

# **The Role of Agriculture in Poverty Reduction in Indonesia**

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May 2011

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# **The Role of Agriculture in Poverty Reduction in Indonesia**

## **Abstract**

This study assesses the role of agricultural growth on poverty reduction in Indonesia and compares it between the pre and post Asian financial crisis eras. By calculating the sectoral contribution to poverty reduction, we result in three important findings: (1) service sector growth has the biggest impact in reducing poverty during both pre and post crisis periods, (2) the role of agricultural growth is strong in rural areas with a slightly declined impact in the post-crisis period, (3) urban service growth continues to have the highest impact, yet the role of rural service growth increases tremendously after crisis in both rural and urban areas. These results add the need for policy makers to assure continuous growth in rural agriculture and urban service while promoting further growth of rural service as an emerging area of poverty reduction.

## I. Introduction

Before hit by the Asian financial crisis in 1997-1998, Indonesia was one among the most successful countries in the world in reducing poverty.<sup>1</sup> The proportion of population living below the official poverty line dropped from around 40 percent in 1976 to around 11 percent in 1996. In absolute number, even though the total number of population increased from around 135 million in 1976 to around 200 million in 1996, the number of poor population decreased markedly from around 54 million people to around 22.5 million people during the same period (BPS, 2002).

This rapid poverty reduction is attributed to the pre-crisis high economic growth experienced by Indonesia. Prior to the crisis, Indonesia was one of the most rapidly growing economies in the world. Between 1986 and 1996, the average of real GDP growth was more than seven percent per year. Furthermore, other social indicators also improved significantly during the pre-crisis period: life expectancy increased, infant mortality rates fell, and school enrollment rates rose. In addition, the provision of basic infrastructure – water supplies, roads, electricity, schools, health facilities – also rose significantly.

However, beginning in mid 1997 Indonesia was struck by a currency crisis, which by the first half of 1998 had already developed into a full blown economic and political crisis, exacerbated by a natural disaster (*El Nino* drought). During this crisis period, the value of Indonesian currency, the rupiah, fell to as low as 15 percent of its pre-crisis value in less than one year, while the economy contracted by an unprecedented magnitude of 13.7 percent in 1998, accompanied by skyrocketing domestic prices particularly those of food,<sup>2</sup> inducing mass riots in the capital Jakarta and a few other cities, which culminated in the fall of the New Order government – which had been in power since mid 1960s – in May 1998.

The social impact of the crisis, in particular on poverty, was substantial. The official estimate indicates that the national poverty rate increased from around 17 percent in February 1996 to 24 percent in February 1999. A study which tracks down poverty rate over the course of the crisis shows that the poverty rate increased by 164 percent from the onset of the crisis in mid 1997 to the peak of the crisis around the end of 1998 (Suryahadi *et al.*, 2003).

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<sup>1</sup> In this paper, poverty is defined as monetary poverty and measured using consumption approach.

<sup>2</sup> The general inflation rate was 78 percent in 1998, while food prices escalated by 118 percent.

During the crisis period, the agriculture sector fared much better than the other sectors. In 1998, when real output shrank from the level in the previous year by unprecedented magnitudes of 9.2 percent in the industrial sector, 18 percent in the trade sector, and 19.6 percent in the services sector respectively, the output of the agriculture sector only slightly fell by 0.7 percent. In the following year, the agriculture sector led the recovery by growing positively at 2.1 percent, helped by the industrial sector which grew by 1.4 percent, while the trade and services sectors were still in negative growth territory of 0.4 and 1.5 percent respectively.

Due to the economic crisis, Indonesia experienced high volatility in poverty rates between 1997 and 2001. Following this, the poverty rate resumed its declining trend but at a much slower pace compared to the pre-crisis period. Using a new standard in BPS' poverty line calculation, the poverty rate declined from 18.2 percent in 2002 to 13.3 percent in 2009.

This has led to the question of what kinds of growth are most beneficial for the poor and hence most effective in reducing poverty? In search for an answer to this question, some researchers have focused on the composition of economic growth (this was started by a seminal paper by Ravallion and Datt (1996)). Since in most poor countries the majority of the poor live in rural areas and are employed in agriculture, it seems logical that growth of agriculture is more important for poverty reduction than growth of industry or services. This view is reaffirmed most recently by Cervantes-Godoy and Dewbre (2010).

However, Dollar and Kray (2002) find that economic growth is associated with increases in incomes of the poor, hence any growth is good for the poor. Hasan and Quibria (2004) find that sector whose growth has the highest impact on poverty reduction depends on country context. Loayza and Raddatz (2010) find that different sectors can be the driver of poverty reduction as long as they are labor-intensive.

This study aims to assess the role of agricultural growth on poverty reduction as has been experienced by Indonesia. The rest of this paper is organized as follows. Section two discusses the role of agriculture in Indonesian economy. Section three discusses the trend and profile of poverty in Indonesia. Section four evaluates the contribution of agriculture in poverty reduction in Indonesia. Finally, section five provides the conclusion and derives policy implications from the findings of this study.

## II. The Role of Agriculture in Indonesian Economy

Industrialization was the heart of economic development strategy adopted by Indonesia's New Order government during its tenure in power from late 1960s to late 1990s. This is true during both its earlier period up until the mid 1980s which emphasized import substitution strategy as well as during its later period which emphasized export orientation strategy. As a consequence, the role of the agricultural sector in the national economy has continuously declined during the whole period. Nevertheless, agriculture remains an important source of livelihood for a large number of households, in particular in rural areas.

### A. Development Policy

Indonesia entered a rapid economic growth phase following the launching of its first five-year development plan in 1969. Since then the country's economy has undergone significant changes. With an average real GDP growth of around seven percent annually during the pre-crisis period, Indonesia holds its place with the other rapidly growing East Asian economies. Since it started from a very low initial condition, however, its per capita income remains still far below its neighboring countries in absolute terms. In 1967, Indonesia's per capita income was around US\$ 50 and it was one of the poorest countries in the world (Agrawal, 1996). Hill (1996) estimates that between 1965 and 1991 the real GDP per capita increased from 190 to 610, measured in 1991 US\$, which constitutes growth of 4.6 percent annually.

From the late 1960s until now, economic development in Indonesia can be divided into four phases. The first is from the late 1960s to mid 1970s, where Indonesia's New Order regime embraced trade and investment policies which were remarkably open for the period. In 1967, a foreign investment law that guaranteed foreign investors the right to repatriate capital and profits was passed. In 1970, there were reforms that reduced the existing barriers to goods trade and foreign borrowing by unifying the multiple exchange rate system and abolishing most of the exchange controls on capital and current account transactions.

