIT only contributed around 8.2 per cent of the total revenue while CIT had a much higher contribution of almost 20 per cent of total revenue. There are two types of PIT. The first is the withholding tax from employees with a single source of income, known as tax article 21. This tax accounted for 18.8 per cent of the revenue from the non-oil and gas sector in 2009. The second type of PIT is applied to those with more than one source of income. This is known as tax article 25/29 and this contributed only 1.2 per cent of total non-oil and gas income tax revenue. This study specifically looks at the PIT from labour income (or PIT article 21) which contributes the major share of Indonesian PIT.

2.2. The PIT reform

The 1983 Indonesian income tax reform effectively came into force in 1984. The motivation for this reform was four-fold. The first aim was to secure revenue from non-oil tax. The second was to simplify the income tax law and its administration in order to ensure more efficient and better services.
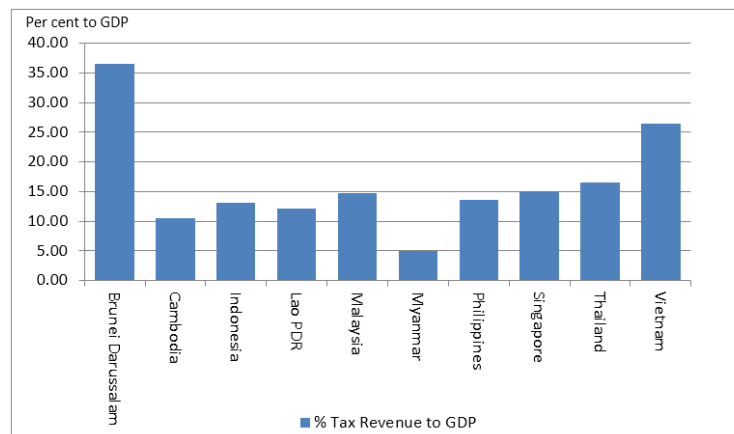
Figure 2: Tax mix comparison with neighbouring countries, 2007
Source: Official web publications by DGT Indonesia, IRAS Singapore, Treasury Malaysia, RD Thailand and GSO Vietnam, accessed in February 2010

The third was to improve income distribution by reducing tax-induced distortions in the allocation of resources and to achieve economic neutrality. The final aim of the reform was to ensure that a lower tax burden applied to the poor (Asher 1989; Gillis 1985). The main features of the 1983 income tax reform were a broader tax base, significantly reduced tax rates and the omission of high income earners' exemptions. The rate that were applied in this 1983 law reform were considerably lower than in most less-developed countries (LDCs) and in North America in 1980s (Gilis 1985). Table 1 details the history, in chronological order, of the main changes featured in the Indonesian PIT reform since 1983.

In Indonesia, the central government, through the Ministry of Finance, has the authority to determine both the tax bases and tax rates for the PIT. Nevertheless, amendments to law are necessary to make any changes in the income tax rate. These law amendments are parts of a long process which requires intense discussion between parliament and the government. In terms of PIT, much of the reform has been related to the income tax progression component. The Indonesian Government first introduced a more progressive rate with a lower tax burden in 1994. This continued in 2000 when the

government initiated an even more progressive tax rate. However, a big gap between the lowest and the highest tax brackets could create unfavorable incentives for income shifting or avoidance by higher income earners (Yuwono 2008). These concerns were addressed with the provision of the latest Law no. 36 year 2008 which introduced more lenient tax brackets, making the impact of this law an interesting focus for more detailed analysis in this study.

The less progressive and more lenient tax brackets were not the only changes introduced by the new tax reform. Starting in 1983, the reform initiated an exemption for working wives as an incentive to encourage women's participation in the labour force (Gillis 1985). Following the first reform in 1983 and the second reform in 1994, more specific and comprehensive administrative reforms were initiated in 2000. This highlighted a starting milestone for tax administrative modernisation (DGT 2007). In Article 7(3), Law no. 36 year 2008 allowed changes in personal exemptions to provide tax relief. The Minister of Finance has authority to propose to the Indonesian parliament changes in the tax threshold to provide some relief for Indonesians that meet certain conditions. This Article aimed to add flexibil-

Table 1: PIT law changes since 1983

No	Income Tax Law	Annual Income Groups (in Indonesian Rupiah)	Tax Rate
1	No. 7 Year 1983	Income $\leq$ 10,000,000	15%
		10,000,000 < Income $\leq$ 50,000,000	25%
		Income > 50,000,000	35%
2	No. 10 Year 1994	Income $\leq$ 25,000,000	10%
		25,000,000 < Income $\leq$ 50,000,000	15%
		Income > 50,000,000	30%
3	No. 17 Year 2000	Income $\leq$ 25,000,000	5%
		25,000,000 < Income $\leq$ 50,000,000	10%
		50,000,000 < Income $\leq$ 100,000,000	15%
		100,000,000 < Income $\leq$ 200,000,000	25%
		Income > 200,000,000	35%
4	No. 36 Year 2008	Income $\leq$ 50,000,000	5%
		50,000,000 < Income $\leq$ 250,000,000	15%
		250,000,000 < Income $\leq$ 500,000,000	25%
		Income > 500,000,000	30%

Source: Various Laws from Ministry of Finance

ity to the tax system by allowing the adjustment of the tax threshold in line with inflation. In the Indonesian PIT law, the personal exemptions component is in the form of non-taxable income. In 2008, it increased from previously IDR13,200,000 per year to IDR15,840,000 per year for the individual tax payer. This change also applied to the additional allowance for the taxpayer's marital status, working wives with joint tax returns, and the dependent allowance (maximum of three dependents allowed for one individual taxpayer). Details of the history of changes from the first tax reform up until the 2008 law are provided in Table 2.

