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**FINDING OUT THE DETERMINANTS OF POVERTY DYNAMICS IN  
INDONESIA: EVIDENCE FROM PANEL DATA**

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**ABSTRACT**

This study aims to examine the determinants of poverty dynamics in Indonesia. This study applies the spell approach of poverty experience and the ordered logit model to identify the poverty status of households: poor, transient poor (-), transient poor (+) and non-poor. Observing the Susenas balanced panel dataset of 2005 and 2007 covering 8,726 households, we found that 28% of poor households classified as poor (remained poor in two periods) while 7% of non-poor households are vulnerable to being transient poor (-). Our estimations confirmed that the important factors of poverty dynamics in Indonesia are educational attainment, number of household members, physical assets, employment status, health shocks, access to electricity, and changes in the household size, in the working sector and in the microcredit program. We also found that households living in Java-Bali are more vulnerable to negative shocks while households living outside Java-Bali are relatively resilient to negative shocks.

**Keywords:** poverty dynamics, panel data, shocks, government assistance, Indonesia

**BACKGROUND**

Indonesia's record of economic growth and combating poverty over the past 20 years is recognized internationally. Continuous economic growth and improving income distribution are the main factors for decreasing poverty in Indonesia (Balisacan *et al.*, 2002; Suryahadi *et al.*, 2009; Miranti, 2010). The incidence of poverty has continuously decreased from 40.10% to 15.40% during the period 1976 to 2009. Unfortunately, when the economic crisis hit and the economic growth decreased drastically, poverty figures increased sharply from 17.47% (34.01 millions) in 1996 to 23.43% (47.97 millions) in 1999.

Poverty in Indonesia has been an area much researched by policy makers, international donors and scholars. However, most of the poverty research in Indonesia,

for example, Bidani and Ravallion (1993), Balisacan *et al.* (2002), Suryahadi *et al.* (2003), and Suryahadi *et al.* (2009), essentially focuses on static poverty that analyses the proportion of the population falling below a given income threshold at a given time. However, it is generally acknowledged that poverty is not a pure static phenomenon since the poor is a human being that is growing and changing over time (Muller, 2002; Chant, 2003; INE, 2007; Dercon and Shapiro, 2007). There is always a chance that at some point in the future households who are currently not poor may fall below the poverty line because of events such as crop loss, job loss, death and other shocks. Contreras *et al.* (2004) found that health problems correlated with falling into poverty in Chile. Dercon and Krishnan (2000) showed that the risk factor is an important reason for the poverty fluctuations in Ethiopia. However, there are also possibilities for households who are currently poor to escape from poverty due to gaining employment or a better job (Fields *et al.*, 2003; Contreras *et al.*, 2004; Kedir and McKay, 2005), increasing educational attainment (Herrera, 1999) and improving infrastructure (Sawada *et al.*, 2008).

On the other hand, the government of Indonesia itself has changed the poverty alleviation policies from a macro top-down approach into a community or household participatory approach. In the last 10 years, the government has innovated and implemented several policies to alleviate chronic poverty such as educational subsidy (*Bantuan Operasional Sekolah*), scholarships, conditional cash transfers, community empowerment programmes (*Program Nasional Pemberdayaan Masyarakat*), credits for small-medium enterprises (microfinance) and infrastructure development projects (*Program Pengembangan Kecamatan*). In addition, Government also provides social safety nets to protect the poor from some external shocks through distributing subsidized rice (RASKIN), cash transfers (*Bantuan Langsung Tunai*) and health insurance targeted to the poor (ASKESKIN). Those policies are deliberated to cope with transient poverty. Sparrow, Suryahadi and Widyanti (2010) using the Susenas panel 2005 and 2006 showed that health insurance targeted to the poor (ASKESKIN) improves access to healthcare in that it increases utilization of outpatient healthcare among the poor. Thus, this policy would potentially protect households falling into the transitory poor category due to health shocks.

However, the effectiveness of these policies in alleviating poverty is still

questionable. Evaluating the impact of poverty alleviation policies in the static term or short period can be difficult since for some policies there is a lag between policy implementation and the results of the policy emerging. For instance, the impact of microcredit on small-medium enterprises often only becomes apparent after two or more years; therefore longer and continuous observation is required. Further, it is generally acknowledged that the impact of human capital investment such as education and health on household welfare cannot be investigated immediately.

Since the poverty incidence can change over time, it is important to conduct the dynamic analysis in order to distinguish between chronic, transient poverty and never poor, to discover the important factors differentiating among groups and also to evaluate the effectiveness of government policies on changing poverty status in Indonesia. This study using recent data contributes mainly on three main parts. First, a valuable contribution to the literature of poverty studies in Indonesia. There has been very little analysis in poverty dynamics in Indonesia, i.e. investigating the welfare movements of a set of households over time; most studies analyse changes in the poverty incidence, depth and severity of poverty at a point in time. Thus, some households that are observed to be below the poverty line at a point in time of cross-sectional data may only be transient poor due to some events. Second, providing information for a deeper understanding of the recent situation of poverty in Indonesia. Analysis of households' welfare movement (poverty condition) over time provides useful insights into what determines households' movement into and out of poverty and why some households remain poor. Third, a pioneer study of poverty dynamics in Indonesia that is dealing with how socio-economic shocks and risks, government assistance and changes in socio-economic variables can change poverty status in Indonesia. Dercon and Shapiro (2007) surveyed that the impact of risks and shocks on poverty mobility has received relatively limited attentions in the literature of poverty dynamics. Hence, analysis of poverty dynamics provides intuitions into the effects of socio-economic and anti-poverty policies and can help policy makers identify policies that effectively help households escape poverty.

This article first briefly explains the concepts of chronic and transient poverty and how they are measured, then also describes the changing of household poverty

status in Indonesia during 2005 to 2007. The next part will review the research methods of the ordered logit model and will subsequently analyse the estimation results. The analysis focuses on the determinants of poverty dynamics and the important factors of changing poverty status. The paper will then end with some important findings and policy suggestions.

## **THEORETICAL FRAMEWORK**

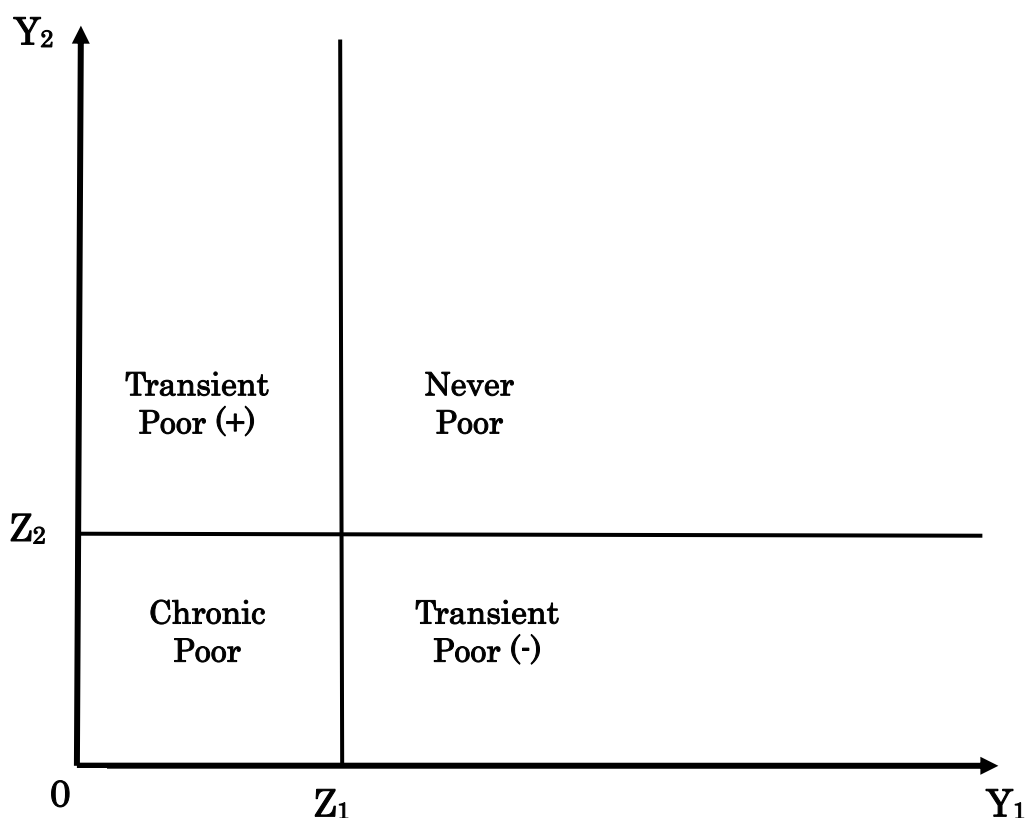
### **Concepts and Measures of Chronic and Transient Poverty Based on Panel Data**

There are two main methods commonly adopted to identify and measure chronic and transient poverty (income and consumption based poverty) based on panel data: the “spell” and “components” approaches (Yaquub, 2000; McKay and Lawson, 2003). The spell approach identifies the chronic and transient poverty based on the number or length of spells of poverty they experience. The defining feature of chronic or transient poverty is its extended duration (Hulme, Moore and Shepherd, 2001; Hulme and Shepherd, 2003). Chronic poor refers to the condition that consumption expenditure or income of household in each period is always below the poverty line. Transient poor means that consumption expenditure or household income is not always below the poverty line but is sometimes over the line. Non-poor (never poor) indicates that the consumption expenditure or household income in all periods is always above the poverty line (Hulme, Moore and Shepherd, 2001).

The difference between chronic and transient poverty is typically based on longitudinal or panel data, which observes the living conditions of the same individual or households at several points in time. McKay and Lawson (2002) explain that the main difference between chronic and transient poverty is the need for either longitudinal or panel data or life history survey. The longitudinal or panel data provides information about individuals or households during an observed period or in some consecutive periods. Chronic poverty then can be described as the household condition of being poor over an extended period while transient poverty refers to a state of occasionally being poor or being non-poor during the period of investigation. Meanwhile a life history survey captures the dynamic aspect of living conditions from a list of retrospective questions. A life history, for instance the weight-for-height anthropometric

measure, can fluctuate significantly in a short time horizon. These fluctuations may reflect various factors such as the period of the agricultural season or the effects of chronic disease. Hence, an individual having the weight-for-height measurement less than the standard over an extended time of observation can be classified as chronic poor. Whereas, an individual with the weight-for-height measurement occasionally equal to or below the standard can be categorized as transitory poor. However, studies of poverty dynamics rarely utilize a life history due to the data availability.

**FIGURE 1 The Distinction between Chronic Poor, Transient Poor (-), Transient Poor (+) and Never Poor**



*Source: adapted from Grab and Grimm (2006)*

Figure 1 shows a simple illustration of the spell approach. Consider that  $Y_1$  and  $Y_2$  is the individual or household income or consumption in period-1 and period-2 respectively. It is assumed that both  $Y_1$  and  $Y_2$  are classified by increasing order.  $Z_1$  and  $Z_2$  are the poverty line in period-1 and period-2. An individual is defined as being **chronic poor**, if his/her consumption ( $Y_1$  and  $Y_2$ ) over time is below the poverty line ( $Z_1$  and  $Z_2$ ) in both periods. An individual is defined as being **transient poor**, if his/her

consumption ( $Y_1$  and  $Y_2$ ) over a time is below a poverty line either in period-1 or period-2 of the time span and above the poverty line in another period. However, in Figure 1, we distinguish between **transient poor (+)** and **transient poor (-)**. Transient poor (+) refers to an individual or household whose income or consumption is below the poverty line in period-1 but above the poverty line in period-2. Transient poor (-), on the other hand, refers to an individual or household whose income or consumption is above the poverty line in period-1 but below the poverty line in period-2. The plus (+) sign indicates improving living conditions while the negative (-) shows the impoverished condition. Further, an individual is defined as being **never poor**, if his/her consumption ( $Y_1$  and  $Y_2$ ) in both periods is never below the poverty line ( $Z_1$  and  $Z_2$ ).

The second approach is the “components” approach that distinguishes the permanent component of a household income or consumption from its transitory variations. This approach classifies the chronic poor as those whose permanent component is below the poverty line (McKay and Lawson, 2003). The most common approach to identify the permanent component is based on the intertemporal average of household income or consumption. The regression model capturing the relationship between a household’s income or consumption and its characteristics is commonly applied in order to distinguish between the permanent component and the transitory component (Jalan and Ravallion, 1998; McCulloch and Baulch, 1999; Sawada *et al.*, 2008).

