LUND UNIVERSITY
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Structural change, income distribution and poverty

in ASEAN-4 countries

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Abstract: This study analyzes the relationship between structural change and income distribution and poverty in ASEAN-4 countries –Malaysia, Indonesia, Thailand, and Philippines, over the last three decades. In particular, the study seeks to find out extent to which and how structural change would affect income distribution and poverty in ASEAN-4 countries. Accordingly, two methodological approaches are adopted. The first approach includes the analyses of sectoral composition change in total output and employment, and of the relationship between structural change and income distribution and poverty in each country by relying on descriptive statistics. The second approach includes econometric analyses, which use pooled OLS regression technique and investigate the relationship between structural change and income distribution and poverty on aggregate level. The results of analyses suggest that in general, structural change that occurred in the last three decades had both positive and negative impacts on income distribution depending on the country, whereas its effect on poverty was significant and positive in all ASEAN-4 countries.

Keywords: Structural change, income distribution, poverty, ASEAN-4, Malaysia, Indonesia, Thailand, Philippines

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1. Introduction

1.1 Research Problem

Income distribution and poverty constitute the core fields of development economics. Issues related to poverty and income distribution have taken interest of many scholars and have been widely studied in the literature. One of the significant issues is regarding the role of structural change or structural transformation on income distribution and poverty. It is commonly accepted that economic growth which is supported by structural change would reduce income inequality and poverty. However, if different development patterns of countries are taken into consideration, studies on this relationship will likely to give different outcomes. East Asian countries would be a good choice to study this relationship relying on their progress in structural transformation and reduction of inequality and poverty since 1970s. In this paper, the relationship between structural change and income distribution and poverty in ASEAN-4 countries over the last three decades will be studied.

In the literature, industrialization is regarded as the driver of technical change and productivity increases are mainly seen as the result of the reallocation of labor from low-productivity to high-productivity activities. Accordingly, it is widely accepted that growth and development requires structural change or transformation in the economy. However, structural change might not work in same way for all countries. In developed countries productivity growth mostly based on technological innovations, whereas in developing countries growth and development are mostly relying on changing the structure of production towards high productive activities. In developing countries, structural change can be achieved through adopting existing technologies, substituting imports and exporting manufactured goods and services, and accumulation of physical and human capital.[1]

The fast growth of most East Asian countries during the last four decades was associated with structural change that these countries experienced in such a way that the importance of agriculture declined whereas industry and service sectors strongly expanded.[2] Even though the export-led and foreign investment-driven growth strategies played an important role in attaining high growth rates by East Asian countries, the factor of structural transformation, which is also related to these policies, cannot be neglected in that process. Furthermore,

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[1-2] UN The World Economic and Social Survey 2006, Chapter II.
http://www.un.org/esa/analysis/wess/wess2006files/chap2.pdf

among ASEAN countries some of them were able to be completely industrialized such as Singapore, South Korea and Taiwan, whereas some other are still industrializing and regarded under the category of newly industrialized country (NIC) such as Malaysia, Indonesia, Thailand and Philippines. As structural change explain the economic growth and development pattern in industrialized ASEAN countries in the last four decades, it might also explain development well for newly industrialized countries which has been following the pattern of industrialized countries in East Asia.

On the other side, some ASEAN countries still have serious problems in issues related with income distribution, equality and poverty reduction. Even though poverty headcount ratio has been reduced a considerable extent in these countries during the last couple of decades, about 15% of their population lived under $1,25 per day poverty line in 2010. When it comes to the population who lives under the $2 per day poverty line, the ratio becomes 30% for the same year. Also, in some ASEAN countries the number of poor people who lives under $1,25 - $2 per day poverty lines increased significantly in recent years. Therefore, it seems that ASEAN countries still have serious challenges in poverty issues. Regarding income distribution and equality concerns, ASEAN countries also have important problems. Especially, after the 1997 financial crisis, inequality has risen in ASEAN countries. Facing with the effects of globalization, it seems that patterns of structural change and economic growth of ASEAN countries did not help to reduce inequality and to remedy income distribution problems (Wan & Sebastian 2011).

1.2 Aim and Scope

The paper aims to investigate the role of structural change in income distribution and poverty in ASEAN-4 countries; Malaysia, Indonesia, Thailand and Philippines, which are all grouped as developing and middle-income countries in ASEAN group. We have excluded other ASEAN countries from the scope of this study because some of them already industrialized and some other are still industrializing but at slower degree and with poorer performance. Therefore, we have chosen the newly industrialized countries which have made certain progress in structural transformation and reducing inequality and poverty during the last three decades. Moreover, the paper takes into account the period from 1980 to 2010 because structural change and its impact on ASEAN-4 economies were widely seen with the beginning of 1980s even though it started one or two decades ago.