Table 2 also shows continuous increase in Indonesia tax threshold. The 2008 tax threshold of IDR15,840,000 is 113.8 per cent of the Indonesian annual average wage of IDR13,900,000 (Indonesian Bureau of Statistics (BPS) 2008). Compared to other emerging strong economies, namely; Brazil, China, India, and South Africa, this threshold provides among the highest levels of tax relief (Gandullia, Iacobone & Thomas 2012). These authors explain that China provides a monthly allowance of 6.7 per cent of the monthly average wage. South Africa allowance is at 84.2 per cent of the average national wage to all taxpayers with additional 46.6 per cent to persons aged 65 and over. For Brazil,

this basic allowance is 105 per cent of the average national wage, while for India the threshold is 206 per cent of its average national wage. In summary, India is the only comparative country that provides higher tax relief than Indonesia.

In addition to tax allowances, all of these comparable countries also provide additional family-based relief. Indonesia provides an annual family member relief of IDR1,320,000, which equates to 9.5 per cent of the average national wage per individual member of the family. The maximum entitlement is for three dependants per taxpayer with the position of a head of household. Brazil, China, India, and South Africa applied various rates less than, or comparable to, the rate that is provided by the Indonesian PIT system.

3. Method

To answer the main research questions, we developed PIT microsimulation for Indonesian individual taxpayers. Microsimulation is the use of microdata of persons, households or firms to analyse the impact of socioeconomic changes on each unit of this individual data. It gives an overview of the impact as an aggregate and its distribution among those

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Table 2: Non-taxable income changes 1983–2008 in Indonesian Rupiah (IDR)

No	Law Base	Article	Individual Tax Payer	Married	Working Wife	Dependant
1	Law No. 7 Year 1983	7 (1)	960	480	960	480
2	MoF Decree KMK 928/KMK.04/1993	2	1,728,000	864	1,728,000	864
3	Law No. 10 Year 1994	7 (1)	1,728,000	864	1,728,000	864
4	MoF Decree KMK 361/KMK.04/1998	2	2,880,000	1,440,000	2,880,000	1,440,000
5	Law No. 17 Year 2000	7 (1)	2,880,000	1,440,000	2,880,000	1,440,000
6	MoF Decree PMK 564/PMK.03/2004	1(1)	12,000,000	1,200,000	12,000,000	1,200,000
7	MoF Decree PMK 137/PMK.03/2005	1(1)	13,200,000	1,200,000	13,200,000	1,200,000
8	Law No. 36 Year 2008	7 (1)	15,840,000	1,320,000	15,840,000	1,320,000

Source: Various Laws from Ministry of Finance

individual units (Mitton, Sutherland & Weeks 2000). Having started in 1960s, the microsimulation approach has continuously developed and has been enhanced by the rapid development of computation technology. Microsimulation had been proven to be a powerful tool to estimate the revenue and distribution impacts of tax policy, especially in developed countries (Gupta & Kapur 2000).

Previous studies have used microsimulation to analyse Indonesian tax performance. One of these studies is by Yuwono (2008), who used micro-level data from salary income withholding tax returns from the Indonesian Directorate General of Taxes (DGT). Using microsimulation, she empirically examined the distribution of income tax burden across different income groups as well as the government's revenue from some proposed scenarios of PIT law. Her microsimulation results suggest that there is a trade-off between revenue and the distribution of tax burden. Another microsimulation study is by Marks (2003), who conducted a microsimulation analysis of PIT Law no 17 year 2000 using National Socioeconomic Survey (Susenas) 2002. He used household as his unit of analysis. His approach suggested a large gap between potential and realised revenues from PIT articles 21, 25 and 23 (on family with single source of income, multiple income and income not from workplace, respectively) .

The studies mentioned above are two of only a few studies that use income variables in Indonesia. The majority of studies use Susenas consumption expenditure as proxy of income distribution (Miranti 2010; Suryadarma et al. 2010; World Bank 2006) while some have tried to apply limited use of the income information from the survey (Alatas & Bourguignon 2005; Cameron 2002; Frankema & Marks 2010; Leigh & van der Eng 2009). Leigh & van der Eng (2009) show that the less adequate coverage of the top incomes in Indonesia is the major limitation to using the income base file provided by the Indonesian statistical survey. Hence those studies using this data only provide a partial analysis of both Indonesian income and/or consumption distribution.