The household relevant characteristics will be used in predicting the permanent income or consumption level. The accuracy and reliability of using this in identifying permanent and transitory components will depend on how well the household characteristics are able to explain the variations in income or consumption. A household may fluctuate in and out of poverty, but where the permanent component of its living standard is below the poverty line it is considered chronically poor (McKay and Lawson, 2003).

### **Previous Researches on Poverty Dynamics**

Studies on the determinants of poverty dynamics often classify the poverty status of households into three groups: chronic poor, transient poor, and non-poor or

never poor. The distinction between chronic and transient poverty is not only important for the perspective of poverty measurement accuracy, but also has policy implication purposes. Either chronic or transient poverty would call for different alleviation strategies. In a country or region where the poverty problem is characterized by the chronically poor, then the appropriate strategy would be to redistribute assets, providing basic physical and human capital infrastructure. If the predominant poverty problems relate to transient poverty, the strategy would be geared towards providing safety nets and coping mechanisms to reduce their vulnerability and help them return to a non-poor situation (Hulme and Shepherd, 2003; McCulloch and Calandrino, 2003).

Many studies have found the important factors of determining poverty status are human capital, demographic factors, geographical location, physical assets and occupational status. Alisjahbana and Yusuf (2003) and Widyanti *et al.* (2009) in Indonesia, Adam and Jane (1995) in Pakistan, Jalan and Ravallion (1998) in Rural China, Herrera (1999) in Peru, Haddad and Ahmed (2003) in Egypt and Mango *et al.* (2004) in Kenya have clearly shown that an increase in human capital indicated by educational attainment decreases the probability of being chronically poor and improves the ability of a household to respond to transitory shocks.

That changes in demographic factors such as increased household size is positively related to chronic poverty has been confirmed by Jalan and Ravallion (1998) in Rural China, Herrera (1999) in Peru, McCulloch and Baulch (1999, 2000) in Pakistan, Mango *et al.* (2004) in Kenya, Woolrad and Klasen (2005) in South Africa, Widyanti *et al.* (2009) in Indonesia. McCulloch and Calandrino(2003) in Rural Shincuan confirmed that chronic poverty is commonly found in rural areas, especially remote areas. However, households living in urban areas have a higher probability of escaping from poverty (Fields *et al.*, 2003; Bigsten *et al.*, 2003, and Kedir and McKay, 2005). Lack of physical assets is another important factor often associated with chronic poverty (Adam and Jane, 1995; Jalan and Ravallion, 1998; McCulloch and Baulch, 2000; Woolard and Klasen, 2005). Lastly, occupation status is frequently found as one of the important factors determining the household poverty status. Okidi and Kempaka (2002) in Uganda found that self-employed farming households are more likely to be chronic poor. Kedir and McKay (2005) found that households with the head working as a waged employee



can escape poverty.

In the case of poverty dynamics in Indonesia, Grab and Grimm (2006), using the Indonesian Fertility Life Survey (IFLS) dataset, compared chronic and transient poverty over two time-spans and showed that absolute comparisons point out a significant decline in chronic poverty from 1993-1997 to 1997-2000. Both the decline in chronic and in transient poverty was largely driven by a substantial poverty decline in rural Indonesia. Fields *et al.* (2003) using the 1993 and 1997 of IFLS panel dataset found that determinants of household income dynamics during that period were household location, age of the household head, employment status of the household head, change in the number of children, change in the gender of the household head and change in employment status of the head. Alisjahbana and Yusuf (2003) using the IFLS dataset from 1993 and 1997 observed that of the 84.8 percentage point non-poor in 1993, 11.6 percentage points had fallen into poverty in 1997. Likewise, of the 15.2 percentage points poor in 1993, 7.8 percentage points remained poor whereas the other 7.4 percentage points had escaped poverty. Suryahadi and Sumarto (2001) found that the chronic poor, who made up only 20% of the total poor before the crisis, by 1999 constituted 35% of the total poor.

#### **OVERVIEW OF POVERTY DYNAMICS IN INDONESIA DURING 2005-2007**

We use the 2005 and 2007 National Socio-Economic Survey (Susenas) collected by Central Statistical Agency of Indonesia (henceforth BPS) to measure poverty dynamics in Indonesia. Susenas consists of two main datasets: Core and Module. Susenas 2005 recorded detailed characteristics of 278,352 households representing 59,321,125 households and covering various geographic regions of Indonesia. Meanwhile, the 2005 Susenas Module collected additional information on a subset of the Core households, around 68,288 households. The Susenas Module recorded detailed information of food and non-food consumption as well as income of the sample households.

BPS selected around 10,600 households from a subset of the 2005 Susenas Module sample and revisited them. These data made up the new BPS Susenas panel dataset. Moreover, Susenas 2007 Core covered 285,186 households and Susenas 2007

Module (focused on housing module) covered 68,640 households. Merging between the 2005 and 2007 Susenas panel and dropping samples of incomplete household information and outliers yield a total of 8,726 households (balanced panel data). The Susenas panel survey did not revisit households who migrated to other locations. Thus, 8,726 revisited households are those living in the same location during 2005-2007<sup>1</sup>. We intended to utilize a longer period of Susenas dataset, for instance from 2002 to 2007, in order to capture the longer dynamic changes in the poverty status. Unfortunately, the database of 2002 and 2007 did not match in terms of code because BPS surveyed only the same sampled households in three years. We would also like to include the 2006 Susenas data in the analysis but we found many inconsistencies of the 2006 data compared to the 2005 and 2007 data.

Analysing the poverty dynamics by utilizing a short period of panel data (three years) might not reflect 100% long run changes of poverty in Indonesia. Due to the data limitation and availability, however, analysing a short period of poverty dynamics in Indonesia by using Susenas dataset that provides the rich information of household socio-economic conditions and covers all provinces in Indonesia will contribute to a deeper understanding of the recent situation of poverty in Indonesia and will also provide useful insights into why some households remain poor and why some others can move out of poverty.

Analysis of poverty dynamics will start from the discussion of general information of household expenditure, the poverty line and poverty incidence during

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<sup>1</sup> Merging between the 2005 sample ID and the 2007 sample ID of Susenas Module, we found 9,935 balanced panel samples. Around 600 samples were lost during the merger. The loss of samples might be due to a split of provinces during 2005 and 2007. South Sulawesi Province was divided into two provinces of South Sulawesi and West Sulawesi while Papua province was also divided into two provinces of Papua and West Papua. Though, some samples are included in the 2005 survey and revisited again in the 2007 survey, they would have a different sample ID due to the different location of initial and final province. Then, they would be automatically dropped during the merging process. Therefore, we faced difficulties to define exactly how much sample attrition is. This study estimated that sample attrition is around 3-4% of total panel sample. When we merged the sample ID of Susenas Module and the sample ID of Susenas Core, we found 9,491 samples of the 2005 and 2007 balanced panel data. Almost 520 samples were lost during this merging. Finally, we merged not only the ID sample but also included household information such as educational attainment, physical assets, shocks and the poverty line, and also deleted samples of incomplete household information and outlier data; we then found only 8,726 balanced panel samples of the 2005 and 2007.

2005-2007 (Table 1). This information provides basic information and guidance of movement of a household's welfare status. During 2005-2007, household expenditure averagely increased 30.35% at national level. Households living outside Java-Bali experienced a significant increase in expenditure, almost 40%, while household living in Java-Bali (Table 1) only experienced 24% increase of expenditure. The significant increase in household expenditure of outside Java-Bali would not be followed by massive poverty reduction in those areas since the poverty line of outside Java-Bali also extensively increased, almost 32%. The significant increase of poverty line was caused by a massive increase in fuel subsidies in 2005. Though, the national poverty incidence remained almost unchanged during 2005-2007, the poverty incidence of outside Java-Bali decreased 0.47 percentage point. Surprisingly, the urban poverty decreased around 0.5 percentage point but the rural poverty moved to an opposite direction, increased almost 1 percentage point. This is because although households living both in rural and urban areas experienced similar proportion of increase in expenditure, the rural poverty line increased almost 25% while the urban poverty line only increased 14%.

This study applies the spell approach as mentioned in Figure 1, the poverty line of 2005 and 2007 and the poverty measures of FGT formula (Foster, Greer and Thorbecke, 1984)<sup>2</sup>. This study only analyses P0 (headcount index) of FGT poverty measurement. Since this study utilizes a short period of panel data, it may be inappropriate to use references of chronic poor and never poor. Both references need a longer longitudinal data, at least five years, to provide a clear definition and analysis of chronic and never poor. Thus, we then categorize households based on expenditure based poverty measures into four groups: poor, transient poor (-), transient poor (+) and non-poor. These reference adjustments would not reduce the significance and contribution of analysis of poverty dynamics in Indonesia. This study also applies three

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<sup>2</sup> The FGT class of poverty measures follows:

$$\pi_{\alpha} = \frac{1}{n} \sum_{i=1}^q \left( \frac{z - y_i}{z} \right)^{\alpha}$$

Where  $\pi$  is the poverty index,  $n$  is the total population size,  $z$  is the poverty line,  $y_i$  is the income of the  $i^{th}$  individual (or household),  $q$  represents the number of individuals just below or at the poverty line, and  $\alpha$  is a parameter for the FGT class.

different poverty lines: the official poverty line published by BPS, the lower poverty line (75% of the official poverty line) and the upper poverty line (1.25% of the official poverty line). Applying three different poverty lines is intended to examine the sensitivity of poverty incidence to changes in the poverty line.

**TABLE 1 Summary of Household Expenditure, the Poverty Line and Poverty Incidence (2005-2007)**

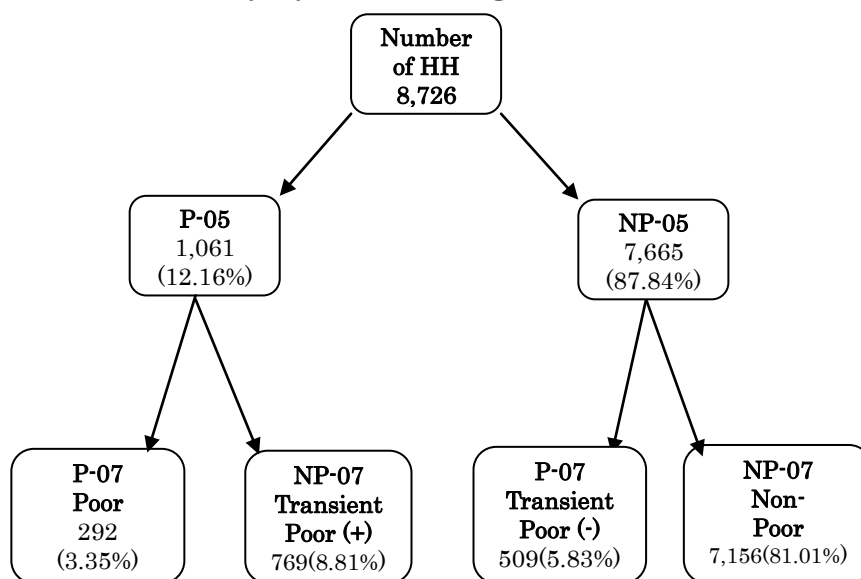
<b>Household Expenditure Calculated Based on the Balanced Panel 2005 and 2007 (Rp./Month/Capita)</b>					
<b>Region</b>	<b>2005</b>		<b>2007</b>		<b>Change (%)</b>
	<b>Mean</b>	<b>St. Dev.</b>	<b>Mean</b>	<b>St. Dev.</b>	
National	288,579	260,391	376,175	330,679	30.35
Urban	401,305	348,171	521,161	409,812	29.87
Rural	208,434	119,911	273,093	205,269	31.02
Java-Bali	312,278	301,724	386,130	337,318	23.65
Outside Java-Bali	261,840	200,639	364,944	322,697	39.38
<b>The Official Poverty Line (Rp./Month/Capita)</b>					
<b>Region</b>	<b>2005</b>		<b>2007</b>		<b>Change (%)</b>
National	141,465		167,390		18.33
Urban	165,565		187,942		13.52
Rural	117,365		146,837		25.11
Java-Bali	145,569		169,031		16.12
<i>Urban</i>	170,153		192,974		13.41
<i>Rural</i>	120,985		145,088		19.92
Outside Java-Bali	135,768		179,015		31.85
<i>Urban</i>	156,456		197,909		26.50
<i>Rural</i>	115,080		160,121		39.14
<b>The Poverty Incidence Calculated Based on the Total Sample of Susenas 2005 and 2007 (%)</b>					
<b>Region</b>	<b>2005</b>		<b>2007</b>		<b>Percentage Change</b>
National	16.59		16.58		-0.01
Urban	13.02		12.52		-0.50
Rural	19.41		20.37		0.96
Java-Bali	15.76		15.97		0.21
Outside Java-Bali	17.95		17.48		-0.47

*Source: Authors' calculation and several BPS's Publications*

Figure 2 shows Indonesian poverty dynamics during 2005-2007 at national level using the official poverty line. By 2005, observing the 8,726 surveyed samples; this

study found the number of poor is 12.61% while the number of non-poor is 87.84%. During 2005-2007, we observed that the number of poor declined from 12.61% (1,061 households) to 9.18% (801 households of 8,726 households). Roughly 72.48% (769 households) of 1,061 households could be able to move out of poverty while the other 292 poor households (27.52%) remained in the poor group. The remaining poor households are considered as the poor group (this group is called the chronic poor group when analysing poverty dynamics using a longer period of panel data) while the households that escaped from poverty is considered as the transient poor (+). Unfortunately, 6.7% (509 households of 7,665 households) of previously non-poor households fell into poverty. This group could be categorized as transient poor (-) indicating they had been impoverished during 2005-2007. Lastly, 81.01% (7,156 households of 8,726 households) that maintained non-poor household status both in 2005 and 2007 could be categorized as non-poor (this group is called the never poor group when analysing poverty dynamics using a longer period of panel data).