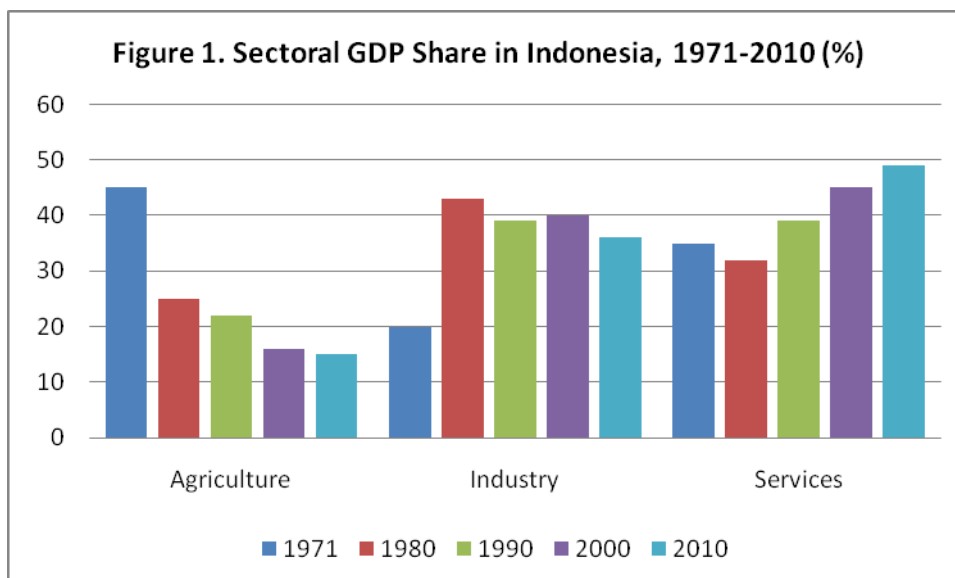
The second phase is from the mid 1970s to the mid 1980s, where Indonesia adopted an inward-looking import-substitution strategy. Awash with revenue from oil exports, the government was eager to build capital intensive industries to replace imports. In addition, it spent a large sum of money in building infrastructure. Not surprisingly, the role of the public sector in the economy's growth was dominant during this period. Aswicahyono *et al.* (1996) argue that this change of policy resulted from tremendous internal pressure on the government to embark on a more interventionist path, especially in the area of industrial policy.

The third phase started in mid 1980s when the Indonesian economy started to open again. This was an indirect result of the large drop in oil prices that began in the early 1980s (Hill, 1996). Because the oil revenue shrank quickly, the government faced a sudden external imbalance. The import substitution strategy had left the Indonesian industries inefficient and unable to compete in the world market at the maintained exchange rate. A combination of this and general decline in primary commodity prices raised the premium on foreign exchange. In 1986, the import substitution strategy was therefore discarded and replaced with export orientation, followed by a devaluation of the exchange rate and combined with deregulation in the domestic economy. This phase ended abruptly with the advent of the economic crisis in 1997-98.

After the turmoil due to the crisis, the fourth phase, which is known as the reform (*reformasi*) period, started in 1999. Officially successive governments in this period have stated their commitment to open economic policy. However, this is not always reflected in reality as pressures from various interest groups requesting protection are omnipresent. This reflects the difficulty for a government in a democratic setting to have a clear and consistent economic policy as it always have to maintain a balance among competing demands from various interest groups. During this phase, the Indonesian economy grows significantly slower compared to the previous three phases.

## B. Output

During the whole period of Indonesian economic development since the end of 1960s, the role of the agricultural sector in the Indonesian economy has continuously declined. Figure 1 shows the structural transformation of the economy's output between 1971 and 1980. The share of the agricultural sector in total GDP has dropped very significantly from 46 percent in 1971 to just 25 percent in 1980, a drop of 21 percentage points in just nine years. Since then it has continuously declined to 22 percent in 1990 and 16 percent in 2000. After this, it has stabilized and only slightly declined to 15 percent by 2010.



Source: BPS (various years)

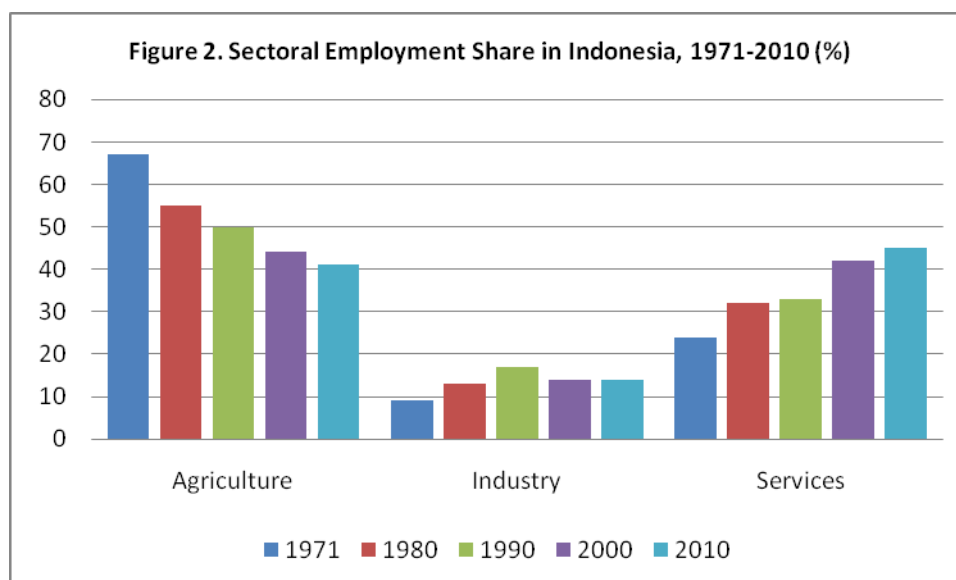
At the early episode of Indonesian development, there was a clear trend of industrialization of the economy. Between 1971 and 1980, the share of the industrial output in the country's GDP jumped more than doubled from 20 percent to 43 percent. However, after this fast industrial growth period, the share of industrial output in the GDP has been levelling off, even tended to decline. It reached 39 percent in 1990, and then stabilized and reached 40 percent in 2000. Afterward, it declined again to reach 36 percent in 2010. This decline was due to unfavorable business climate for labor intensive manufacturing industries due to high labor cost brought by new labor market regulations.