This study aims to further improve the reliability of the labour income database by constructing a true income approximation to enable full distributional analysis of the Indonesian income structure. We will combine the power of the detailed characteristics and representativeness of survey data from both the National Socioeconomic Survey (Susenas) 2008 and the National Labour Force Survey (Sakernas) 2008 with the high income coverage of the tax administration data from the National PIT Return 2008 database. We construct a microsimulation model based on these three datasets and then conduct analysis to assess the impact of the PIT law no. 36 (2008). However, this study does not account for any behavioural change. Therefore, the model is static and only measures the first-round effect, just before individuals change their behaviour as a response to the changes.

After establishing the labour income database, a tax estimator module was built using STATA. This module generates output on revenue and distribution impact for every sampled taxpayer in the database. We centred our impact analysis on the taxpayers in different income deciles.. Following Yuwono (2008), we calculated tax burden as the income tax liability divided by annual gross income. We measure the difference in tax burden before and after the implementation of the new law. We also measure the change in government income tax revenue, calculated as the new weighted income tax liabilities (under the proposed new law) minus the existing weighted income tax liabilities (under existing law).

3.1. Data and Variables

The first base data used in this analysis is Susenas 2008, particularly the main income module, with some modifications to adapt to the prescribed conditions for income tax base. Susenas is a national survey designed to collect social and economic indicators. It is conducted through face-to-face interviews with around 202,500 households in 1993, gradually increasing to around 285,904 households in 2008.

Susenas has two set of questionnaires — core and module. The core questionnaire captures information on the more general household characteristics annually, while three different module questionnaires capture specific information in each of the survey's three yearly periods. The first year covers household consumption and income data collection. Welfare, social, cultural, travel and criminality data are collected in the second year while the third year module collects health, nutrition, education and housing information. This study uses the consumption and income module which will then be adjusted to the core module to obtain the correct allocation of individual income. It is necessary to adjust households to individual units as a taxing unit under Indonesian law is the individual.

Being maintained and improved continuously by the Indonesian Bureau of Statistics (BPS), Susenas has the richest information at this time on Indonesian household characteristics and these households' individual members. The household survey covers household size, type of housing and amenities, income and expenditure, employment status, form of transport used, telephone and computer usage, and also household business. The persons survey covers sex, age, marital status, crime, school participation, health, immunisation, literacy and numeracy, telephone and computer usage, daily activities, employment status and contraceptive use. Due to this range of variables, Susenas has become the main data source for most studies on disadvantage, inequality and poverty in Indonesia.

The main variables that we utilise from Susenas are individual characteristics from the core module such as sex, age, marital status, number of household members, and relationship with the head of household. Unfortunately, the official publication of Susenas 2008 microdata did not include information on labour income. Therefore, we needed to impute this information from our second database, Sakernas. Sakernas was initiated in 1976. Through direct interviews, it collects national labour market and workforce data on the characteristics of all working-age individuals in the sampled households. It is designed to monitor the general dynamics of the labour force situation and changes in labour force structure between the survey periods. The survey applies a two-stage sampling design, using census block as the first stage and household as the second stage. From 1986 onward, Sakernas was conducted annually and from 2005 the collection period changed to a semi-annual collection, with February and August as collection months each year. The rotation pattern includes 25 per cent samples every semester. Sakernas 2008 is used for

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this analysis and it has a sample size of 293,088 households and 931,890 individuals.

BPS adopted International Labour Organisation standard concepts for Sakernas and it collects information from persons aged 10 years and over. Similarly to Susenas, the individual characteristics information includes relationship to the head of household, sex, age, marital status, and educational attainment. However, Sakernas contains more detail than Susenas on working activities, including being in work, temporarily not working, looking for work, attending school, housekeeping and other (e.g. receiving a pension, being disabled). Furthermore, there is also information available about place of work, industry, total hours of work during the last week, and total wage or salary received for those who work. BPS officially uses Sakernas to monitor three main pieces of information about the economy. The first of these is related to employment by education, working hours, industrial classification and employment status. The second is related to unemployment by different characteristics and efforts looking for work while the third set of information is related to the working-age population that is not in the labour force, for example in school, housekeeping or other. BPS also uses Sakernas for a publication on monthly average wages per province. However Sakernas only includes salary and wages in cash and in kind earned in the main job over the last week. It does not include any other sources of income.

Our final source of income data is a unique and under-explored income taxation dataset for the year 2008. The administrative records of anonymous personal income taxation returns for 2008 contain 4,061,136 individual recorded returns. DGT has provided us the access to this database. The problem of Indonesian tax administrative data lies in its limited ability to be scaled up to a wide range of analyses. Given the database came only from the fraction of taxpayers who submit their tax return,

this database is not an accurate representation of Indonesian tax revenue generation. For the construction of our database, we used these incomes from individual taxpayer data to be imputed to our database. The next sub section, estimation process will discuss this process further.