**FIGURE 2 Poverty Dynamics during 2005-2007 at National Level**



*Source: Authors' calculation*

*Note: P and NP refer to poor and non-poor; Figures in the parenthesis are the percentage value.*

Table 2 shows that the poverty incidence varies responding to the applied poverty line. The number of poor household jumped from 3.24% (under the lower poverty line) to 12.16% (under the official poverty line) and 26.55% (under the upper poverty line). Most of the poor households (around 73.52%) are in rural areas. These

figures show that poverty in Indonesia is a rural phenomenon and is quite sensitive to changes in the poverty line. A 25% increase in the poverty line causes more than a double increase in the poverty.

**TABLE 2 Overview of Poverty Status during 2005 and 2007**

Description			Condition in 2007								
			Lower Poverty Line			Official Poverty Line			Upper Poverty Line		
			Total	Poor	Non Poor	Total	Poor	Non Poor	Total	Poor	Non Poor
Condition in 2005	Rural-Urban Classification	Urban									
		Poor	74	2	72	281	13	268	690	171	519
		Non-Poor	3,552	2	3,550	3,345	32	3,313	2,936	220	2,716
		Rural									
	Poor	209	35	174	780	279	501	1,627	832	795	
	Non-Poor	4,891	153	4,738	4,320	477	3,843	3,473	783	2,690	
	Regional Classification	Java-Bali									
		Poor	108	16	92	475	143	332	1,088	472	616
		Non-Poor	4,518	16	4,502	4,151	243	3,908	3,538	513	3,025
		Outside Java-Bali									
	Poor	175	21	154	586	149	437	1,229	531	698	
	Non-Poor	3,925	139	3,786	3,514	266	3,248	2,871	490	2,381	
National	Poor	283	37	246	1,061	292	769	2,317	1,003	1,314	
	Non-Poor	8,443	155	8,288	7,665	509	7,156	6,409	1,003	5,406	
<b>Total</b>			<b>8,726</b>	<b>192</b>	<b>8,534</b>	<b>8,726</b>	<b>801</b>	<b>7,925</b>	<b>8,726</b>	<b>2,006</b>	<b>6,720</b>

Sources: Authors' calculation based on Susenas 2005 and 2007

Note: Calculation of the poverty incidence (headcount index) using both weighted Susenas panel and unweighted Susenas panel does not result in significant differences. For instance, at the national level, the weighted proportion of poor, transient poor (-), transient poor (+) and non-poor is 3.24%, 5.48%, 8.34% and 82.94% respectively while the unweighted proportion of poor, transient poor(-), transient poor(+) and non-poor is 3.35%, 5.83%, 8.81% and 81.01% correspondingly. At the national level, by 2005, the poverty incidence is 12.16% (unweighted samples) and 11.58% (weighted samples) while at the urban level, the poverty incidence is 3.31% (weighted samples) and 3.22% (unweighted samples). Thus, the estimates obtained from the unweighted Susenas panel dataset as shown in Table 1 can represent these disaggregate groups nationally.

Interesting findings can be seen in the disaggregate level where 95.40% (268 households of 281 households) of 2005 urban poor households are able to climb out of poverty during 2005-2007 while merely 64.23% (501 households of 780 households) of 2005 rural poor households are able to move out of poverty in the same period. Moreover, during the period 2005-2007, around 11% (477 households) of 2005 rural non-poor households fell into poverty while only 1% of 2005 urban non-poor

households fell into poverty. Urban households contribute more transient poor (+) and non-poor while rural households contribute more transient poor (-) and poor. This indicates that the rural households are more vulnerable to poverty than urban households since income sources of rural households mostly rely on agriculture activities, which are relatively unstable compared to industrial or service sectors in the urban area. Therefore, some negative shocks such as crop loss, price falls of agricultural products, or death and illness can easily send the rural households falling into poverty.

Table 2 also shows poverty dynamics in the disaggregated regional level of Java-Bali and outside Java-Bali<sup>3</sup>. In Indonesia it is generally observed that there are two types of regional segregation, Java and Bali versus outside Java and Bali, and Western Indonesia versus Eastern Indonesia. Western Indonesia comprises Sumatera, Java, Bali and Kalimantan, while Eastern Indonesia consists of Sulawesi, Nusa Tenggara, Maluku and Papua. Java and Bali are significantly more developed than other islands in terms of economic activities, population and infrastructure. Manufacturing activities and service sectors dominate the economy of Java and Bali while agricultural and mining activities dominate the economy outside Java and Bali. According to BPS, by 2005, the Java-Bali economy contributed 61.2% of Indonesian Gross Domestic Product and the population of Java-Bali contributed 58.8% of the total population. Suryadarma *et al.* (2006) using the 2003 Podes (Village Potential Survey) and Susenas panel 2002-2004 showed that households in Java-Bali has better access on basic services such as education and health than households outside Java-Bali. Almost 20% of villages outside Java-Bali had no primary school while only 0.77% of villages in Java-Bali had no primary school. Meanwhile, between Java-Bali districts (*Kecamatan*) and outside Java-Bali districts, the difference in the health service (*Puskesmas*) availability is 46% versus 44%.

The regional segregation between Java-Bali and outside Java-Bali might influence poverty characteristics of households due to differences in economic structure

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<sup>3</sup> According to BPS, the data of 2005-2007 Susenas panel should be presented at the national level and the rural-urban level but not at provincial level. However, there is still possibility and validity to analyse at the regional level Java-Bali and outside Java-Bali since the samples of balance panel of Susenas 2005 and 2007 had been distributed proportionally between Java-Bali (4,626 households) and outside Java-Bali (4,100 households). Another reason is following Suryadarma *et al.*'s (2006) work that had utilized the 2002 and 2004 Susenas panel dataset to analyse access of basic services at the disaggregate regional level. Hence, the disaggregation analysis at the regional level using the 2005 and 2007 Susenas panel dataset still has validity to provide useful insights related to households' move in or out of poverty during 2005-2007.

and infrastructure availability. In the disaggregate regional level, this study found 69.9% (332 households) of 2005 Java-Bali poor households are able to climb out of poverty during 2005-2007 while 74.57% (437 households) of 2005 outside Java-Bali poor households are able to move out of poverty in the same period. Moreover, during the period 2005-2007, 5.9% of 2005 Java-Bali non-poor households fell into poverty while 7.6% of 2005 non-poor households living outside Java-Bali fell into poverty. Around 70% of 2005 Java-Bali poor households and 75% of 2005 poor households living outside Java-Bali could move out of poverty. Further, around 30% of poor households in Java-Bali and around 25% of poor households living outside Java-Bali are categorized as remaining poor households in two periods of observation. Non-poor households outside Java-Bali seem more vulnerable to becoming transient poor (-) than non-poor households in Java-Bali while poor households outside Java-Bali are more easily out of poverty than poor households in Java-Bali. One possible explanation why non-poor households outside Java-Bali are more vulnerable to fall into poverty is that the economic activities of outside Java-Bali are highly dependent on agricultural and mining activities. These sectors are very vulnerable to price fluctuation, crop loss and climate change. Price fluctuations of these commodities will directly lead to the fluctuation of household income/expenditure outside Java-Bali. Thus, households' condition is easily moved in and out of poverty.

The discussion of poverty dynamics would be more interesting if there is data of internal migration during 2005-2007. A poor household in rural Java-Bali might perform an internal migration either to an urban area within Java-Bali or to outside Java-Bali in order to escape from the poverty. The 2005 Intercensal Population Survey (*Survey Penduduk Antar Sensus (SUPAS)*) recorded that the net-recent migration in Java-Bali was -2,484 people while the net-recent migration outside Java-Bali was 175,875 people<sup>4</sup>. Almost 2.44 million people (2% of total Java-Bali population) migrated in/out Java-Bali whereas almost 1.4-1.6 million people (1.55% of total outside Java-Bali population) migrated in/out outside Java-Bali. Additionally, the 2010 population census recorded that there were 3.8% of recent migration into urban area and 1.2% of recent migration into rural area. Table 1 could not capture household migrations

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<sup>4</sup> BPS defined recent migration as the person whose residence at the time of data collection is different from his residence five years previous.



during 2005-2007 due to the availability of migration data in the Susenas panel survey. Even so, Table 1 still provides insightful information on poverty dynamics in Indonesia since the migration rate was not massive.

## **RESEARCH METHODOLOGY**

### **Model Specification**

The spell approach based on the length of spells of poverty experienced has divided households in Indonesia into four groups: poor, transient poor (-), transient poor (+) and non-poor. This study believes that the poverty status of households has an order in which one status might be more favourable than others. In order to assign an order of the poverty status, let us assign poor as  $(P_{05}, P_{07})$ , transient poor (-) as  $(NP_{05}, P_{07})$ , transient poor (+) as  $(P_{05}, NP_{07})$  and non-poor as  $(NP_{05}, NP_{07})$ .  $P_{05}$  and  $P_{07}$  are poor conditions in two periods of 2005 and 2007 while  $NP_{05}$  and  $NP_{07}$  are non-poor conditions in 2005 and 2007, respectively.  $(NP_{05}, NP_{07})$  is the most preferred condition while  $(P_{05}, P_{07})$  is least preferred among the four conditions. The order of  $(NP_{05}, P_{07})$  and  $(P_{05}, NP_{07})$  is in between  $(NP_{05}, NP_{07})$  and  $(P_{05}, P_{07})$ . There is a difficulty to determine which is preferred between the two options of  $(NP_{05}, P_{07})$  and  $(P_{05}, NP_{07})$ . This study, however, assumes that the improvement condition like  $(P_{05}, NP_{07})$  is more favourable than the degradation condition of  $(NP_{05}, P_{07})$ . Thus, the order of the poverty status is  $(NP_{05}, NP_{07}) > (P_{05}, NP_{07}) > (NP_{05}, P_{07}) > (P_{05}, P_{07})$ .

We then propose an Ordered Logit Model to examine the determinant factors that can affect the poverty status of households. We also ascertain the important factors that enable the poor to escape from poverty. The ordered logit model is useful for understanding the relative effect of different household characteristics on their poverty status, but it is less useful for distinguishing between poverty categories. Independent variables (predictors) in the model are essentially divided into two groups: the 2005 initial variables and change variables during 2005-2007. The initial variables represent the initial condition and position of households that will affect the future poverty status of households. For instance, poor agricultural households with a small area of land in

the initial year might continuously be poor in the future because a small area of land could not produce more than a subsistence level. They, however, do not have enough resources to invest in a modern agricultural technology or to buy good seed for the next production. Households that experienced health shocks and were without any insurance in the initial years might become poor in the future since they could not work or they have to allocate all resources for medical treatments. They, sometimes, were forced to sell land for medical treatments and this might impoverish them in the next period. In terms of changes in variables, non-poor households in the initial period might become a poor household in the next period due to changing marital status or losing jobs.