The sector that is clearly gaining ground in terms of GDP share is services. After declined from 35 percent to 32 percent between 1971 and 1980, the share of services sector's output in total GDP has steadily increased since then. It reached 39 percent in 1990, increased again to 45 percent in 2000, and continued to increase to reach 49 percent by 2010. This means now around one half of Indonesia's total output is produced by the services sector.

### C. Employment

The role of the economic sectors in their share of employment more or less mimics their share of GDP. Figure 2 shows the employment shares of agriculture, industry, and services sectors between 1971 and 2010. Along with its declining share in GDP, the share of the agricultural sector in employment has continuously declined from 67 percent in 1971 to 55 percent

in 1980, to 50 percent in 1990, to 44 percent in 2000, and finally to 41 percent in 2010. However, the pace of reduction in employment share of the agricultural sector is much slower than the pace of reduction in its GDP share. As a result, the ratio between GDP share and employment share of the agricultural sector has declined from 0.67 in 1971 to 0.37 in 2010.



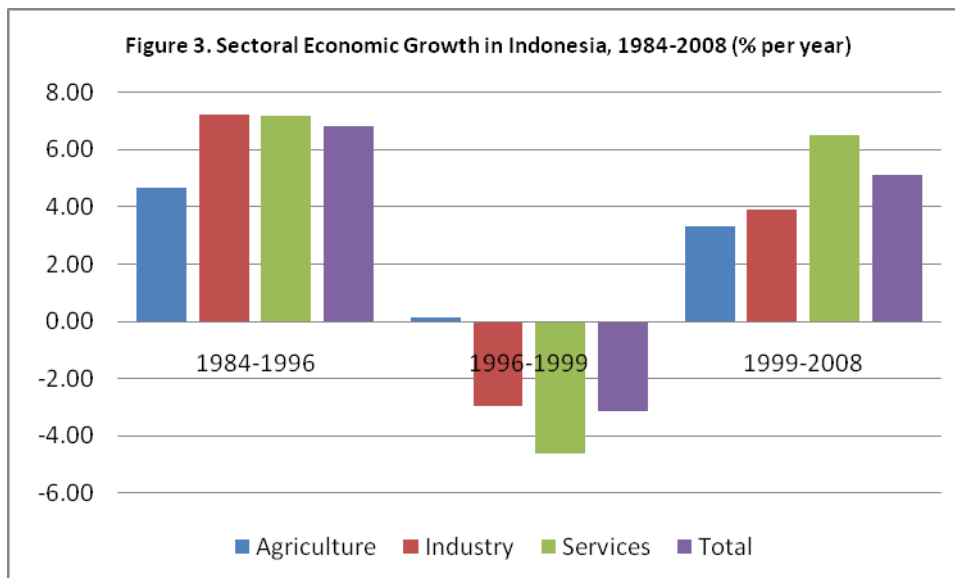
Source: BPS (various years)

Meanwhile, the industrial sector increased its employment share in the economy during the period of 1971-1990, from 9 percent in 1971 to 13 percent in 1980 and to 17 percent in 1990. The GDP share of the industrial sector between 1980 and 1990 actually declined, but its employment share continued to increase significantly. This reflects the change in Indonesia's industrial development strategy in mid 1980s from capital intensive import substitution to labor intensive export orientation. However, after the Asian financial crisis in 1997/98, the employment share of the industrial sector declined again and reached 14 percent in 2000. During the reform period, this share stagnated and remained 14 percent in 2010.

In line with its increasing share in the GDP, the share of the services sector in total employment also continuously increased. The share increased very significantly during the early development period of 1971-1980 from 24 percent to 32 percent. However, when manufacturing employment expanded rapidly during the period of 1980-1990, the employment share of the services sector remained stable and reached 33 percent in 1990. After the Asian financial crisis, the share of the services sector in employment expanded rapidly again and reached 42 percent in 2000. After this period, it still continued to increase but at a slower pace and reached 45 percent by 2010.

## D. Economic Growth

The importance of a sector in the economy is not only related to its share in GDP and employment, but also its role driving economic growth. Figure 3 shows sectoral as well as total economic growth during the pre-Asian financial crisis (1984-1996), during the Asian financial crisis (1996-1999), and after the Asian financial crisis (1999-2008) periods. Before the onset of the Asian financial crisis, the Indonesian economy grew on average by 6.83 percent annually between 1984 and 1996. This was driven mostly by growth in the industrial sector, which grew by 7.25 percent annually, and services sector, which grew by 7.18 percent annually. Meanwhile, the agricultural sector only grew by 4.65 percent annually.



Source: BPS (various years)

During the Asian financial crisis period, the agricultural sector was the only sector that did not suffer from a contraction. Between 1996 and 1999, the agricultural sector still managed to record a positive growth albeit very low at 0.15 percent annually. Meanwhile, the industrial sector suffered from a contraction of -2.97 percent annually and the services sector suffered the most by a contraction of -4.63 percent annually. As a result, the Indonesian economy suffered from a contraction of -3.12 percent annually.

After the Asian financial crisis, the services sector recorded the highest sectoral growth, while the industrial sector has lost its role as the driver of economic growth in Indonesia. During the 1999-2008 period, the Indonesian