This is not the first study that combine administrative and survey data. Several advanced countries have used income data from both administrative and survey data to study income distribution. These include France with its 'Enquête sur les Revenus Fiscaux' and the UK with its Survey of Personal Income, both of which are based on a sample survey of income tax returns. Atkinson (1997) explains that generally the two sources of income survey and income tax return each have their own strengths and weaknesses. The survey has less adequate coverage of top incomes while the tax return data does not cover non- taxpayers and hence does not cover low incomes. He suggests the use of both sources for better estimates of income in income distribution studies.

3.2. Estimation process

The first step of the estimation process is actually part of the database building process. As the PIT calculation should be based on individual data, the model takes the information from the household level in the Susenas income-module 2008 and imputes them onto the Susenas core 2008 individual unit data using the household identification number. The relevant characteristics that need to be imputed are household composition and number of household members. This also means we need to put the information about the age of the dependants into the individual data of the potential taxpayer.

The most sophisticated process required in the data building is to overcome the missing income information in Susenas 2008. We attempt to complete

information on wage data in Susenas as our primary survey data source by drawing the income information from Sakernas as the donor source. We chose to use a modified cold-deck matching method for this iterative process. Cold-deck is usually used for imputing values onto panel surveys whereby the values of the same person from another wave of surveys is used to impute the missing values in the survey for the reference year. (Bennet 2001; Gavin 1985; Nordholt 1998; OECD 2013; Radner 1981). Our cold-deck sorted the data according to the matching variables in the independent donor survey using information from the similar matched record and transferred the income variable to the nearest match in the primary survey data. The range of matching variables is as follows:

- geographic: province, municipality, district, sub-district
- demographic: highest education level, sex, age, marital status, number of household members, number of dependants
- employment: active working status, main occupation sector.

We draw wage information for each observation in Susenas from the representative cells in the Sakernas donor. Our iterative process will match the income from the person in representative cells with the closest characteristics to provide the wage information in the primary database. Although the data matching imputation method could provide the Susenas data with income, we need to acknowledge that both the Susenas and Sakernas surveys have failed to cover the higher income households in the economy. This study tries to overcome this issue by using tax return data to enrich the information available about higher income groups. Having said that, it is important to note that the ability to cover higher income households depends on the proportion of these households that lodged a tax form.

The additional process needs to first identify the part of the tax return that can be covered by Susenas-Sakernas income data. This means we need linking variables from tax return data to the Susenas-Sakernas income data. Since taxpayer characteristics variables in this dataset are not as rich in individual characteristics information as the survey data, the possible linking categories consist only of geographical category, income level category and the dependants category.

Initially we matched the geographical information in the tax return based on the location of the receiving tax office to the Susenas provincial code. After that we grouped cells of 17 pre-determined income brackets, ranging from 25 million rupiahs to 3 billion rupiahs of gross annual income based on the income ranges that have different tax rates. We then compared the lower and upper income limits between the tax administrative data and survey data to identify those higher income groups that are not covered by the first stage of income imputation and could be imputed by our Indonesian tax administrative (PIT return) dataset. This process adjusted the income for 2.6 million individuals into our dataset..

After the income dataset was completed, we proceeded to the second component of the model, which was building our tax estimator. We followed the previous Indonesian personal income tax static microsimulation model developed by Yuwono (2008) with some modifications. The tax estimator detailed all of the Indonesian tax structure variables as stipulated by the tax law. It started with the calculation of taxable income from the imputed annual gross income minus non-taxable income. Non- taxable income is a function of the number of dependants as personal exemptions simulations. The simulation proceeded to produce income tax liability from taxable income multiplied by the marginal tax rate. Tax burden was then calculated by income tax liability divided by annual gross income. This sequential

simulation proceeds continuously for all observations in the database.

The tax estimator simulates both the estimate of tax based on previous laws and the application of the recent new law. It calculates the changes in revenue and tax burden due to the application of the new law. This simulation will lead us to answer our research questions on how revenue and tax distribution are affected by the changes in the income taxation rule.

4. Results and Analysis

4.1. The impact on the tax base

This study aims to analyse the impact of the new tax law of 2008 on tax capacity and distribution in Indonesia on one of the major features of the amendment — the change in tax structure. The new law has only four different tax rates as opposed to the five rates of the income tax law no 17 year 2000. As can be seen in the previous Tables 1 and 2, the new tax law changed the non-taxable income threshold together with income tax brackets and tax rates. Therefore, the microsimulation model estimates the potential tax revenue from these two tax structures.

Table 3 shows that the number of eligible taxpayers has slightly decreased as a result of the reform. To take account of the income earners who are not eligible to be taxpayers, we used a non-taxable income group as one of the categories shown in Table 3 in addition to the formal income groups. This is to show the category of salary/wage earners with nil income tax liability. The application of the new law indicates a reduction of about 3.57 million taxpayers or around 6.21 per cent of the total number of potential personal taxpayers. The increase in this category of non-taxable potential taxpayers is mainly a result of the increase in the income tax

relief component with the application of the Law no. 36 year 2008. This could be seen as a significant loss in the tax basis but given that those people who no longer need to pay tax are in the low income category and would only have needed to pay the five per cent rate, the actual value from the related tax revenue foregone may not be substantial.