Independent variables included in the model considers the data availability in the 2005 and 2007 Susenas and also variables used in the previous researches done by Jalan and Ravallion (1998), Herrera (1999), Okidi and Kempaka (2002), Cruces and Wodon (2003), Alisjahbana and Yusuf (2003), McCulloch and Calandrino (2003), McKay and Lawson (2003), Fields *et al.* (2003), Haddad and Ahmed (2003), Bigsten *et al.* (2003), Contreras *et al.* (2004), Mango *et al.* (2004), Kedir and McKay (2005), Woolard and Klasen (2005), and Widyanti *et al.* (2009). The ordered logit model is shown below:

$$y_i = HHC_i^0 \beta + SECO_i^0 \chi + ShockGov_i^0 \phi + \Delta VAR_i^{05-07} \varphi + e_i \quad [1]$$

where,

- $y_i$  = a household poverty status: 0 = poor, 1 = transient poor (-), 2 = transient poor (+), 3 = non-poor;
- $HHC_i^0$  = a vector of family characteristics in 2005 including marital status, age, education attainment, number of household members, dummy of location and dummy of an island;
- $SECO_i^0$  = a vector of socio-economic characteristics in 2005 including dummy of working sector, employment status, land ownership (in hectare), size of house (in square metre), access to electricity for illuminating energy and dummy of household with a family member working as migrant workers;
- $ShockGov_i^0$  = a vector of shocks, risks and policy variables received by a household in 2005. The negative shocks and risks include economic risks and

health shocks. The positive shocks are an improvement of public facilities surrounding living area and a gaining of new jobs. Economic risks include crop loss, job loss, price fall and an increase in production costs. This vector also includes interaction variables between socio-economic shocks and saving, and policy variables of cheap rice (RASKIN), health insurance targeted to the poor (ASKESKIN) and microcredit. These are intended to examine the effectiveness of saving and government policies to cope with the negative shocks.

- $\Delta VAR_i^{05-07}$  = a vector of changes in variables during 2005-2007 including change in marital status, number of household members, working sector, employment status, access to electricity for illuminating energy and microcredit;
- $e$  = error term;
- $i$  = household- $i$ ,  $i=1, \dots, 8,726$ .

The detailed information and expected signs of predictors are presented in Appendix 1. Meanwhile, Appendix 2 shows cross-correlation between independent variables to check and assure no close colinearity between predictors that may reduce effectiveness and efficiency of estimations.

### **Ordered Response Model**

Equation 1 is ordered response models with four outcomes  $\{y = 0, 1, \dots, 3\}$ . In order to explain an ordered response model, we follow the general form of Wooldridge (2002). This study first explains the **ordered probit model** as a standard model. The ordered probit model for  $y$  (conditional on explanatory variables  $x$ ) can be derived from a latent variable model. Assume that a latent variable  $y^*$  is determined by,

$$y^* = x\beta + e, \quad e|x \sim Normal(0,1) \quad [2]$$

where  $\beta$  is  $K \times 1$  and, for reasons to be seen,  $x$  does not contain a constant. Let  $\alpha_1 < \alpha_2 < \dots < \alpha_J$  be unknown **cut points** (or **threshold parameters**), and define

$$\begin{aligned} y = 0 & \text{ if } y^* \leq \alpha_1 \\ y = 1 & \text{ if } \alpha_1 < y^* \leq \alpha_2 \\ & \vdots \\ y = J & \text{ if } y^* > \alpha_J \end{aligned} \quad [3]$$

Given the standard normal assumption for  $e$ , the conditional distribution of  $y$  given  $x$  is derived straightforward. The computation of each response probability is as below:

$$\begin{aligned}
 P(y = 0|x) &= P(y^* \leq \alpha_1|x) = P(x\beta + e \leq \alpha_1|x) = \Phi(\alpha_1 - x\beta) \\
 P(y = 1|x) &= P(\alpha_1 < y^* \leq \alpha_2|x) = \Phi(\alpha_2 - x\beta) - \Phi(\alpha_1 - x\beta) \\
 &\cdot \\
 &\cdot \\
 &\cdot \\
 P(y = J - 1|x) &= P(\alpha_{J-1} < y^* \leq \alpha_J|x) = \Phi(\alpha_J - x\beta) - \Phi(\alpha_{J-1} - x\beta) \\
 P(y = J|x) &= P(y^* > \alpha_J|x) = 1 - \Phi(\alpha_J - x\beta)
 \end{aligned}
 \tag{4}$$

When  $J=1$  we obtain the binary model  $P(y = 1|x) = 1 - P(y = 0|x) = 1 - \Phi(\alpha_1 - x\beta) = \Phi(x\beta - \alpha_1)$ , and so  $-\alpha_1$  is the intercept inside  $\Phi$ . It is for this reason that  $x$  does not contain an intercept in the formulation of the ordered probit model. The parameters  $\alpha$  and  $\beta$  can be estimated by using Maximum Likelihood Estimation procedure. For each  $i$ , the lod-likelihood function is

$$\begin{aligned}
 \ell_i(\alpha, \beta) &= 1[y = 0] \log[\Phi(\alpha_1 - x_i\beta)] + 1[y = 1] \log[\Phi(\alpha_2 - x_i\beta) - \Phi(\alpha_1 - x_i\beta)] \\
 &+ \dots + 1[y_i = J] \log[1 - \Phi(\alpha_J - x_i\beta)]
 \end{aligned}
 \tag{5}$$

Replacing  $\Phi$  with the logit function,  $\Lambda$ , will give the **ordered logit model**. The sign of estimates coefficients from the ordered probit (logit) models have the exact meaning with the result of OLS estimations. The negative sign determines whether the choice probabilities shift to lower categories when the independent variable increases. The result of estimate coefficients particularly on a partial effect of independent variables, however, cannot be interpreted directly as the result of Ordinary Least Square (OLS) estimation. In most cases, we are interested in the response probabilities or partial effects  $P(y = j|x)$  of the ordered probit model.

$$\begin{aligned}
 \partial p_0(x) / \partial x_k &= -\beta_k \phi(\alpha_1 - x\beta); \\
 \partial p_j(x) / \partial x_k &= \beta_k [\phi(\alpha_{j-1} - x\beta) - \phi(\alpha_j - x\beta)]; \\
 \partial p_j(x) / \partial x_k &= \beta_k \phi(\alpha_j - x\beta), \quad 0 < j < J
 \end{aligned}
 \tag{6}$$

The formula for the response probabilities of the ordered logit model is similar to the ordered probit model.

This study intended to apply the ordered logit model rather than the ordered probit model since the distribution of error is assumed following the standard logistic. The logistic distribution function is similar to the normal distribution function but has a much simpler form. The ordered logit model in Equation 1 is estimated using three sample groups: Java-Bali, outside Java-Bali and National (All Sample). Although the analysis of poverty dynamics focuses on the national level, separating the sample helps to show the consistency and robustness of estimation results. This also checks whether there are significant differences of poverty characteristics between Java-Bali and outside Java-Bali<sup>5</sup>.

### **Descriptive Data Analysis**

Table 3 shows that households, based on their poverty experience, are divided into four groups: poor (292 households), transient poor (-) (509 households), transient poor (+) (769 households) and non-poor (7.156 households). We observed that the poor group has the following characteristics: they are uneducated or have attained a low educational attainment; they are living in the rural area, highly dependent on the agricultural sector (around 80%) and in the informal sector (around 84%); and they either own a small area of land or are landless households. Compared with the other groups, the poor group is excluded from modern utility sources. Nearby, 40% of the poor group does not connect to electricity.

Around 28% of households experienced the negative economic risks and a few of them has been using saving instruments to cope with these shocks. Daily activities of poor households are disrupted around 6.4 days/month due to health problems. However, only a few of them who experienced the negative shocks, either economic risks or

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<sup>5</sup> This study also wants to estimate the determinants of poverty status (under the lower poverty line) to check the robustness of regression estimates since the poverty incidence and the grouping of poverty status are sensitive to the applied poverty line. However, the proportion of poverty status (under the lower poverty line) to total sample is not representative. At the national level, the proportions of poor, transient poor (-), transient poor (+) and non-poor are 0.42%, 1.78%, 2.82% and 94.98% respectively. Hence, the regression estimates of determinants of poverty status (under the lower poverty line) may result biased estimates. Therefore, the robustness of estimates is checked using three different samples: Java-Bali, Outside Java-Bali and National.

health shocks, received government assistance such as the cheap rice (RASKIN) and health insurance targeted to the poor (ASKESKIN). In the poor group, almost 13% of households experienced positive shocks of improvement of public facilities in their surrounding living area. In addition, during 2005-2007, the number of household members averagely decreased by 0.065 people or almost no change in the number of household members. Households who are changing in working sectors from agricultural sectors to non-agricultural sectors and changing in employment status from formal sectors to informal sectors are both 11.3% on average. Interestingly none of the households in poor group received microcredit either from the government or from other sources. They are totally excluded from access to financial services.

**TABLE 3 Descriptive Data of Poverty Status**

Variable	Poor		Transient Poor (-)		Transient Poor (+)		Non-Poor	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
<b>Demographic Variables in 2005</b>								
1. Marital Status of Household Head (1 = marriage; 0= others)	0.880	0.325	0.853	0.355	0.871	0.335	0.849	0.359
2. Age of Household Head (in years)	47.428	14.281	46.171	14.903	47.429	14.232	45.533	13.709
3. Education Attainment of Household Head (years of schooling)	4.736	3.152	5.096	3.365	5.646	3.191	6.908	4.377
4. Number of Household Member (number of people)	4.719	1.787	4.057	1.744	4.879	1.774	3.853	1.597
5. Dummy of Island (1= Java and Bali; 0= outside Java and Bali)	0.490	0.501	0.477	0.500	0.432	0.496	0.546	0.498
6. Dummy of Location (1= Urban; 0= Rural)	0.045	0.207	0.063	0.243	0.349	0.477	0.463	0.499
<b>Socio-Economic Variables in 2005</b>								
7. Working Sector of Household Head (1= agricultural sectors; 0= others)	0.805	0.397	0.719	0.450	0.636	0.481	0.446	0.497
8. Employment Status (1= formal sectors; 0= others)	0.158	0.365	0.179	0.384	0.173	0.378	0.303	0.460
9. Land Ownership (in hectare)	0.639	0.789	0.858	1.186	0.737	1.264	0.519	1.593
10. Size of House (in square meter)	59.774	50.192	58.165	27.923	56.671	55.954	70.317	65.373
11. Household with a Family Member Working as Migrant Workers (TKI) (1= having TKI; 0= others)	0.038	0.191	0.043	0.204	0.038	0.191	0.045	0.207
12. Access to Electricity for Illuminating Energy (1= no access to electricity; 0= having access to electricity)	0.390	0.489	0.269	0.444	0.270	0.444	0.100	0.301
<b>Shocks &amp; Risks and Policy Variables in 2005</b>								
13. Economic Shocks and Risks (ECSHRS) (1= experiences with disaster, price falls, crop loss and employment loss; 0= no experiences)	0.284	0.452	0.257	0.438	0.233	0.423	0.158	0.365
14. Cheap Rice (RASKIN) as a Safety Net to Cope with Economic Shocks and Risks (ECSHRS) (1= experiencing ECSHRS and receiving RASKIN; 0= others)	0.021	0.142	0.016	0.125	0.027	0.163	0.007	0.083
15. Daily Activities Disrupted by Health Problems for All Family Members (days in a month)	6.363	11.203	4.450	8.607	4.849	8.705	3.729	7.800
16. Insurance to Cope with Health Problems (1= having Health Insurance Targeted to the Poor (ASKESKIN); 0= others)	0.038	0.191	0.028	0.164	0.023	0.151	0.010	0.098
17. Saving as a Coping Strategy to Cope with Economic Risks and Health Shocks (ECSHRS) (1= having saving; 0= no saving)	0.007	0.083	0.006	0.077	0.021	0.143	0.026	0.159
18. Microcredit (1= receiving microcredit; 0= no credit)	0.000	0.000	0.026	0.158	0.016	0.124	0.032	0.177
19. Source of Microcredit (1= government; 0= others)	0.000	0.000	0.008	0.088	0.005	0.072	0.010	0.101
20. Family Member Gaining Employment (1= gaining employment; 0= others)	0.062	0.241	0.045	0.208	0.099	0.299	0.080	0.271
21. Improvement of Public Facilities in Surrounding Living Area (1= improving public facilities ; 0= others)	0.130	0.337	0.092	0.290	0.082	0.274	0.096	0.294
<b>Change Variables during 2005-2007</b>								
22. Change in Number of Household	-0.065	1.273	0.639	1.502	-0.585	1.672	0.070	1.531
23. Change in Marital Status (1= divorce; 0= others)	0.055	0.228	0.045	0.208	0.062	0.242	0.055	0.229
24. Change in Working Sectors (1= agricultural sectors to non-agricultural sectors; 0= others)	0.113	0.317	0.110	0.313	0.134	0.341	0.140	0.347
25. Change in Employment Status (1= formal sectors to non-formal sectors; 0= others)	0.113	0.317	0.138	0.345	0.081	0.272	0.119	0.324
26. Change in Access to Electricity for Illuminating Energy (1= gaining access in 2007 but not in 2005; 0= others)	0.106	0.309	0.079	0.269	0.131	0.338	0.045	0.206
27. Change in Credits (1= receiving credit in 2007 but not in 2005; 0= others)	0.027	0.164	0.037	0.190	0.053	0.225	0.071	0.257
<b>Number of Observation</b>	<b>292</b>		<b>509</b>		<b>769</b>		<b>7,156</b>	