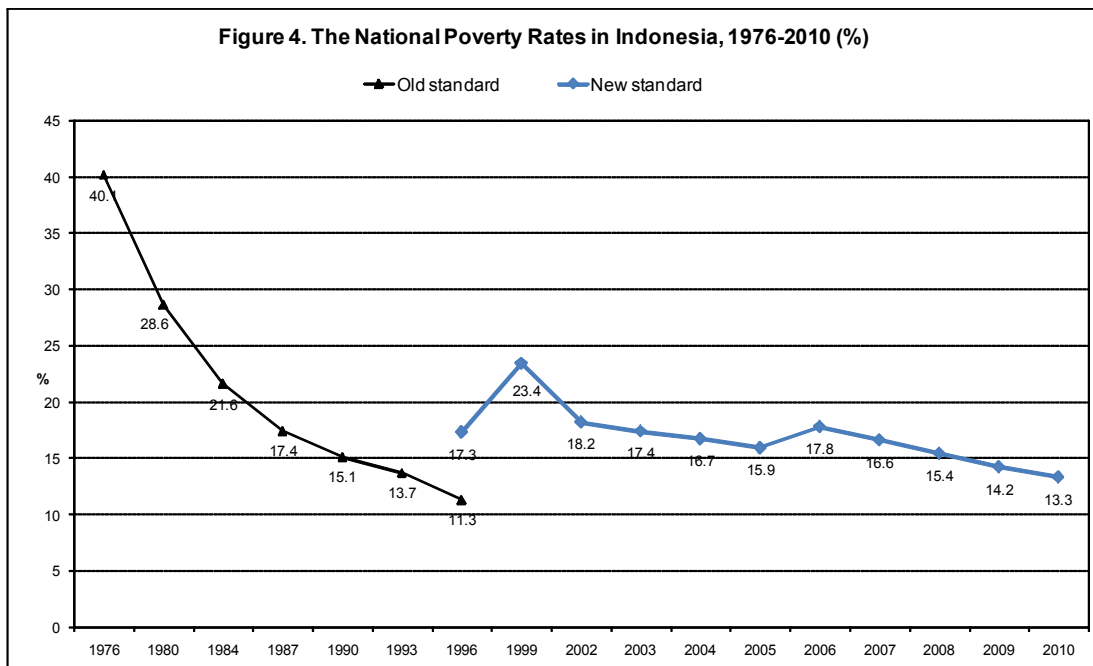
economy grew on average by 5.12 percent annually. This growth was driven mostly the growth in the services sector, which grew by 6.51 percent annually. Meanwhile, the industrial sector only grew by 3.91 percent annually, slightly higher than the agricultural sector, which grew by 3.34 percent annually.

### III. Poverty Trend and Profile

Before the onset of the Asian financial crisis in 1997, the Indonesian economy grew fast and, as a result, reduced poverty significantly. Other welfare indicators – such as infant mortality rate, school enrolment rate, and life expectancy at birth – also improved. However, the Asian financial crisis that engulfed Indonesia during 1997-1998 has reversed the trends in social improvements, apparent in particular from a large re-increase in the poverty rate in 1999. After the crisis, Indonesia resumed its trend in reducing poverty further, however, at a slower pace compared to the pre-crisis period.

#### A. Long Term Trend in Poverty

The long term trend in poverty in Indonesia can be seen in Figure 4. The poverty rate in Indonesia is calculated by the Government's statistical agency, the BPS (*Badan Pusat Statistik*), using data collected through the National Socioeconomic Survey (Susenas). The poverty line is estimated based on the Food Energy Intake (FIE) method, anchored at 2,100 calories per capita per day, plus some essential non-food allowances. Prior to 2002 the poverty rate was calculated every three years. Starting in 2002 BPS calculates the poverty rate every year. In 1998 BPS revised its method in setting the poverty line, resulting in an increase in the poverty threshold, apparent in the adjustment in 1996 poverty rate from 11.3 percent to 17.3 percent.



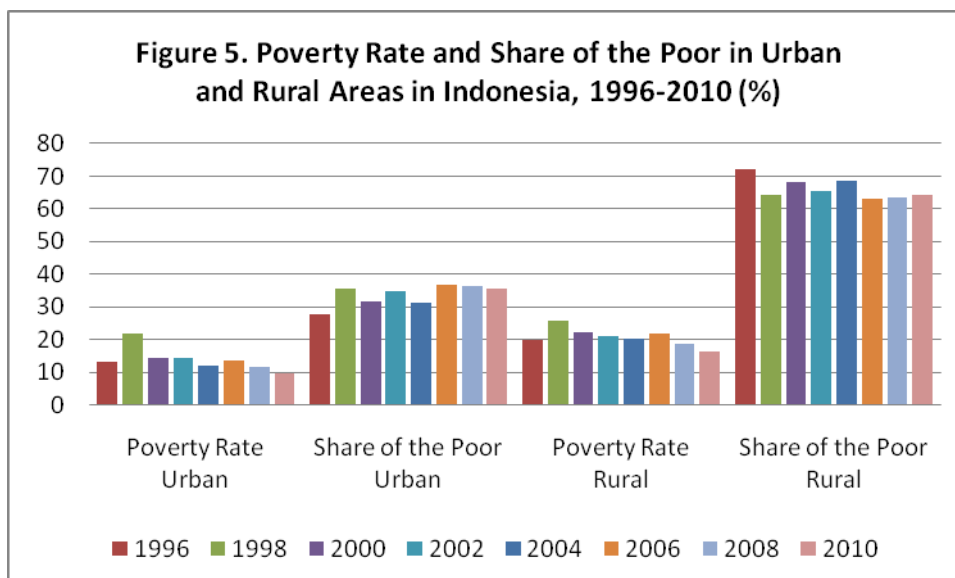
Source: BPS (various years)

Figure 4 clearly shows that there is a declining trend in poverty in Indonesia, at least since BPS started to calculate the poverty rate in 1976. However, there is an apparent structural break in the trend around the time of Asian financial crisis in 1997/98. The pace of poverty reduction in the post-crisis period is significantly slower compared to the pace during the pre-crisis period. In the earlier period, the poverty rate decreased from 40.1 percent in 1976 to 11.3 percent in 1996, a reduction of 28.8 percentage points in 20 years or an average of 1.44 percentage points reduction in poverty rate per year. Leaving aside the volatile period during the Asian financial crisis, the poverty rate declined from 18.2 percent in 2002 to 13.3 percent in 2010, a reduction of 4.9 percentage points in eight years or an average of 0.61 percentage point reduction in poverty rate per year. This means that the pace of poverty reduction in the post-crisis period is only 42.5 percent of its pace during the pre-crisis period.

During the whole period from 1976 to 2010, there were only two occasions when the poverty rate increased. The first one was in 1999 due to the Asian financial crisis, where the poverty rate increased from 17.3 percent in 1996 (based on the new standard) to 23.4 percent in 1999. A combination of loss or declining income and hyperinflation forced many of the near poor to live below the poverty line. The second occasion was in 2006 due to the government policy to increase the domestic prices of fuels by an average of 125 percent in October 2005. In Indonesia the prices of fuels are fixed by the government with the gap with international oil price is covered by government subsidy. When the international oil price increased substantially in 2005, the pressure on government budget became unbearable, forcing the government to increase the domestic fuel prices in order to reduce the subsidy. The ensuing 18 percent inflation in 2006 caused the poverty rate to increase from 15.9 percent in 2005 to 17.8 percent in 2006.