A larger impact of the law may well come from the considerable reduction of the tax rate for the top income groups. From the previous small fraction of 0.42 per cent of income earners who paid up to the marginal rate of 35 per cent in the highest income group, the new proportion reduces to only 0.11 per cent those who pay the new lower marginal tax rate of 30 per cent and another 0.19 per cent paying 25 per cent. The remaining taxpayers previously paying a 35 per cent tax rate (0.12 per cent of income earners) are now included in the much lower tax rate of 15 per cent. Therefore, we should expect a significant reduction of tax revenue due to the decreasing tax base and decreasing marginal tax rate.

4.2. The impact on revenue

Following the framework of analysis from Wallace, Wasylenko & Weiner (1991) for the US *Tax Reform Act 1986* and Yuwono (2008) for the Indonesian Income Tax Reform 2008, we analysed the effects for both the changes in the taxable income base (personal income tax relief) and changes in the tax rates. From both of these main changes arising from the personal income tax reform, we then assessed the impact on taxpayers' income tax liabilities and on taxpayers' income tax burden. Tax liabilities represent government income tax revenue collection from labour income. The change in tax liabilities is calculated as the new income tax liabilities (income tax liabilities under the new income tax law) minus the current income tax liabilities (in-

Table 3: Number of eligible taxpayers based on Law no. 17 year 2000 and Law no. 36 year 2008

Income Group	Annual Income (in million rupiahs)	Rate	No. of Potential Taxpayers	% from Total Salary Earners
	Law no 17 year 2000			
0	non taxable	-	40,912,160	71.17%
1	x ≤ 25	5%	13,313,726	23.16%
2	25 < x ≤ 50	10%	1,836,832	3.20%
3	50 < x ≤ 100	15%	798,739	1.39%
4	100 < x ≤ 200	25%	380,019	0.66%
5	x > 200	35%	241,862	0.42%
	Total Potential Taxpayers		16,571,178	28.83%
	Law no 36 year 2008			
0	non taxable	-	44,483,075	77.38%
1	x ≤ 50	5%	11,677,941	20.32%
2	50 < x ≤ 250	15%	1,150,084	2.00%
3	250 < x ≤ 500	25%	107,132	0.19%
4	x > 500	30%	65,105	0.11%
	Total Potential Taxpayers		13,000,262	22.62%

Sources: Authors' simulation applied to year 2008 taxpayers database

come tax liabilities under the previous income tax law). The second impact on the income tax burden is calculated as income tax liabilities divided by gross annual income of the taxpayer. We simulate tax liabilities and tax burden under four scenarios: pre-reform (year 2000 income tax law) tax relief and tax rates scenario; pre-reform tax relief and post-reform (year 2008 income tax law) tax rates; the post-reform tax relief and pre-reform tax rates; and the post-reform tax relief and tax rates. In doing so, we can check whether most of the tax revenues and tax burden changes are attributable to the change in the tax bases or to the changes in the tax rates. Table 4 presents the results for the PIT simulation under our incidence assumption. Tax revenues are totalled while tax burden is averaged over the individuals in each taxpayer's income decile.

Table 4 shows the revenue impact of the tax reform 2008. This adds further analysis to the previous section's finding on the reduction of the tax base from the implementation of the new tax structure. It also shows that the reduction of tax is greater for high income (even in terms of proportion). In addition to the changes in the tax base, these results demonstrate that the second major component of the reform, the changes to the tax rates,

had a greater impact. Because of the relationship between the components of the two changes, it can be expected that the potential tax revenue would be reduced by more than 6.21 percentage points of the nominal reduction in the tax base (as shown in the last three columns of Table 4).

The results presented in Table 4 confirm the expectations above, showing that potential tax revenue is reduced by a much higher rate than the reduction of the tax base itself. Our static microsimulation estimation shows that the total impact of the new reform is a 25.87 per cent decrease in potential government revenue. To fully understand the total revenue impact, we further analysed the detailed breakdown of the 2008 reform. We assessed the impact of the combined tax base changes and tax rates changes before finally concluding our analysis with the total impact from the 2008 reform.

As shown by the results for the first seven deciles, the change in tax rates generally did not reduce their tax liability. There was no impact from the tax rate changes for those deciles. We can see that changes only started from decile 8 with a slight revenue reduction of 0.57 per cent as a result of the tax rate changes. This indicates that the large number of low income earners from the first income