Source: Authors' calculation based on the balanced panel of Susenas 2005 and 2007

**TABLE 4 Descriptive Data used in the Ordered Logit Model**

Variable	Java and Bali		Outside Java and Bali		National	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
<b>Demographic Variables in 2005</b>						
1. Marital Status of Household Head (1 = marriage; 0= others)	0.850	0.358	0.854	0.353	0.852	0.355
2. Age of Household Head (in years)	46.727	14.030	44.755	13.589	45.801	13.859
3. Education Attainment of Household Head (years of schooling)	6.511	4.265	6.739	4.216	6.618	4.243
4. Number of Household Member (number of people)	3.785	1.538	4.208	1.760	3.984	1.660
5. Dummy of Island (1= Java and Bali; 0= outside Java and Bali)					0.530	0.499
6. Dummy of Location (1= Urban; 0= Rural)	0.506	0.500	0.314	0.464	0.416	0.493
<b>Socio-Economic Variables in 2005</b>						
7. Working Sector of Household Head (1= agricultural sectors; 0= others)	0.410	0.492	0.581	0.493	0.490	0.500
8. Employment Status (1= formal sectors; 0= others)	0.299	0.458	0.258	0.438	0.280	0.449
9. Land Ownership (in hectare)	0.227	1.091	0.940	1.833	0.562	1.528
10. Size of House (in square meter)	73.383	62.547	62.038	62.368	68.052	62.716
11. Household with a Family Member Working as Migrant Workers (TKI) (1= having TKI; 0= others)	0.042	0.200	0.046	0.209	0.044	0.205
12. Access to Electricity for Illuminating Energy (1= no access to electricity; 0= having access to electricity)	0.027	0.161	0.257	0.437	0.135	0.342
<b>Shocks &amp; Risks and Policy Variables in 2005</b>						
13. Economic Shocks and Risks (ECSHRS) (1= experiences with disaster, price falls, crop loss and employment loss; 0= no experiences)	0.161	0.368	0.190	0.393	0.175	0.380
14. Cheap Rice (RASKIN) as a Safety Net to Cope with Economic Shocks and Risks (ECSHRS) (1= experiencing ECSHRS and receiving RASKIN; 0= others)	0.006	0.076	0.014	0.118	0.010	0.098
15. Daily Activities Disrupted by Health Problems for All Family Members (days in a month)	3.737	7.668	4.208	8.527	3.958	8.086
16. Insurance to Cope with Health Problems (1= having Health Insurance Targeted to the Poor (ASKEKIN); 0= others)	0.011	0.104	0.015	0.122	0.013	0.113
17. Saving as a Coping Strategy to Cope with Economic Risks and Health Shocks (ECSHRS) (1= having saving; 0= no saving)	0.027	0.163	0.019	0.137	0.024	0.152
18. Microcredit (1= receiving microcredit; 0= no credit)	0.046	0.209	0.011	0.104	0.029	0.169
19. Source of Microcredit (1= government; 0= others)	0.016	0.125	0.002	0.044	0.009	0.096
20. Family Member Gaining Employment (1= gainin employment; 0= others)	0.082	0.274	0.075	0.264	0.079	0.269
21. Improvement of Public Facilities in Surrounding Living Area (1= improving public facilities; 0= others)	0.102	0.303	0.088	0.283	0.095	0.294
<b>Change Variables during 2005-2007</b>						
22. Change in Number of Household	0.071	1.416	0.007	1.693	0.041	1.553
23. Change in Marital Status (1= divorce; 0= others)	0.049	0.216	0.063	0.242	0.055	0.229
24. Change in Working Sectors (1= agricultural sectors to non-agricultural sectors; 0= others)	0.136	0.343	0.138	0.345	0.137	0.344
25. Change in Employment Status (1= formal sectors to non-formal sectors; 0= others)	0.117	0.322	0.116	0.320	0.117	0.321
26. Change in Access to Electricity for Illuminating Energy (1= Gaining access in 2007 but not in 2005; 0= others)	0.016	0.127	0.101	0.302	0.056	0.230
27. Change in Credits (1= receiving credit in 2007 but not in 2005; 0= others)	0.080	0.272	0.050	0.218	0.066	0.248
<b>Poverty Status</b>						
Poor		143		149		292
Transient Poor (-)		243		266		509
Transient Poor (+)		332		437		769
Non-Poor		3,908		3,248		7,156
<b>Number of Observation</b>		<b>4,626</b>		<b>4,100</b>		<b>8,726</b>

Source: Authors' calculation based on the balanced panel of Susenas 2005 and 2007



In the case of the transient poor (-) group, the demographic characteristics and socio-economic variables are slightly better than those of the poor group. This group has higher educational attainment, better access to electricity and owns larger areas of land (0.86 hectare). Households experiencing economic risks and health shocks are lower than poor group. Daily activities disrupted by health shocks are two days lower than the poor group. This study finds that the major variable changes faced by the transient (-) group during 2005-2007 was an increase of one household member, change in employment status from formal sectors to the informal sector (14%).

In contrast to the transient poor (-) group, the transient poor (+) group has mostly completed elementary school, lives in an urban area (35%), has better access to electricity, has a low percentage working in agricultural sectors, has a low percentage of households experiencing economic and health risks and has sufficient savings to cope with economic and health risks. The greatest difference between the transient (+) group and the two previous groups is a decrease of almost one household members, a larger proportion of households receiving microcredit, a higher proportion of households gaining access to electricity and a low percentage of households moving from formal sectors to informal sectors.

Lastly, the non-poor group has different characteristics compared to the other three groups. They are more educated households, with almost the majority having completed junior high school; they have fewer household members, live in urban area; they have a better connection to electricity (90%), less experience of economic risks and health shocks and have enough savings to cope with negative shocks. The daily activities of households in this group are disrupted by health shocks only 3.7 days in a month, around half of that experienced by the poor group. Furthermore, they are working in formal sectors and non-agricultural sectors so the income is less volatile and does not depend on assistance from the government.

Table 4 shows that households, based on the living location, are divided into three sub groups: Java-Bali (53%), outside Java-Bali (47%) and National. Households living in Java-Bali could be classified as poor (3.1%), transient poor (-) (5.25%), transient poor (+) (7.18%) and non-poor (84.48%). Households living outside Java-Bali could be classified as poor (3.63%), transient poor (-) (6.49%), transient poor (+) (10.66%) and non-poor (79.22%). These figure show that households outside Java-Bali

are more vulnerable to being transient poor, both (-) and (+), compared to households in Java-Bali.

The significant differences between households living in Java-Bali and outside Java-Bali are that households outside Java-Bali have more family members (4.2 people), mostly live in a rural area (69%) and have a wider agricultural land (almost 1 hectare). Almost 97% households in Java-Bali are connected to electricity while only 74% households outside Java-Bali have electricity connections for their sources of illuminating energy. Furthermore, households outside Java-Bali experienced more economic risks and health shocks than households in Java-Bali. Around 19% of household outside Java-Bali experienced economic risks and shocks while only 16% of households in Java-Bali experienced them. Daily activities of households outside Java-Bali are disturbed a half day more than households in Java-Bali due to health shocks.

#### **THE DETERMINANTS OF POVERTY DYNAMICS IN INDONESIA**

This study estimated three models: Java-Bali (MODEL 1), Outside Java-Bali (MODEL 2) and National (MODEL 3). The aim of separating the sample is to ensure the consistency and robustness of estimation. The models are estimated using the maximum likelihood estimation with robust standard errors. The estimation results of the ordered logit model are shown in Table 5 and Table 6. The signs of coefficients in the three models are almost the same except in the following variables: age of household head (outside Java-Bali), economic shocks and risks (outside Java-Bali), source of microcredits (outside Java-Bali) and change in marital status (Java-Bali). All models show that the Wald Chi-Square statistics of Log likelihood of ordered logit model are statistically significant indicating at least one of the covariates or independent variables affects the poverty status of households. Generally, the built ordered logit models of the poverty dynamics show their consistency and robustness.

The Pseudo R-squared ranges from 11.05% to 14.62%. These values seem too small but are often found in household data analysis either using OLS or a non-linear model, i.e. discrete choice model or categorical outcome variables due to a larger

variation on household data<sup>6</sup>. Another possible reason for the low value of Pseudo R-squared on these estimates is that most predictors (independent variables) are dummy variables (not continuous variables) so it will not improve greatly the log likelihood. The Pseudo R-squared of many studies on poverty dynamics is also ranging from 19% (Alisjahbana and Yusuf, 2003), 10% and 26.46% (Cruces and Wodon, 2003), and 7.87% and 14.00% (McCulloch and Calandrino, 2003).

Table 6 shows the partial effects (dy/dx) of changes in a probability of households being poor, transient poor (-), transient poor (+) and non-poor responding to change in independent variables (predictors). The partial effects (the predicted probability of household poverty status) evaluated at means of independent variables ( $y = j|x$ ). The probability of households in Java-Bali being poor, transient poor (-), transient poor (+) and non-poor are 1.5%, 3.2%, 5.4% and 89.9% respectively. On the other hand, the probability of households outside Java-Bali being poor, transient poor (-), transient poor (+) and non-poor are 2.2%, 4.7%, 9.5% and 83.6% respectively. If the household characteristics are the same as the average value of the sample, the probability of households being non-poor is almost 90% in Java-Bali and 84% outside Java-Bali while the probability of households being poor is 1.5% in Java-Bali and 2.2% outside Java-Bali. Furthermore, households living outside Java-Bali have a higher probability of being either transient poor (-) or transient poor (+) than households living in Java-Bali.

### **Demographic Variables**

All models statistically confirmed the demographic variables such as the number of household members, educational attainment (years of schooling) and location are the important factors in distinguishing the poverty status of households. In addition,

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<sup>6</sup> The evaluation of the goodness of fit of logistic regression (discrete outcome variables) is evaluated based on Pseudo R<sup>2</sup> with the higher value indicating a better model fit. One approach of calculating Pseudo R<sup>2</sup> adapted by the STATA software package is McFadden's mirror approaches 1 and 2. McFadden Approach and McFadden Approach Adjusted are  $R^2 = 1 - \frac{\ln \hat{L}(M_{full})}{\ln \hat{L}(M_{inc.})}$  and  $R^2 = 1 - \frac{\ln \hat{L}(M_{full}) - K}{\ln \hat{L}(M_{inc.})}$ , respectively; where  $\hat{L}$  is estimated likelihood;  $M_{full}$  is model with predictors;  $M_{inc.}$  is model without predictors (only intercept) and  $K$  is number of predictors.

the variables of marital status and age of the household head are both statistically significant influencing the poverty status at a national level (MODEL 3) but not in MODEL 1 (Marital Status) and MODEL 2 (Age). Married households outside Java-Bali have a higher probability being non-poor. This is because most of the households outside Java-Bali are working in the agricultural sectors, labour intensive; so a married household has more labour supply to produce more outputs or incomes than a single household.

Table 6 shows an increase in number of household member decrease the probability of being non-poor by 4.6% while this increases the probability being poor, transient poor (-) and transient poor (+) by 0.8%, 1.5% and 2.4% respectively (MODEL 3). This finding is similar to Herrera (1999), Haddad and Ahmed (2003), Woolard and Klasen (2005). Given a fixed income, an increase in the number of members forced the households to reduce their consumption and to support the additional member(s). Meanwhile, a better education raises the probability of being non-poor because a higher-education level provides a higher opportunity for a better job and higher income. These findings confirmed the conclusions of other studies such as Adam and Jane (1995), Jalan and Ravallion (1998), McCulloch and Baulch (2000), Alisjahbana and Yusuf (2003), Bigsten *et al.* (2003), Mango *et al.* (2004), and Widyanti *et al.* (2009).