## **B. Urban and Rural Poverty**

The face of poverty in Indonesia is still dominated by rural poverty despite the fact that now around half of the population reside in urban areas. Figure 5 disaggregates the poverty rates and poor population by rural and urban areas. The figure clearly shows that the poverty rate in rural areas is always substantially higher than in urban areas. The difference in poverty rates between rural and urban areas is always more than six percentage points, except in 1998 during the Asian financial crisis which hit the urban areas harder than rural areas.

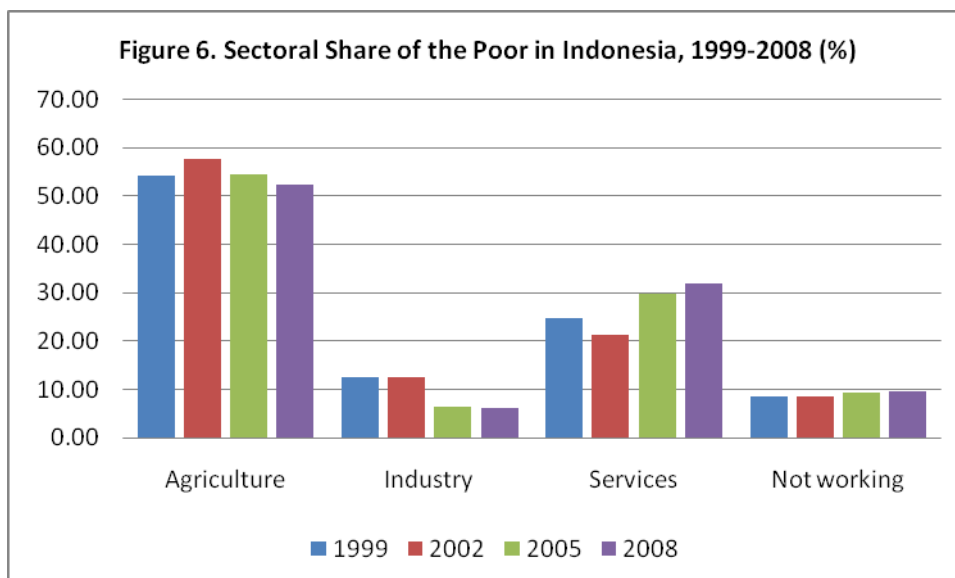


Source: BPS (various years)

In terms of the share of poor population, Figure 5 shows that around 65 percent of the poor live in rural areas. This implies that the number of poor population in rural areas is almost doubled of those in urban areas. However, there is an indication of urbanization of poverty over time. Although slightly fluctuating, over the longer period the share of urban poverty has increased from 27.7 percent in 1996 to 35.8 percent in 2010.

### C. Sectoral Profile of Poverty

As shown in the previous section, poverty in Indonesia is a phenomenon mainly found in rural areas. Further disaggregation by sector indicates that poverty in Indonesia is very much related to the agricultural sector. Figure 6 shows the sectoral share of the poor from 1999 to 2008. The figure clearly shows that more than a half of the poor in Indonesia have a livelihood in the agricultural sector, while the rest are mostly in the services sector.



Source: BPS (various years)

Since the 1999 figure was affected by the Asian financial crisis, which hit the modern sector in urban areas hardest, the trend in sectoral share of poverty is better depicted by the 2002 figure onward. There is a clear indication that the role of agriculture as major source of poverty in Indonesia is declining. In 2002, 57.69 percent of all the poor in Indonesia had a livelihood in the agricultural sector. By 2008, this share has significantly declined to 52.27 percent. On the other hand, the services sector is emerging a new major source of poverty. In 2002, 21.20 percent of all the poor had a livelihood in the services sector. By 2008, this share has substantially increased to 31.84 percent.

## IV. Agriculture and Poverty Reduction

The previous section shows that Indonesia experienced a fast reduction in poverty during high growth period in the 1980s and 1990s prior to the Asian financial crisis. In the post-crisis era, however, the pace of poverty reduction has been slowing down considerably. This section assesses the role of the agriculture sector on the change in the pace of reduction in poverty. To answer to this question, it utilizes the results of studies assessing the impact of sectoral economic growth on poverty and calculates the sectoral contribution to poverty reduction.

### A. Overview

Ravallion and Datt (1996) formulate the basic model to estimate the impact of economic growth on poverty as:

$$dP = \alpha + \beta \dot{y} + \varepsilon \quad (1)$$

where  $P$  refers to the level of poverty rate and  $dP$  refers to the change in poverty rate,  $\dot{y}$  represents the rate of economic growth (that is  $\dot{y} = \frac{dY}{Y}$ , with  $Y$  is the level of GDP and  $dY$  is its change),  $\varepsilon$  is the error term, while  $\alpha$  and  $\beta$  are parameters to be estimated. In particular, the parameter of interest is  $\beta$ , which shows the percentage point change in poverty rate due to one percent GDP growth.

The findings, however, have been mixed. Ravallion and Datt (1996) find that for the case of India the growth of agricultural sector has been most effective in reducing poverty. They showed that 85 percent of the reduction in poverty in India was due to agricultural growth. Similarly de Janvry and Sadoulet (2009) find that rapid growth in agriculture in Vietnam has opened pathways out of poverty for farming households.

On the other hand, Warr and Wang (1999) find that in Taiwan it is the growth of the industrial sector which has the largest impact on poverty reduction. Different still, Warr (2002), by pooling the data from four Southeast Asian countries (Thailand, Indonesia, Malaysia, and the Philippines), finds that it is the growth of the services sector which accounts for the largest reduction in poverty in these countries.

The finding of Ravallion and Datt (1996) is also contradicted by the finding of Quizon and Binswanger (1986, 1989). Using a partial equilibrium multimarket model for India, they show that the agricultural growth effects of the Green revolution did not benefit the rural poor. They show that the main way to help the poor is to raise non-agricultural incomes. Sarris (2001), however, criticizes their analysis since they only consider agricultural incomes and did

not take into account spillover effects to non-agricultural incomes. It is quite plausible that initial rises in agricultural incomes help increase the non-agricultural incomes, which eventually help the poor.