Table 4: Income tax revenue simulation before and after reform (income tax denominated in billion rupiahs)

| Income Decile | Before Reform | | | | After Reform | | | | |
| | Law no 17 year 2000 | | Rates Change Only | | Base Change Only | | Law no 36 year 2008 | | |
	Income Tax	% from total	Income Tax	% Change	Income Tax	% Change	Income Tax	% Change	% from total
1	92.90	0.15%	92.90	0.00%	97.60	5.06%	97.60	5.06%	0.21%
2	196.00	0.31%	196.00	0.00%	179.00	-8.67%	179.00	-8.67%	0.39%
3	280.00	0.45%	280.00	0.00%	262.00	-6.43%	262.00	-6.43%	0.57%
4	445.00	0.71%	445.00	0.00%	406.00	-8.76%	406.00	-8.76%	0.88%
5	659.00	1.05%	659.00	0.00%	596.00	-9.56%	596.00	-9.56%	1.29%
6	944.00	1.51%	944.00	0.00%	796.00	-15.68%	795.00	-15.78%	1.72%
7	1,270.00	2.03%	1,270.00	0.00%	1,080.00	-14.96%	1,080.00	-14.96%	2.33%
8	1,750.00	2.80%	1,740.00	-0.57%	1,460.00	-16.57%	1,440.00	-17.71%	3.11%
9	3,160.00	5.05%	2,610.00	-17.41%	3,030.00	-4.11%	2,330.00	-26.27%	5.03%
10	53,800.00	85.95%	40,600.00	-24.54%	51,700.00	-3.90%	39,100.00	-27.32%	84.48%
Top 5%	49,800.00	79.56%	37,600.00	-24.50%	47,600.00	-4.42%	35,800.00	-28.11%	77.35%
Top 1%	36,400.00	58.15%	27,700.00	-23.90%	33,900.00	-6.87%	26,100.00	-28.30%	56.39%
Total	62,596.90	100.00%	48,836.90	-21.98%	59,606.60	-4.78%	46,285.60	-26.06%	100.00%

Sources: Authors' simulation

brackets with 5 per cent tax rates dominate deciles 1 to 7. In terms of the biggest percentage of revenue reduction from tax rate changes, the highest decile (decile 10) and the second highest decile (decile 9) experienced the biggest reduction. The tenth decile shows a 23.91 per cent reduction, while the ninth decile experienced a 17.41 per cent reduction in potential tax revenue.

While the tax rate change produced no impact in the seven lower deciles, the tax base change produced a larger impact on revenue reduction for these deciles. The large impact of the reduction started from the lowest decile 1 up to decile 8. We found that the change in the tax base impacted significantly and removed all potential revenue from income decile 1 and 2. When we only changed the base, almost all of the taxpayers in these deciles were actually not paying taxes. This is presumably due to a significant reduction associated with the omission of these individuals' taxable income base right after the application of the new tax exemptions based on the new legislation. The subsequent impact on the reduction of income tax liabilities continued to be experienced in each decile: the higher the decile, the lower the impact. We suspect the gradual revenue reduction from decile 3 to decile 8 could also relate to our previous findings of the impact due to the increasing tax exemptions in the new legislation. These increased exemptions re-

sulted in a big shift for most of the taxpayers in the lower decile to become non-tax paying citizens.

The domination of the impact of tax rates started from decile 9 and 10 (including the top five per cent and one per cent) of individual taxpayers. The change in tax rates reduced revenue from decile 9 by more than 17.41 per cent, while at the same time the change in the tax base reduced revenue by about 13.9 per cent. A more extreme impact came from the highest decile, where the tax rate change contributed 23.91 per cent while the change in the tax base resulted in not more than a 1.57 per cent reduction. In sum, this last impact had the most extreme influence leading to a total reduction of 25.13 per cent of revenue.

Yuwono (2008) found that under a full application of Law no. 36 year 2008 (which was scenario four in her study) taxpayers in the lowest income deciles 1 and 2 and the highest income decile 10 contributed a larger share to revenue compared to other income groups. Yuwono based her analysis on the administrative data of personal income tax returns of the previous year. In contrast to Yuwono's findings, using our base file of combined survey and administrative data, we found that under the application of the new tax law, all four highest deciles of taxpayers, from decile 7 to decile 10, contributed a higher share of the potential tax revenue compared

to the estimation of the previous law. Decile 6 contributed the same proportion of the total revenue, while the other 5 lower deciles (decile 5 down to decile 1) contributed a smaller potential tax revenue share after the reform. These results differ from Yuwono's findings which concluded that, although the total sum of income tax liabilities of the individual taxpayers in each income decile were reduced, under the new law the share of income tax liability for the lower income decile increased. We found the opposing result, with the share of income tax liabilities from lower income deciles decreasing under the new law while the share from higher income deciles increased. This finding indicates that income tax burden under the new law will be lower and more equally distributed.

4.3. The impact on the tax burden distribution

Table 5 shows the impact of the 2008 tax reform on the distribution of the PIT burden, disaggregated based on income decile of the taxpayers.

Overall, changes made to the PIT by Law 36 year 2008 reduced the overall tax burden at the national level. This is in line with our previous findings about the decreasing revenue impact as a result of the enactment of the new law. The highest individual income deciles (deciles 9 and 10) experienced a larger decrease in total tax burden compared to other deciles. The burden reduction is even larger in the top five per cent and top one per cent of the individual income deciles. It seems that the reform largely eases the burden of the highest income decile while still maintaining a low burden on the lower income deciles.