Dummy of location has an ability to distinguish the poverty status of households in three models. Those living in urban areas have a higher probability of being non-poor. These findings of location dummy significantly influencing the poverty status in Indonesia confirmed other study findings in countries such as Bigsten *et al.* (2003), Fields *et al.* (2003), Okidi and McKay (2003) and Kedir and McKay (2005). Urban areas where most industries and economic activities are located provide more job opportunities either in the formal or informal sector.

### **Socio-Economic Variables**

As many studies have found, households working in the agricultural sector have a tendency of being poor due to low productivity and wage rates. The probability of being poor of household working in the agricultural sectors increases by 1.3% (Java-Bali), 1.1% (outside Java-Bali) and 1.4% (National) (Table 6). Furthermore, households that are working in formal sectors have a higher probability of being non-poor. The definition of formal sectors is that the household head is working in an

agency/office/company with a fixed salary either in cash or in goods. Those working in formal sectors increase their probability of being non-poor by 5.8% (National), 6.8% (outside Java-Bali) and 4.6% (Java-Bali). This is because formal sectors guarantee a stable income and pay higher wage rates than the informal sectors. Kedir and McKay (2005) also confirmed that those who are working as waged employees have a better probability to escape from poverty in Rural Ethiopia.

On the other hand, because of the lack of job opportunities in Indonesia, individuals who could not find jobs in the formal sectors and start a business (entrepreneur) are forced to either work in domestic informal sectors with a low wage rate or to work outside Indonesia as migrant workers. Most migrant workers are also working in informal sectors as domestic helpers, but they are paid a higher wage rate. This study confirmed that households having a family member working outside Indonesia tend to be non-poor due to remittances that can form either family transfers to support basic needs or entrepreneur capital transfers to support their families to start up a business. Hall (2007) also showed remittances have an important role in the poverty dynamics in Latin America. This variable, however, is insignificant in the sample of outside Java-Bali.

Land ownership as an indicator of physical assets significantly affects the poverty status of households. Three models show that one hectare increase in land will increase the probability of being non-poor between 1.6% (Java-Bali), 1.3% (outside Java-Bali) and 1.7% (National). Landless and small landholder households tend to be chronic poor since their productive assets are inadequate to increase their income. Land reforms to increase the ownership of productive assets of poor households should be considered as a policy alternative to alleviate chronic poverty. This finding is similar to the discoveries of Adam and Jane (1995), Jalan and Ravallion (1998), McCulloch and Baulch (2000), Haddad and Ahmed (2003), and Woolard and Klasen (2005). The size of a house as one indicator of physical assets can also determine the poverty status of households. A larger size of a house will increase the probability of being non-poor. Both findings imply that certification of agricultural land and house ownership is among possible policy alternatives to alleviate poverty. The certification would legalize land and house ownership that could be utilized as collateral for gaining productive credit from the formal institution.

Other socio-economic variables such as access to modern utilities of electricity significantly increase a probability to climb out of poverty. The unit cost of lighting with electricity is cheaper per kilowatt-hour than lighting with candles or oil lamp. Therefore, households can save energy expenditure that can potentially be reallocated to income-generating activities or, in the case of children, to education. This can ultimately serve to free households from poverty. Table 4 shows that households in Java-Bali have better access to electricity than households outside Java-Bali due to a better availability of electricity grid. A lack of access to electricity of households outside Java-Bali is more due to a lack of availability of electricity grid rather than the inability of the household to pay a connection fee (LPEM FEUI, PSE-KPUGM, PSP-IPB, 2004b). Thus, the government should widen access to electricity especially for households outside Java-Bali as one of its poverty alleviation policies.

### **Shocks, Risks and Government Assistance**

Low income groups in most developing countries usually face volatility in consumption due to external shocks, either positive or negative. Dartanto and Nurkholis (2010) found that households in a rural area of Kebumen, Indonesia are vulnerable from negative shocks and they will respond differently to negative shocks depending on consumption structure, asset ownership, cattle ownership and family assistance.

Interestingly, this study found that there are significant differences in behaviours between households living in Java-Bali and outside Java-Bali responding to economic risks and health shocks. Households living in Java-Bali are more vulnerable to negative shocks while households living outside Java-Bali are relatively resilient to negative shocks. Even so, households outside Java-Bali experienced more negative shocks than households in Java-Bali (Table 4) but the estimation results showed that the coefficients of economic risks and health shocks are statistically insignificant affecting the poverty status of households outside Java-Bali. This might be due to households outside Java-Bali generally working in agricultural sectors and owning larger lands. They, therefore, could reduce agricultural risks such as crop loss and price fall through a diversification in agricultural cultivations.

**TABLE 5 Estimation Results of Ordered Logit Model**

Variable	MODEL 1: Java and Bali		MODEL 2: Outside Java and Bali		MODEL 3: National	
	Coeff.	Robust Std. Error	Coeff.	Robust Std. Error	Coeff.	Robust Std. Error
<b>Demographic Variables in 2005</b>						
1. Marital Status of Household Head (1 = marriage; 0= others)	0.198	0.145	0.295	0.134**	0.239	0.097***
2. Age of Household Head (in years)	-0.007	0.004*	0.004	0.004	-0.002	0.003***
3. Education Attainment of Household Head (years of schooling)	0.079	0.012***	0.052	0.011***	0.068	0.008***
4. Number of Household Member (number of people)	-0.431	0.032***	-0.421	0.028***	-0.402	0.021***
5. Dummy of Island (1= Java and Bali; 0= outside Java and Bali)					-0.410	0.073***
6. Dummy of Location (1= Urban; 0= Rural)	1.283	0.105***	0.291	0.115**	0.868	0.079***
<b>Socio-Economic Variables in 2005</b>						
7. Working Sector of Household Head (1= agricultural sectors; 0= others)	-0.822	0.109***	-0.540	0.113***	-0.720	0.077***
8. Employment Status (1= formal sectors; 0= others)	0.544	0.161***	0.544	0.161***	0.544	0.113***
9. Land Ownership (in hectare)	0.182	0.091**	0.095	0.033***	0.149	0.032***
10. Size of House (in square meter)	0.006	0.002***	0.007	0.003**	0.006	0.002***
11. Household with a Family Member Working as Migrant Workers (TKI) (1= having TKI; 0= others)	0.716	0.247***	0.097	0.219	0.337	0.159**
12. Access to Electricity for Illuminating Energy (1= no access to electricity; 0= having access to electricity)	-1.984	0.290***	-1.033	0.124***	-0.916	0.108***
<b>Shocks &amp; Risks and Policy Variables in 2005</b>						
13. Economic Shocks and Risks (ECSHRS) (1= experiencing with disaster, price falls, crop loss and employment loss; 0= no experiences)	-0.377	0.111***	0.005	0.114	-0.173	0.079**
14. Cheap Rice (RASKIN) as a Safety Net to Cope with Economic Shocks and Risks (ECSHRS) (1= experiencing ECSHRS and receiving RASKIN; 0= others)	-0.241	0.378	-0.204	0.282	-0.107	0.229
15. Daily Activities Disrupted by Health Problems for All Family Members (days in a month)	-0.010	0.005**	-0.007	0.005	-0.007	0.004*
16. Insurance to Cope with Health Problems (1= having Health Insurance Targeted to the Poor (ASKESKIN); 0= others)	-1.164	0.280***	-0.337	0.307	-0.646	0.212***

**TABLE 5 Estimation Results of Ordered Logit Model (Continued)**

Variable	MODEL 1: Java and Bali		MODEL 2: Outside Java and Bali		MODEL 3: National	
	Coeff.	Robust Std. Error	Coeff.	Robust Std. Error	Coeff.	Robust Std. Error
<b>Shocks &amp; Risks and Policy Variables in 2005 (Continued)</b>						
17. Saving as Coping Strategy to Cope with Economic Risks and Health Shocks (1= having saving; 0= no saving)	0.558	0.309*	0.653	0.368*	0.596	0.243***
18. Microcredit (1= receiving microcredit; 0= no credit)	0.920	0.382**	0.118	0.400	0.639	0.278**
19. Source of Microcredit (1= government; 0= others)	-0.254	0.608	0.475	1.049	0.085	0.492
20. Family Member Gaining Employment (1= gaining employment; 0= others)	0.364	0.173**	0.062	0.156	0.219	0.115*
21. Improvement of Public Facilities in Surrounding Living Area (1= improving public facilities; 0= others)	-0.318	0.136**	0.601	0.178***	0.092	0.108
<b>Change Variables during 2005-2007</b>						
22. Change in Number of Household	-0.152	0.031***	-0.184	0.026***	-0.160	0.020***
23. Change in Marital Status (1= divorce; 0= others)	0.048	0.218	-0.342	0.176**	-0.190	0.135
24. Change in Working Sectors (1= agricultural sectors to non-agricultural sectors; 0= others)	0.528	0.148***	0.240	0.129*	0.393	0.096***
25. Change in Employment Status (1= formal sectors to non-formal sectors; 0= others)	-0.265	0.213	-0.675	0.194***	-0.500	0.141***
26. Change in Access to Electricity for Illuminating Energy (1= getting access in 2007 but not in 2005; 0= others)	1.318	0.356***	0.151	0.137	0.150	0.128
27. Change in Credits (1= receiving credit in 2007 but not in 2005; 0= others)	0.431	0.179**	0.826	0.237***	0.531	0.138***
/cut0	-4.510	0.289***	-4.614	0.275***	-4.631	0.200***
/cut1	-3.327	0.288***	-3.430	0.270***	-3.465	0.197***
/cut2	-2.496	0.282***	-2.460	0.265***	-2.576	0.193***
<b>Number of Observation</b>	<b>4,626</b>		<b>4,100</b>		<b>8,726</b>	
<b>Log Pseudolikelihood</b>	<b>-2,345.27</b>		<b>-2,629.68</b>		<b>-5,055.63</b>	
<b>Wald Chi-Squared</b>	<b>708.78</b>		<b>561.21</b>		<b>1,102.26</b>	
<b>Pseudo R-Squared</b>	<b>0.1462</b>		<b>0.1105</b>		<b>0.1170</b>	

Source: Authors' Estimates. \*, \*\*, \*\*\* are significant at 10%, 5% and 1% respectively.



Households in Java-Bali experiencing economic risks resulting from crop loss, job loss and price falls have a tendency to be poor and transient poor. Moreover, health shocks represented by a number of daily activities disrupted by health problems are significantly affecting the poverty status of households. Those experiencing these shocks tend to be poor. This finding is consistent with Contreras *et al.* (2004) in Chile. However, three models confirmed households experiencing either economic or health shocks and having enough savings should be able to cope with these shocks easily and to keep their poverty status as non-poor household. MODEL 3 shows that having savings will decrease the probability of being poor and transient poor (-) by 0.9% and 1.7% respectively (MODEL 3).

This study includes only four types of government assistance: cheap rice (RASKIN), health insurance targeted to the poor (ASKESKIN), microcredit and improvement of public facilities due to data availability in the Susenas panel dataset and considering the relation with shocks. Even so, the interaction variable of cheap rice (RASKIN) and economic shocks and risks (ECSHRS) does not statistically affect the poverty status of households but the probability of households being poor decreases from 0.6% to 0.4% when the government distributed cheap rice to households in Java-Bali who are experiencing economic risks and shocks (ECSHRS). This study confirmed Sumarto *et al.*'s (2005) findings that the subsidized rice programme appears to reduce the risk of poverty. Further, the probabilities of being poor and transient poor (-) for those who are experiencing health shocks and receiving ASKESKIN in Java-Bali are 3.1% and 5.7% correspondingly.

Unexpected results that statistical evidences do not confirm the effectiveness of both policies to protect the poor might be due to wrong targets and uneven distribution of government assistance as indicated in Table 3 and Table 4. The proportions of households experiencing health problems and receiving health insurance targeted for the poor (ASKESKIN) are 3.8% of the poor group, 2.8% of the transient poor (-) group, 2.3% of the transient poor (+) group and 1% of the non-poor group. Similar proportions are also found in the case of households experiencing economic shocks and risks (ECSHRS) and receiving cheap rice (RASKIN). Approximately 7.4% of poor households that experienced economic shocks and risks received cheap rice (RASKIN). At the disaggregate regional level, the proportions of government assistance (RASKIN and ASKESKIN) received by households experiencing economic shocks, risks and

health shocks are also relatively small. These facts should encourage the government to improve the distribution of assistance. The government should not only focus on providing assistance based on the poverty condition but also pay attention to such shocks/events experienced by households.