Hasan and Quibria (2004) find that growth of the sector that has the highest impact on poverty reduction depends on country context. For example, while agricultural growth was the most effective factor in poverty reduction in South Asia and Sub-Saharan Africa, poverty reduction in East Asia was driven by industrial growth and in Latin America from the growth of services sector. In Latin America and the Caribbean, agricultural productivity gains did not translate into lower rural poverty rates because these gains were driven by capital and hence created fewer employment opportunities. However, Loayza and Raddatz (2010) find that even though these poverty reducing sectors differ across regions, they have the same characteristic as labor-intensive sectors.

Specifically on Indonesia, Sumarto and Suryahadi (2007) applied the model to the Indonesian case using a three-sector model – agriculture, industry, and services – and estimated using province level panel data covering the period of 1984-1999. This study finds a dominant role of the agricultural sector growth in poverty reduction in Indonesia during the pre-crisis period.

Suryahadi *et al.* (2009a) developed the work of Sumarto and Suryahadi (2007) further by splitting the three sectors into their urban and rural locations, resulting in the following six-sector model:

$$dP_j = \alpha + \beta_U^A \left( H_{Uj}^A y_{Uj}^A \right) + \beta_U^I \left( H_{Uj}^I y_{Uj}^I \right) + \beta_U^S \left( H_{Uj}^S y_{Uj}^S \right) + \beta_R^A \left( H_{Rj}^A y_{Rj}^A \right) + \beta_R^I \left( H_{Rj}^I y_{Rj}^I \right) + \beta_R^S \left( H_{Rj}^S y_{Rj}^S \right) + \gamma dS_j + \delta P_j + \mu_m E_{mj} + \varepsilon \quad (2)$$

where the superscript  $k = \{A, I, S\}$  indexes the agricultural, industrial, and services sector respectively, while the subscript  $l = \{U, R\}$  indexes the urban and rural location, while  $H_{ij}^k$  is the location and sectoral share of GDP. Meanwhile,  $dS_j$  is the change in population share in province  $j$ ,  $P_j$  is the initial (1984) poverty rate in province  $j$ , and  $E_{mj}$  is a vector of initial conditions in province  $j$ .

If  $\beta_U^A = \beta_U^I = \beta_U^S = \beta_R^A = \beta_R^I = \beta_R^S$ , which implies that the location and sectoral compositions of economic growth do not influence its impact on poverty, then equation (2) collapses to:

$$dP_j = \alpha + \beta \dot{y}_j + \gamma dS_j + \delta P_j + \mu_m E_{mj} + \varepsilon \quad (3)$$

which is an extended version of equation (1). Otherwise, i.e. if equation (2) holds, then the location and sectoral compositions of economic growth do matter because each sectoral growth affects poverty differently.

Suryahadi *et al.* (2009a) estimated the model using the same province level panel data used by Sumarto and Suryahadi (2007) extended to 2002. The study finds that services sector growths are the dominant factor in reducing poverty in both urban and rural areas. Meanwhile, agricultural growth retains their importance in poverty reduction, however its role is limited only to rural poverty.

## B. Growth Elasticity of Poverty

The estimation results of Suryahadi *et al.* (2009a) for rural and urban areas are reproduced here in Appendix 1. The coefficients show that there are strong cross-sectoral and cross-location effects of growth on poverty. This is consistent with the finding of Suryahadi *et al.* (2009b), which shows the existence of strong growth linkages and multiplier effects across sectors and location in Indonesia. Similar phenomenon is also found in Vietnam by de Janvry and Sadoulet (2009).

Interpreting these coefficients of sectoral GDP growth is not straightforward as the independent variables in equation (2) are sectoral economic growth weighted by their GDP share.<sup>3</sup> Hence, the coefficient indicates the percentage point change in poverty rate from a sectoral economic growth equal to one percent times the inverse of the sector's GDP share.<sup>4</sup> Based on the numbers in Appendices 1 and 2, and assuming that the coefficients in Appendix 1 do not change over the period of 1984-2008, Figure 7 presents the results of calculation of growth elasticity of poverty in rural areas.

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<sup>3</sup> The GDP shares of each economic sector over time are shown in Appendix 2.

<sup>4</sup> Suppose a sector makes up 25% of the whole economy. Then, the coefficient indicates the percentage point change in poverty rate due to  $1/0.25$  or 4% of growth in that sector. Notice that 4% multiplied by 25% is equal to 1%.

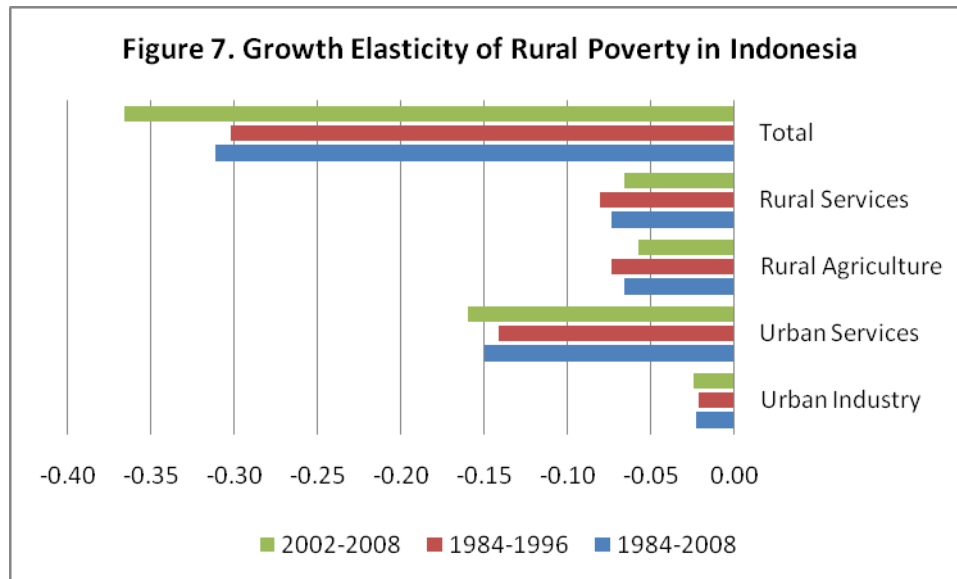
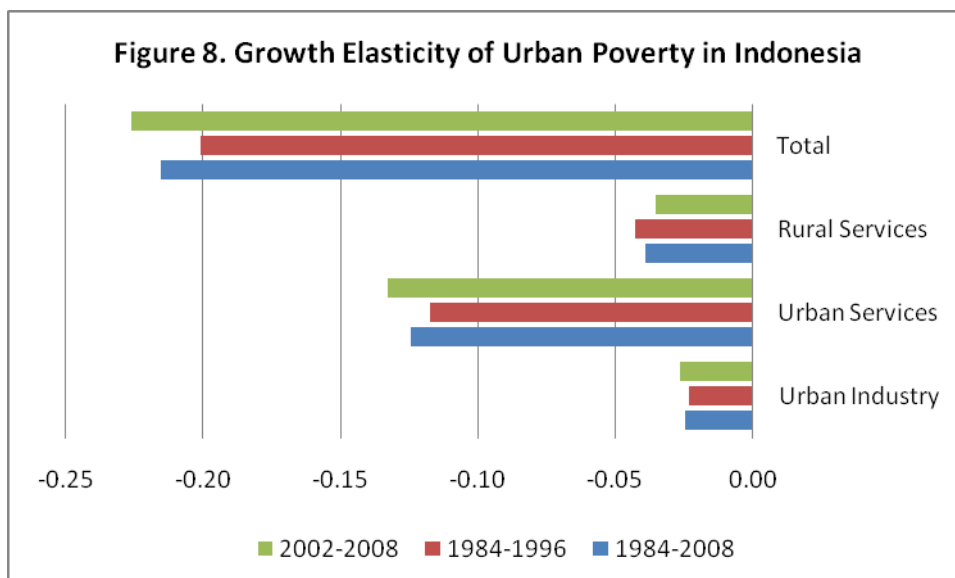