In total, tax rate changes contributed more to the reduction of the burden than tax base changes. However, as an impact from tax rate change, there was no change in the burden especially from the lowest

income decile (decile 1) to the seventh decile. The considerable burden reduction only came from the minority of taxpayers in decile 9 to decile 10. Furthermore, we found different conditions for deciles 1 up to decile 8. For these deciles, tax burden changes were mainly from the base reduction, while for deciles 9 and 10, the combined effects from the tax rate change and the tax base change meant a larger total burden reduction from the implementation of Law no. 36 year 2008. We note that the tax base change does decrease the burden for taxpayer deciles 9 and 10, however the burden reduction from the tax rates change is more dominant for these groups.

Summing up, implementing the new law will result in revenue reduction but will ease the burden for all income deciles. Moreover, the tax burden figures show that it is the tax burden of the highest income earners that is reduced most by the new law. Nevertheless, the estimate still shows that the highest income decile still bears the highest burden. The highest decile bears 8.98 per cent of the income tax burden, followed by 3.21 per cent and 2.69 per cent borne by decile 9 and 8 respectively, and so on. The lower the decile the, lower the income tax burden borne.

4.4. Tax potential versus tax compliance

So far, our microsimulation estimate shows a large decrease in tax potential following the reduction of the number of taxpayers and the rates they have to pay. However, there is another side to the story, which is the fact that less than 10 per cent of Indonesian salary earners are registered by the tax authority (in 2008, there were a total of 5.43 million personal income taxpayers registered from 57 million salary earners). Some taxpayers may not be registered and some tax may not be collectable

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Table 5: Distribution of personal income tax burden before and after reform

Income Decile	Before Reform			After Reform			
	Law no 17 year 2000	Rates Change Only		Base Change Only		Law no 36 year 2008	
	Tax Burden	Tax Burden	% Decrease	Tax Burden	% Decrease	Tax Burden	% Decrease
1	0.0043	0.0043	-	-0.0048	-0.91%	-0.0048	-0.91%
2	0.0107	0.0107	-	0.0029	-0.78%	0.0029	-0.78%
3	0.0146	0.0146	-	0.0076	-0.70%	0.0076	-0.70%
4	0.0180	0.0180	-	0.0117	-0.63%	0.0117	-0.63%
5	0.0215	0.0215	-	0.0159	-0.56%	0.0159	-0.56%
6	0.0244	0.0244	-	0.0194	-0.50%	0.0194	-0.50%
7	0.0273	0.0273	-	0.0230	-0.44%	0.0230	-0.44%
8	0.0308	0.0306	-0.03%	0.0269	-0.40%	0.0269	-0.40%
9	0.0442	0.0350	-0.92%	0.0387	-0.55%	0.0321	-1.21%
10	0.1261	0.0932	-3.29%	0.1217	-0.44%	0.0898	-3.63%
Top 5%	0.1626	0.1194	-4.32%	0.1587	-0.39%	0.1167	-4.59%
Top 1%	0.2663	0.2033	-6.30%	0.2642	-0.21%	0.1844	-8.19%
Total	0.0662	0.0516	-1.46%	0.0609	-0.52%	0.0472	-1.90%

Sources: Authors' simulation

due to the informal nature of some types of work, but the potential for an increase in the number of taxpayers exists.

Ikhsan, Trialdi & Syahrial (2005) argued that expansion of the tax base can be implemented given that the current tax base is very much concentrated in the highest income decile of taxpayers. Our microsimulation estimate verified this finding: in 2008, the highest decile of taxpayers paid around 86.69 per cent of tax (Table 4). This exposes the potential to raise significant tax revenue through 'extensification' especially to the next lower income decile. Based on our microsimulation estimate, given the potential is there, the extensification program, by improving compliance, is more important at this moment than changing the tax structure to increase the tax base or the tax potential. Nevertheless, the estimate also shows that even with extensification the structure of income and tax will always preserve the concentration of income in the first and second highest deciles. Thus, to some extent our microsimulation shows that the dependency on the higher income taxpayers cannot be reduced unless there is a significant change in the distribution of income in Indonesia.

Our final focus relates to compliance, and we argue that in 2009 the Indonesian government had

considerable success in regards to improving compliance in personal income tax payment. This argument is based on our microsimulation that shows considerably decreased in both the tax base and especially potential tax revenue as the result of the new law while the data shows that the revenue from personal income tax still increased in 2009. This discrepancy is likely to be related to, the issue of under-coverage of high income earners in the Indonesian income data. In our tax microsimulation, 70 per cent of the estimated tax liabilities (around 40 billion rupiah from the 60 billion rupiah in tax liabilities) is coming from the income from the tax administrative data base that represent only around 2.2 million of around 60 million salary earners and 14 million taxpayers.