On the contrary, microcredit is well functioned as a poverty alleviation programme, particularly in Java-Bali. This may simply reflect households living in Java-Bali have better access to this programme. The proportion of households receiving microcredit in Java-Bali is 4.6% while only 1.1% of households living outside Java-Bali received this programme. The positive coefficient of microcredit in all three models marks that households receiving credit programmes tend to be non-poor. Microcredit either coming from the government or from others is not necessary related to the poverty status. This finding confirmed that microcredit has an important role in alleviating poverty in Indonesia. Deploying accesses to either microcredit or financial institutions particularly outside Java-Bali might significantly speed up the poverty reduction in this area. Moreover, the positive shock of obtaining jobs improves the poverty status of households. Gaining an employment is identical with increased income or expenditure in that both can lift the household from poverty. If a household member can find a job, the probability of being poor in Java-Bali and nationally will decrease by 0.5% and 0.4% respectively. This confirmed Fields *et al.*'s (2003) findings that gaining a job would lift the household out of poverty in Indonesia.

In addition, the improvement of public facilities such as the development of bridges and roads has a positive effect on poverty alleviation, particularly outside Java-Bali where these regions often face infrastructure bottlenecks. The probability of households being non-poor outside Java-Bali increases by 6.9% along with the development of public facilities in this area. In contrast to the finding outside Java-Bali, the estimation result is quite surprising in that infrastructure developments in Java-Bali do not have a positive impact on improving the poverty status. This is most likely because Java-Bali is a well-developed region that already had good infrastructures. Thus, new constructions such as toll roads sometimes lead to either land acquisitions or eviction of residents. Another example, the renovation of traditional markets into modern markets occasionally marginalizes previous traders because of their inability to afford the new price of buildings. These conditions might send households living in Java-Bali into poverty.

### **Changes in Household Indicators during 2005-2007**

Lastly, this part discusses the impact on poverty status of some changes in demographic, socio-economic and government assistance variables during 2005 to 2007. An increase of one family member decreases the probability of the household being non-poor by 1.9% at a national level. An increase of one family member is associated with falling into poverty since a given amount of resources needs to be redistributed to support the new member. Households with a high dependent ratio could not save and allocate the resources into other productive activities to assist them in moving out of the poverty. This finding should encourage government at any level to continuously and actively promote a family planning programme. Change in the demographic variable of marital status due to divorce is also positively increasing the probability of households being poor and transient poor (-) outside Java-Bali but not in Java-Bali. A divorce results in the loss of productive family members, either the mother or father that might reduce household ability and capacity in terms of economic power. This is consistent with Woolard and Klasen's (2005) finding that female headed households tend to fall into poverty in South Africa.

Further, change in working status from an agricultural to a non-agricultural sector increases the probability of households being non-poor. Non-agricultural sectors theoretically pay higher and more stable wage rates. Therefore, households are able to increase and smooth their consumption level. Those who are able to find a job in a non-agricultural sector will increase their probability of being non-poor by 4.1% (Java-Bali), 3.1% (outside Java-Bali) and 4.1% (National). A structural reform through either changing the economic basis from agriculture into non-agriculture or changing traditional agriculture into an agriculture-based industry should be considered as an important policy to alleviate poverty. Meanwhile, a change in employment status from the formal sector into the informal sector sends a previously non-poor household into poverty. Households experiencing layoffs and finding new jobs either as an employee or as self-employment in informal sectors is associated with a higher probability of being either poor or transient poor (-). Those experiencing layoffs and finding new jobs in the informal sector will decrease their probability of being non-poor by 6.6% at a national level.

**TABLE 6 Estimation of Partial Effect (dy/dx)**

Variable	MODEL 1: Partial Effects (dy/dx) Java and Bali				MODEL 2: Partial Effects (dy/dx) Outside Java and Bali				MODEL 3: Partial Effects (dy/dx) National			
	Poor	Transient Poor (-)	Transient Poor (+)	Non- Poor	Poor	Transient Poor (-)	Transient Poor (+)	Non- Poor	Poor	Transient Poor (-)	Transient Poor (+)	Non- Poor
<b>Demographic Variables in 2005</b>												
1. Marital Status of Household Head (1 = marriage; 0= others)	-0.003	-0.006	-0.010	0.019	-0.007	-0.014	-0.022	0.043	-0.005	-0.010	-0.015	0.029
2. Age of Household Head (in years)	0.000	0.000	0.000	-0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000
3. Education Attainment of Household Head (years of schooling)	-0.001	-0.002	-0.004	0.007	-0.001	-0.002	-0.004	0.007	-0.001	-0.003	-0.004	0.008
4. Number of Household Member (number of people)	0.006	0.013	0.020	-0.039	0.009	0.018	0.031	-0.058	0.008	0.015	0.024	-0.046
5. Dummy of Island (1= Java and Bali; 0= outside Java and Bali)									0.008	0.015	0.024	-0.047
6. Dummy of Location (1= Urban; 0= Rural)	-0.020	-0.040	-0.060	0.121	-0.006	-0.012	-0.021	0.038	-0.016	-0.031	-0.049	0.096
<b>Socio-Economic Variables in 2005</b>												
7. Working Sector of Household Head (1= agricultural sectors; 0= others)	0.013	0.027	0.040	-0.080	0.011	0.022	0.038	-0.072	0.014	0.027	0.043	-0.084
8. Employment Status (1= formal sectors; 0= others)	-0.007	-0.015	-0.023	0.046	-0.011	-0.021	-0.037	0.068	-0.009	-0.018	-0.030	0.058
9. Land Ownership (in hectare)	-0.003	-0.005	-0.008	0.016	-0.002	-0.004	-0.007	0.013	-0.003	-0.006	-0.009	0.017
10. Size of House (in square meter)	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.001
11. Household with a Family Member Working as Migrant Workers (TKI) (1= having TKI; 0= others)	-0.008	-0.016	-0.026	0.050	-0.002	-0.004	-0.007	0.013	-0.006	-0.011	-0.018	0.035
12. Access to Electricity for Illuminating Energy (1= no access to electricity; 0= having access to electricity)	0.080	0.128	0.132	-0.341	0.029	0.054	0.082	-0.166	0.025	0.045	0.064	-0.134
<b>Shocks &amp; Risks and Policy Variables in 2005</b>												
13. Economic Shocks and Risks (ECSHRS) (1= experiencing with disaster, price falls, crop loss and employment loss; 0= no experiences)	0.006	0.013	0.019	-0.038	0.000	0.000	0.000	0.001	0.003	0.007	0.011	-0.021
14. Cheap Rice (RASKIN) as a Safety Net to Cope with Economic Shocks and Risks (ECSHRS) (1= experiencing ECSHRS and receiving RASKIN; 0= others)	0.004	0.008	0.012	-0.024	0.005	0.009	0.016	-0.030	0.002	0.004	0.007	-0.013
15. Daily Activities Disrupted by Health Problems for All Family Members (days in a month)	0.000	0.000	0.000	-0.001	0.000	0.000	0.000	-0.001	0.000	0.000	0.000	-0.001

**TABLE 6 Estimation of Partial Effect (dy/dx) (Continued)**

Variable	MODEL 1: Partial Effects (dy/dx) Java and Bali				MODEL 2: Partial Effects (dy/dx) Outside Java and Bali				MODEL 3: Partial Effects (dy/dx) National			
	Poor	Transient Poor (-)	Transient Poor (+)	Non- Poor	Poor	Transient Poor (-)	Transient Poor (+)	Non- Poor	Poor	Transient Poor (-)	Transient Poor (+)	Non- Poor
<b>Shocks &amp; Risks and Policy Variables in 2005 (Continued)</b>												
16. Insurance to Cope with Health Problems (1= having Health Insurance Targeted to the Poor (ASKESKIN); 0= others)	0.031	0.057	0.074	-0.162	0.009	0.016	0.026	-0.051	0.017	0.031	0.045	-0.093
17. Saving as Coping Strategy to Cope with Economic Risks and Health Shocks (1= having saving; 0= no saving)	-0.006	-0.013	-0.021	0.041	-0.011	-0.022	-0.040	0.072	-0.009	-0.017	-0.030	0.056
18. Microcredit (1= receiving microcredit; 0= no credit)	-0.009	-0.019	-0.032	0.060	-0.002	-0.005	-0.008	0.016	-0.009	-0.018	-0.031	0.059
19. Source of Microcredit (1= government; 0= others)	0.004	0.008	0.013	-0.025	-0.008	-0.017	-0.030	0.055	-0.002	-0.003	-0.005	0.009
20. Family Member gaining employment (1= gaining employment; 0= others)	-0.005	-0.010	-0.015	0.029	-0.001	-0.003	-0.004	0.008	-0.004	-0.007	-0.012	0.024
21. Improvement of Public Facilities in Surrounding Living Area (1= improving public facilities; 0= others)	0.005	0.011	0.016	-0.032	-0.010	-0.021	-0.038	0.069	-0.002	-0.003	-0.005	0.010
<b>Change Variables during 2005-2007</b>												
22. Change in Number of Household	0.002	0.005	0.007	-0.014	0.004	0.008	0.013	-0.025	0.003	0.006	0.010	-0.019
23. Change in Marital Status (1= divorce; 0= others)	-0.001	-0.001	-0.002	0.004	0.009	0.016	0.027	-0.052	0.004	0.008	0.012	-0.023
24. Change in Working Sectors (1= agricultural sectors to non-agricultural sectors; 0= others)	-0.006	-0.013	-0.021	0.041	-0.005	-0.010	-0.017	0.031	-0.007	-0.013	-0.021	0.041
25. Change in Employment Status (1= formal sectors to non-formal sectors; 0= others)	0.004	0.009	0.013	-0.026	0.019	0.035	0.054	-0.109	0.011	0.022	0.033	-0.066
26. Change in Access to Electricity for Illuminating Energy (1= gaining access in 2007 but not in 2005; 0= others)	-0.011	-0.023	-0.039	0.073	-0.003	-0.006	-0.011	0.020	-0.003	-0.005	-0.009	0.017
27. Change in Credits (1= receiving credit in 2007 but not in 2005; 0= others)	-0.005	-0.011	-0.018	0.034	-0.013	-0.026	-0.048	0.087	-0.008	-0.016	-0.027	0.052
<b>Probability (y = j   x)</b>	<b>0.015</b>	<b>0.032</b>	<b>0.054</b>	<b>0.899</b>	<b>0.022</b>	<b>0.047</b>	<b>0.095</b>	<b>0.836</b>	<b>0.019</b>	<b>0.040</b>	<b>0.074</b>	<b>0.867</b>

Source: Authors' estimation

Note: dy/dx is for discrete change of dummy variable from 0 to 1

The role of infrastructure development such as widening access to electricity in Indonesia is clearly confirmed by MODEL 1. Expanding electricity access to poor households will decrease the probability of being poor in Java-Bali by 1.1%. Increasing access to electricity can substantially enhance the productivity of households and household based micro-enterprises. Electricity makes possible the use of appliances that substantially increase productivity and hence the income generating potential of micro-enterprises (pumps, sewing machines, power tools), while information and communication technologies enhance the availability of market information and the possibility of social and political participation (LPEM FEUI, PSE-UGM, PSP-IPB, 2004a and 2004b).

Among the most interesting finding related to the changes of government assistance is that the poor group obtaining credit programmes are able to improve their standard of living and climb out of the poverty. The programme enables and equips households to start up small businesses, create job opportunities, and empower themselves. At the end, this enables them to move out from the poverty. Households receiving microcredit during 2005-2007 will increase their probability of being non-poor by 3.4% (Java-Bali), 8.7% (outside Java-Bali) and 5.2% (National). Expanding microcredit, particularly outside Java-Bali where financial institutions have not developed well yet, will accelerate the poverty reduction in Indonesia.