Figure 7 shows that the growth elasticity of poverty in rural areas is -0.31, implying that one percent economic growth reduces rural poverty by 0.31 percentage point. When the period is split into before and after Asian financial crisis, surprisingly the post-crisis elasticity at -0.37 is higher than the pre-crisis elasticity, which is -0.30. This indicates that the change in GDP structure after the Asian financial crisis does not reduce the power of economic growth in reducing poverty as popularly believed. In fact, it slightly increases. Miranti (2010) also finds that growth elasticity of poverty in Indonesia was relatively stable during the 1984-2002 period.

Looking at growth's sectoral components, it turns out that growth in urban services has the highest impact on rural poverty with an elasticity of -0.15, followed by rural services and rural agriculture, both with elasticity around -0.07, and urban industry with an elasticity of -0.02. Meanwhile, growth in urban agriculture and rural industry do not have significant impact on rural poverty. Comparing the elasticities before and after the Asian financial crisis, the figure shows that the elasticities of growth of urban sectors slightly increase, while those of rural sectors slightly decrease.

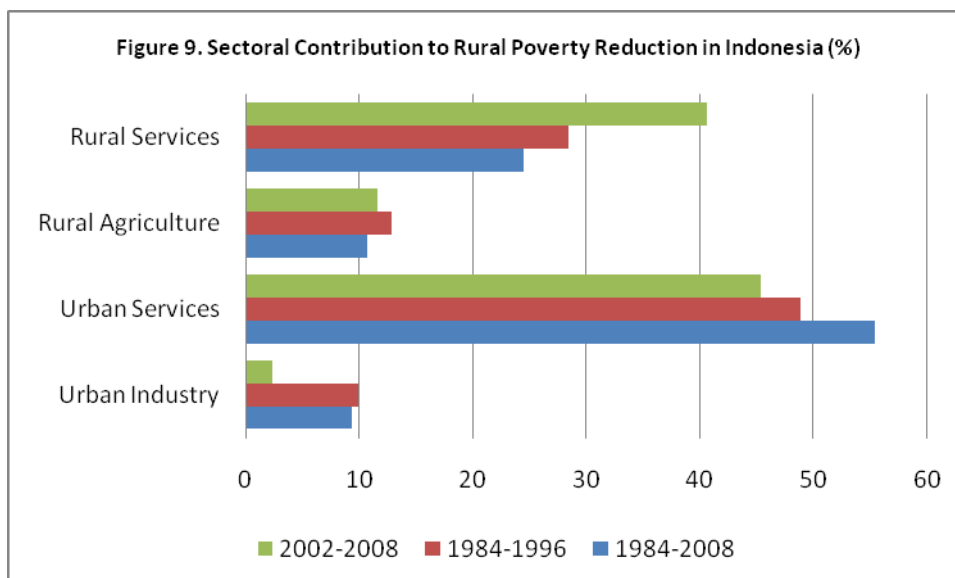
Figure 8 presents the results of calculation of growth elasticity of poverty in urban areas. Compared to rural poverty, growth elasticity of urban poverty is lower at -0.22, which means that one percent economic growth reduces urban poverty by 0.22 percentage point. Similar to the elasticity in rural area, the elasticity in urban areas after the Asian financial crisis, which is -0.23, is slightly higher than the elasticity before the crisis, which is -0.20.



Looking at the sectoral components of growth, also similar to rural poverty, growth in urban services has the highest elasticity in reducing urban poverty with  $-0.12$ , followed by rural services with  $-0.04$  and urban industry with  $-0.02$ . Comparing the elasticities before and after the Asian financial crisis, again similar to rural poverty, the elasticities of growth of urban sectors slightly increase and the elasticities of rural sectors slightly decrease. The finding that services sector growth plays an important role in reducing poverty in Indonesia is similar to the experience of Latin American countries (Hasan and Quibria, 2004).

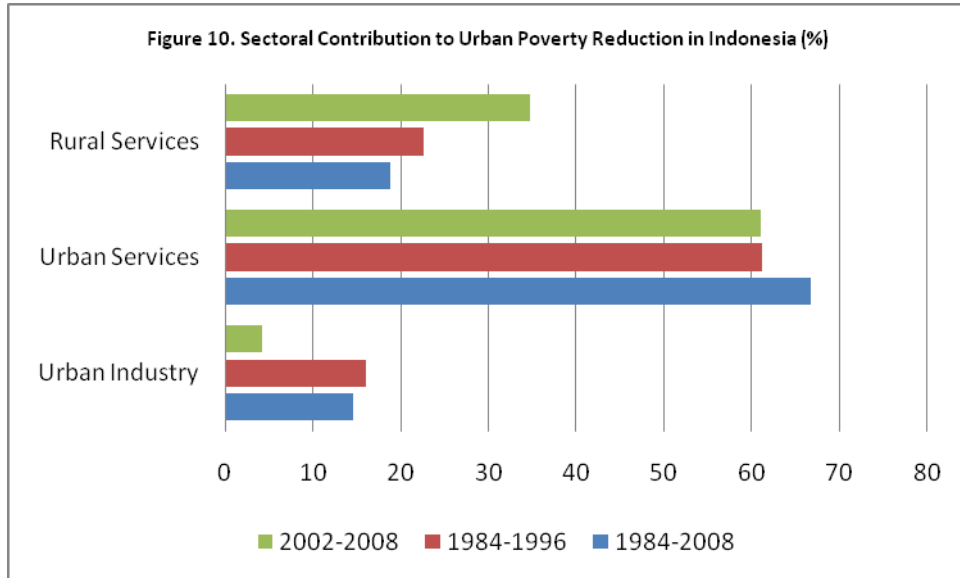
### C. Agriculture's Contribution to Poverty Reduction