Table 6 shows registered taxpayers increased 62 per cent from 2008 (5.4 million personal taxpayers) to 2009 (8.8 million personal taxpayers). The compliance rate for the submission of tax returns increased 189 per cent, which is more than three times the increase in registration. Hence, if it is possible to construct a new base data set for 2009, this should at least add another 3.4 million personal taxpayers to the microsimulation base file. With the previous benchmark of more than 70 per cent increased tax liabilities, the estimated potential lia-

Table 6: Tax ratio and personal taxpayer compliance

Details Tax Ratio	2005	2006	2007	2008	2009
Oil & Gas Revenue to Domestic Revenue (%)	29.40	32.61	24.99	30.71	20.28
Tax to Domestic Revenue	70.26	64.32	69.53	67.26	74.06
Income Tax to Total Tax	28.43	26.05	27.54	25.58	30.90
Income Tax to GDP Ratio (% to GDP)	6.33	6.25	6.04	6.61	5.72
Tax to GDP Ratio (% to GDP)	12.51	12.25	12.43	13.30	11.61
Personal Tax Payer Compliance	2005	2006	2007	2008	2009
Registered Taxpayers	2,564,735	2,959,006	3,251,753	5,431,689	8,807,666
● growth		15.37%	9.89%	67.04%	62.15%
Submitted Tax File Return	851,19	898,036	899,567	1,677,160	4,853,323
● growth		5.50%	0.17%	86.44%	189.38%

Sources: Authors' calculations using data from State Budget Realisation Report, Directorate General of Treasury,
Ministry of Finance, the Republic of Indonesia, 2010 and Socio Economic Indicators,
Bureau of Statistics (BPS) Indonesia, 2010

bilities by using the new base file will increase by at least 18.2 per cent from estimated tax liabilities in 2008 (calculated from 70 per cent increase of the estimated liabilities times a 26 per cent decrease from the application of the new law).

Table 7 shows the result of simulating the revenue impact from the 2009 increase in compliance. We simulated the total revenue impact by using the 2008 taxpayers base plus the addition of registered taxpayers in 2009. The impact showed increased revenue in most deciles with the exception of decile 1, which showed a slight decrease due to the addition of the negative revenue base. This negative revenue base represents taxpayers whose taxable income and calculated tax liabilities become negative after the subtraction of tax exemptions. The total impact is a 44.75 per cent increase in potential revenue in 2009 or 36.11 per cent higher than the realised/actual revenue in 2009. In addition, there is an increase in the share of income tax to total tax revenue from 2008 to 2009. Although the increase in the tax revenue from income cannot match the increase in GDP (this can be seen from the lower ratio of income tax to GDP), we argue that without increasing the compliance rate, the ratio of income tax should drop much further to around 63 per cent of the 6.6 per cent of GDP or become around 4 per cent of GDP. The information in Table 6 supports this argument by showing that not only did the num-

ber of registered taxpayers increase in 2009 but this was followed by an increase in the number of those who submitted a tax return.

5. Conclusions

The results from our static microsimulation model show that the 2008 personal income tax policy implementation would have yielded significant losses to the potential tax base and for the government's potential tax revenue. At the same time, all income deciles bear a smaller burden under the application of the new law. The distribution of the tax burden has become more equal in this income law due to the reduction of the income tax burden in the highest income decile while still maintaining a low burden in the lower income deciles.

Based on the findings of a high concentration of income and tax in the highest decile, our microsimulation estimate verifies that the structure of income and tax will always preserve the concentration of income in the first and second highest decile. This, to some extent, shows that the dependency on the higher income taxpayers cannot be reduced unless there is a significant change in the distribution of income in Indonesia. Because of this, we believe that the 'extensification' program, by improving compliance, is more important at this moment than

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Table 7: Simulated revenue using 2009 compliance base

Income Decile	After Reform (simulated with 2008 Compliance Base)		After Reform (simulated with 2009 Compliance Base*)		
	Law no 36 year 2008		Law no 36 year 2008		
	Income Tax	% from total	Income Tax	% Change	% from total
1	- 129.00	-0.26%	- 138.00	-6.98%	-0.19%
2	- 37.20	-0.08%	- 25.20	32.26%	-0.04%
3	39.20	0.08%	58.50	49.23%	0.08%
4	203.00	0.41%	262.00	29.06%	0.37%
5	418.00	0.85%	512.00	22.49%	0.72%
6	703.00	1.43%	844.00	20.06%	1.19%
7	1,030.00	2.10%	1,230.00	19.42%	1.73%
8	1,500.00	3.06%	1,800.00	20.00%	2.54%
9	2,370.00	4.84%	3,080.00	29.96%	4.34%
10	42,900.00	87.56%	63,300.00	47.55%	89.25%
Top 5%	40,100.00	81.84%	58,600.00	46.13%	82.62%
Top 1%	30,500.00	62.25%	44,300.00	45.25%	62.46%
Total	48,997.00	100.00%	70,923.30	44.75%	100.00%

PIT Actual Revenue 2009 = 52,107.34
% simulated revenue from the actual = 136.11%
*) simulated with the assumption of 62.15% increase in compliance

changing the tax structure to increase the tax base or tax potential. The main features of the new law provide a favorable incentive to increase taxpayer voluntary compliance. The revenue and compliance figures in 2009 show that the government had considerable success in its first step to increase the tax base and personal taxpayer compliance. This is an important point as the Indonesian government look at another set of administrative reforms that involve tax amnesty. This study suggests the government to not deter by the low tax ratio after the 2008 reform as this result is likely to be driven mainly by the lower tax bracket rather than unsuccessful reform.

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