## **CONCLUDING REMARKS**

Observing the Susenas panel dataset of 2005 and 2007 and applying the spell approach in determining poverty status of households, we found that around 28% of poor households in Indonesia could be considered as chronic poor (remained poor in two periods) and roughly 7% of non-poor households is vulnerable to being transient poor (-). Poverty in Indonesia is a rural phenomenon and quite sensitive to change in the poverty line. A 25% increase in the poverty line causes more than a two-fold increase in the poverty rate. Further, the rural households are more vulnerable to falling into poverty than urban households. During 2005-2007, around 11% of rural non-poor households fell into poverty while only 1% of 2005 urban non-poor households did. Around 30% of poor households in Java-Bali and around 25% of poor households outside Java-Bali are categorized as poor (poor in two periods) households. Further,

outside Java-Bali contributed more in transient poor while Java-Bali contributed more in poor (chronically or remained poor in two periods).

This study applying the ordered logit model found that the important factors of poverty dynamics in Indonesia are educational attainment, the number of household member, physical assets (land and house ownership), working sector, employment status, access to modern utilities of electricity, changes in the household size, in the working sector, in the employment status, and in the microcredit programme. The estimation of partial effects of change in independent variables confirmed that one hectare increase in land will increase the probability of being non-poor between 1.6% (Java-Bali), 1.3% (outside Java-Bali) and 1.7% (National). An increase of one family member decreases the probability of the household being non-poor by 1.9% (national). Besides, households receiving microcredit during 2005-2007 will increase their probability of being non-poor by 3.4% (Java-Bali), 8.7% (outside Java-Bali) and 5.2% (National).

This study also found the interesting findings that households living in Java-Bali are more vulnerable to negative shocks while households living outside Java-Bali are relatively resilience to negative shocks. Moreover, no consistent statistical evidence in three models supports the hypothesis that the role of government policies such as cheap rice (RASKIN) and health insurance targeted to the poor (ASKESKIN) as an instrument to cope with negative shocks. Microcredit programmes, however, are well functioned as a poverty alleviation policy. Even though, there is no consistent statistical evidence of government policies in changing poverty status; this does not necessarily mean that the government should stop these policies. The government, however, should improve targeted households and consider negative shocks/events experiencing by households in distributing assistance.

The estimation results confirmed that poverty alleviation policies could not be generalized to all regions because of the differences in characteristics of poverty between Java-Bali and outside Java-Bali. For example, since the poor in Java-Bali is more vulnerable to negative shocks than households outside Java-Bali, the government should provide more safety nets to enable households in Java-Bali to cope with negative shocks. Moreover, the other policy suggestions particularly deliberated to the rural

household are: continuously promoting family planning; redistributing land and certifying both land and house ownership that can be used as collateral for getting credit; widening access to electricity to enhance the productivity of households and household based micro-enterprises and widening microcredit programme and providing technical assistance for starting and doing business. A consistent implementation of these policies will massively enable households to lift out of poverty.

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**APPENDIX 1 Description of Independent Variables and Expected Signs**

Var. code	Name of Variable	Variable Description	Exp. Sign
<b>Demographic Variables in 2005</b>			
Var_1	1. Marital Status of Household Head (1 = marriage; 0= others)	Marital status of household head	+
Var_2	2. Age of Household Head (in years)	Age of household head	+
Var_3	3. Education Attainment of Household Head (years of schooling)	Years of schooling completed by household head	+
Var_4	4. Number of Household Member (number of people)	Number of household members	-
Var_5	5. Dummy of Island (1= Java and Bali; 0= outside Java and Bali)	Household living in Java-Bali or living in Sumatera, Kalimantan, Sulawesi, Papua and Nusa Tenggara	-
Var_6	6. Dummy of Location (1= Urban; 0= Rural)	Whether household is living in urban area or in rural area	+
<b>Socio-Economic Variables in 2005</b>			
Var_7	7. Working Sector of Household Head (1= agricultural sectors; 0= others)	Household head who is working in food and non-food agricultural productions.	-
Var_8	8. Employment Status (1= formal sectors; 0= others)	Household head who is working in agency/office/company with a fixed salary either in cash or in goods.	+
Var_9	9. Land Ownership (in hectare)	Land owning by household	+
Var_10	10. Size of House (in square meter)	House owning by household	+
Var_11	11. Household with a Family Member Working as Migrant Workers (TKI) (1= having TKI; 0= others)	Household member either household head or other member become TKI	+
Var_12	12. Access to Electricity for Illuminating Energy (1= no access to electricity; 0= having access to electricity)	Household does not use electricity from state owned company, a private company, or self-production for illuminating energy	+
<b>Shocks &amp; Risks and Policy Variables in 2005</b>			
Var_13	13. Economic Shocks and Risks (ECSHRS) (1= experiences with disaster, price falls, crop loss and employment loss; 0= no experiences)	Household experiencing at least one of economic risks and shocks (ECSHRS)	-
Var_14	14. Cheap Rice (RASKIN) as a Safety Net to Cope with Economic Shocks and Risks (ECSHRS) (1= experiencing ECSHRS and receiving RASKIN; 0= others)	Household experiencing at least one of economic risks and shocks (ECSHRS) and receiving RASKIN; Interaction variable between shocks and policy var.	+
Var_15	15. Daily Activities Disrupted by Health Problems for All Family Members (days in a month)	Daily activities disrupted by health problems for all family members	-
Var_16	16. Insurance to Cope with Health Problems (1= having Health Insurance Targeted to the Poor (ASKESKIN); 0= others)	Household experiencing health problems and having ASKESKIN; Interaction between health shock and policy var.	+
Var_17	17. Saving as a Coping Strategy to Cope with economic risks and health shocks (ECSHRS) (1= having saving; 0= no saving)	Household experiencing at least one of economic risks and shocks (ECSHRS) and having saving; Interaction variable between shocks and saving	+
Var_18	18. Microcredit (1= receiving microcredit; 0= no credit)	Household gaining microcredit	+
Var_19	19. Source of Microcredit (1= government; 0= others)	Microcredit is coming from government programmes	+
Var_20	20. Family Member gaining employment (1= gaining employment; 0= others)	A family member either household head or family member gaining employment	+
Var_21	21. Improvement of Public Facilities in Surrounding Living Area (1= improving public facilities; 0= others)	Household experiencing improvement of public facilities such as road, bridge, traditional market, etc surrounding living area	+
<b>Change Variables during 2005-2007</b>			
Var_22	22. Change in Number of Household	Changes in household member due to death, split family, recent migration etc	-
Var_23	23. Change in Marital Status (1= divorce; 0= others)	Household become a single mother/father due to marriage divorce or death of partner (divorce in the religion terms)	-
Var_24	24. Change in Working Sectors (1= agricultural sectors to non-agricultural sectors; 0= others)	Working sectors of household head that is previously in agricultural sectors changing into non-agricultural sectors	+
Var_25	25. Change in Employment Status (1= formal sectors to non-formal sectors; 0= others)	Employment status of household head that is previously formal sector becoming informal sector due to fire, end of contract or voluntary choice	-
Var_26	26. Change in Access to Electricity for Illuminating Energy (1= gaining access in 2007 but not in 2005; 0= others)	Household gaining electricity access in 2007 but remained unconnected to this service in 2005	+
Var_27	27. Change in Credits (1= receiving credit in 2007 but not in 2005; 0= others)	Household receiving microcredit in 2007 but not in 2005	+

Source: Authors

**APPENDIX 2 Correlation Matrixes between Independent Variables**

	Var_1	Var_2	Var_3	Var_4	Var_5	Var_6	Var_7	Var_8	Var_9	Var_10	Var_11	Var_12	Var_13	Var_14	Var_15	Var_16	Var_17	Var_18	Var_19	Var_20	Var_21	Var_22	Var_23	Var_24	Var_25	Var_26	Var_27
Var_1	1.000																										
Var_2	-0.208	1.000																									
Var_3	0.123	-0.250	1.000																								
Var_4	0.319	-0.025	0.060	1.000																							
Var_5	-0.007	0.071	-0.027	-0.127	1.000																						
Var_6	-0.041	-0.065	0.250	0.010	0.194	1.000																					
Var_7	0.098	0.011	-0.187	-0.003	-0.171	-0.419	1.000																				
Var_8	0.122	-0.259	0.222	0.040	0.045	0.237	-0.168	1.000																			
Var_9	0.031	0.059	-0.037	0.093	-0.233	-0.245	0.236	-0.139	1.000																		
Var_10	0.031	0.144	0.077	0.130	0.090	0.042	-0.038	-0.009	0.018	1.000																	
Var_11	0.012	0.027	-0.064	-0.017	-0.010	-0.083	0.040	-0.073	-0.004	-0.003	1.000																
Var_12	-0.018	-0.016	-0.104	0.010	-0.337	-0.278	0.280	-0.135	0.232	-0.121	-0.008	1.000															
Var_13	0.037	0.009	-0.082	0.040	-0.038	-0.149	0.130	-0.109	0.092	-0.035	0.009	0.150	1.000														
Var_14	0.009	0.011	-0.026	0.054	-0.042	-0.069	0.052	-0.036	0.067	-0.013	0.007	0.087	0.215	1.000													
Var_15	-0.014	-0.012	0.028	0.010	0.027	0.044	-0.041	0.002	0.002	0.007	0.004	-0.020	0.242	0.046	1.000												
Var_16	0.043	0.115	-0.063	0.103	-0.029	-0.057	0.000	-0.066	0.039	-0.005	0.029	0.037	0.084	0.075	0.014	1.000											
Var_17	-0.024	0.057	-0.049	0.016	-0.018	-0.037	0.015	-0.040	0.009	-0.018	0.010	0.035	0.067	0.040	0.029	0.127	1.000										
Var_18	0.017	0.001	-0.011	0.013	0.103	0.010	-0.031	-0.036	-0.022	0.049	0.009	-0.055	0.023	0.031	0.027	0.015	-0.008	1.000									
Var_19	0.017	0.004	-0.012	0.017	0.073	0.036	-0.027	-0.016	-0.023	-0.002	-0.009	-0.032	0.015	0.015	0.008	0.002	0.010	0.559	1.000								
Var_20	0.015	0.012	-0.028	0.058	0.012	0.021	-0.003	0.010	-0.012	0.002	0.064	-0.012	0.072	0.010	0.050	0.033	0.012	0.017	0.002	1.000							
Var_21	-0.006	-0.011	-0.021	0.002	0.025	-0.019	0.045	-0.008	0.016	-0.002	-0.012	-0.019	0.137	0.015	0.052	0.010	0.046	-0.008	-0.024	0.117	1.000						
Var_22	-0.077	-0.056	0.007	-0.444	0.020	0.027	-0.026	0.020	-0.034	-0.055	-0.007	-0.008	-0.003	-0.013	0.000	-0.052	-0.030	0.009	0.017	-0.011	0.002	1.000					
Var_23	0.101	0.039	0.009	0.017	-0.030	0.017	-0.024	-0.007	0.002	0.001	0.005	-0.003	-0.011	-0.004	0.002	0.033	0.012	-0.021	-0.008	0.007	-0.010	-0.157	1.000				
Var_24	0.040	-0.128	-0.010	-0.011	-0.003	-0.008	0.406	0.134	-0.010	-0.016	-0.007	-0.029	-0.031	-0.012	-0.011	-0.036	-0.004	0.002	0.003	0.007	0.012	0.009	-0.019	1.000			
Var_25	0.056	-0.132	0.063	0.020	0.003	0.053	-0.048	0.583	-0.084	-0.022	-0.020	-0.051	-0.018	-0.007	0.007	-0.026	-0.016	-0.027	-0.021	0.032	-0.001	0.010	0.065	0.039	1.000		
Var_26	-0.007	-0.012	-0.047	-0.017	-0.184	-0.149	0.147	-0.061	0.138	-0.072	-0.001	0.618	0.051	0.037	-0.018	0.003	-0.002	-0.025	-0.014	0.012	-0.020	0.007	0.008	0.005	-0.022	1.000	
Var_27	0.050	-0.028	0.041	0.044	0.061	-0.007	-0.037	0.001	0.018	0.022	0.006	-0.040	0.008	0.011	0.035	0.013	-0.010	-0.046	-0.026	0.013	0.019	0.006	-0.018	0.023	-0.003	-0.009	1.000

Source: Authors' calculation

Note: the name of dependent variables, i.e. Var\_1, Var\_2,..., Var\_27 refers to the name in Appendix 1.

According to the definition of variables in Appendix 1, the dependent variables of working sectors (Var\_7), employment status (Var\_8) and household having a family member working as a migrant worker (VAR\_11) have the possibility to be highly correlated, but the correlation coefficients in Appendix 2 do not show a close relationship among those variables. Additionally, Appendix 2 clearly shows that each dependent variable does not have close colinearity; thus, there is no concern about the multicollinearity issue on the regression analysis.