To calculate the contribution of each sector in total poverty reduction, the elasticity estimated in the previous section is calculated by the actual growth of each sector and compared to the total poverty reduction. Figure 9 shows the sectoral contribution to poverty reduction in rural areas. The figure shows that around 55 percent of poverty reduction in rural areas during the 1984-2008 period can be attributed to growth of urban services sector. The remaining is 25 percent due to growth of rural services, 11 percent due to growth of rural agriculture, and 9 percent due to growth of urban industry.



Comparing the periods before and after the Asian financial crisis, there is a notable increase in the contribution of rural services from 28 percent to 41 percent. On the other hand, the contribution of urban industry fell significantly from 10 percent to 2 percent. This is apparently due to the fall in industrial growth during the post-crisis period (see Figure 3). Meanwhile, the contribution of urban services slightly fell from 49 percent to 45 percent and the contribution of rural agriculture slightly fell from 13 percent to 12 percent.

Figure 10 shows the sectoral contribution to poverty reduction in urban areas. The figure shows that around 67 percent of urban poverty reduction is due to growth of urban services sector. The remaining is 19 percent due to growth of rural services and 15 percent due to growth of urban industry.



Comparing the periods before and after the Asian financial crisis, similar to the case of rural poverty, the contribution of rural services jumped from 23 percent to 35 percent and the contribution of urban industry fell from 16 percent to 4 percent. Meanwhile, the contribution of urban services remained at around 61 percent.

## V. Conclusion and Implication

This study asks whether the growth of agricultural sector is most effective in reducing poverty in Indonesia and whether there is a difference between the pre and post Asian financial crisis eras. In line with Suryahadi *et al.* (2009a), our results show that the growth of agricultural sector is not the most effective one. The growth of services sector appears to have the highest impact in reducing poverty in Indonesia for both urban and rural areas. This result holds for both the pre and post Asian financial crisis eras. The role of agricultural sector growth nevertheless remains important in reducing poverty in rural areas, however this impact slightly declines after the crisis.

When we compare agricultural and services sectors, we find that services sector obtains higher growth elasticity of poverty during both the pre and post Asian financial crisis periods. As our estimation of sectoral growth is weighted by GDP share, services sector which contributes the most in terms of GDP outplays agricultural sector in its capacity to reduce poverty. The fact that agricultural sector excelled during the financial crisis shows that the growth of agricultural sector is more stable. Nonetheless the output produced from this sector does not contribute as much as the output produced from service sector in reducing poverty. As a result, the growth in services sector is more effective in reducing poverty.

The Asian financial crisis did not change the role of service sector growth to lead poverty reduction. A notable change after the financial crisis however is found in the rising role of rural services sector growth. The contribution of rural service growth jumps remarkably after the Asian financial crisis in both urban and rural areas. This may be attributed to the development of rural infrastructure which allows for more opportunities in the services sector. The extent of our study unfortunately cannot confirm this account. As further research, a study dedicated to the role of rural service sector growth will be useful in disclosing this issue.

Unlike the popular belief, our results show that the power of Indonesian economic growth to reduce poverty is in fact stronger after the crisis. There are nonetheless two possible explanations of why poverty reduction slows down after the crisis. First, economic growth does not reach those who need attention the most. While the majority of poor live in rural areas, there is a division in which the pace of poverty reduction slows down in rural areas and speeds up in urban areas after the crisis. Second, the contribution of urban services sector growth, which we find most effective in reducing poverty, decreases for rural areas after the crisis. In this case, rural areas are now not being impacted by the urban services sector growth as much as they were before the crisis happened. Consequently it is not surprising that the pace of poverty reduction as a total decreases in this country.

The results of this study require several policy responses. With the growth of agricultural sector still strongly reduces rural poverty, policies on this area must continue to be treated as a priority. Meanwhile, the rising capacity of

rural services sector in reducing poverty along with the growing number of poor people coming from the services sector implies that services sector policies must be carefully developed to optimize poverty alleviation and so as not to create backlash. Finally, with more and more people moving from rural to urban areas, especially after the crisis, Indonesia needs to develop appropriate policies to anticipate growing urban poverty.

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## Appendix

Appendix 1. The Impact of Sectoral GDP Growth on Rural and Urban Poverty

	Rural Poverty		Urban Poverty	
	Coefficient	z-values	Coefficient	z-values
Urban Agricultural GDP Growth	-0.190	-0.83	0.058	0.32
Urban Industrial GDP Growth	-0.099 **	-2.83	-0.106 **	-3.02
Urban Services GDP Growth	-0.413 **	-4.52	-0.344 **	-4.75
Rural Agricultural GDP Growth	-0.445 *	-2.19	-0.017	-0.08
Rural Industrial GDP Growth	-0.102	-0.89	0.012	0.17
Rural Services GDP Growth	-0.555 **	-5.37	-0.294 **	-3.81
Change in population share	6.477 **	3.43	2.614	1.68
Initial poverty headcount	-0.143 **	-2.72	-0.106	-1.86
Initial Gini ratio	-0.002	-0.01	0.043	0.30
Initial human capital	-0.264	-1.64	-0.026	-0.40
Constant	0.138 *	2.34	0.040	0.89
Number of observations	132		132	
Wald chi-square	91.43		51.94	
Log likelihood	140.88		176.83	

Appendix 2. Sectoral GDP Share in Indonesia 1984-2008

	Urban Agriculture	Urban Industry	Urban Services	Rural Agriculture	Rural Industry	Rural Services
1984-2002	0.0222	0.2326	0.3619	0.1479	0.1032	0.1321
1984-1996	0.0172	0.2169	0.3418	0.1656	0.1128	0.1457
2002-2008	0.0268	0.2475	0.3861	0.1300	0.0902	0.1193