The main objective of this study is to contribute to the literature through understanding the role of structural change in income distribution and poverty reduction in East Asian case from different perspectives. By pursuing on this aim, we would like to gain deeper understanding in these issues: How structural change occurs in ASEAN-4 countries, extent to which the change or transformation in economy occurs like a shift from low-productivity to high-productivity sectors; how and to what extent changing sectoral compositions do have impacts on income distribution and poverty alleviation, are changing sectoral compositions really matter in explaining improvements in income equality and poverty reduction.

Furthermore, the study would give some insight and implications for development impacts of structural change on income distribution and poverty in ASEAN-4 countries. However, the implications of this relationship regarding economic development of these countries will be taken for further studies in order to completely analyze it based on different country characteristics. In that sense, we have planned this study as starting point for our further studies regarding income distribution and poverty issues in ASEAN-4 countries.

1.3 Outline of Thesis

The thesis is organized as follows. In next chapter, we provide detailed information about income distribution and poverty in ASEAN-4 countries over the last three decades period. Particularly, we observe the trends in income distribution and poverty in three decades for each country and present a general outlook of them. In third chapter, firstly we mention theoretical framework of the thesis which includes discussions on the relationship between structural change and income distribution and poverty. Secondly, we present some of previous studies and their results related to this study's subject. Thirdly, by relying on information provided in Chapter 2 and theoretical considerations in previous section, we propose some hypotheses to be tested in the thesis. In fourth chapter, we give details of the study's data source material and explain data sets for analyses done in following sections. The fifth chapter concerns with methodology and defines two main methods; descriptive statistics and econometric models. In sixth chapter, analyses are done in three main sections. The first section is regarding the analysis of sectoral composition change in output and employment. In the second section we do analysis of the relationship between structural change and income distribution and poverty for each four ASEAN country based upon information provided in Chapter 2 and the analysis done in the first section of this chapter. The third section provides

and discusses the results of econometric analyses. Eventually, seventh chapter makes conclusion with an extensive and comparative summary of the analyses in the thesis.

2. Background: Income Distribution and Poverty in ASEAN-4

In this chapter, we will provide background information regarding income distribution and poverty in ASEAN-4 countries for following analyses. We will look into income distribution and poverty trends in four ASEAN countries during the last three decades basically by observing Gini index, income share deciles, and poverty headcount ratios of each country.

2.1 Malaysia

Table 1. Income distribution and poverty in Malaysia

	1984	1987	1989	1992	1995	1997	2004	2007	2009
Gini Index	48,6	47,0	46,2	47,7	48,5	49,2	37,9	46,0	46,2
Income share held by									
Highest 10%	38,5	36,9	36,4	37,0	37,9	38,4	28,8	34,8	34,7
Highest 20%	53,9	52,7	52,0	53,1	53,8	54,3	44,8	51,4	51,5
Lowest 10%	1,8	2,0	2,1	1,9	1,8	1,7	2,7	1,9	1,8
Lowest 20%	4,6	4,9	5,1	4,7	4,5	4,4	6,5	4,7	4,5
Second 20%	8,4	8,7	8,9	8,4	8,3	8,1	10,8	8,7	8,7
Third 20%	13,0	13,3	13,5	13,2	13,0	12,9	15,6	13,7	13,7
Fourth 20%	20,1	20,5	20,5	20,6	20,4	20,3	22,4	21,5	21,6
GDP per capita ($)	2.235	2.163	2.446	2.932	3.582	4.023	4.386	4.926	4.915
Population (Million)	15,3	16,7	17,7	19,2	20,7	21,8	25,6	27,1	27,9
Poverty Headcount Ratio									
$1,25 a day (% of pop.)	3,2	2,4	1,9	1,6	2,1	0,5	0,5	0,0	0,0
$2 a day (% of pop.)	12,3	11,9	11,1	11,2	11,0	6,8	7,8	2,9	2,3

Source: World Bank

By looking at Gini coefficients of Malaysia in the 1980s and 1990s, we can say that income inequality remained more or less at high levels along with slight increases and decreases. It seems that in the 1980s income equality improved, however this improvement was lost and even deteriorated more in the latter decade. There are several factors that might explain the up-and-down trends in Gini coefficients during these two decades. Commodity booms and expanding exports in Malaysia during the 1980s and 1990s benefited riches more than poor; however, on the other hand, broad-based and high-rate of economic growth contributed to employment expansion and led to a certain degree of catching up by the poor (Rao 2004). It is also stated that rapid industrial development coupled with the policy of rural industrialization and the expansion of the population in Malaysia have facilitated the conversion of agriculture

land to housing or industrial uses to accommodate the increasing demand. Those who own strategically located rural lands that were accruing to benefits of industrialization have managed to make large capital gains. However, this argument has not taken much support as Gini ratios were relatively low in industrialized states (Zin 2005).

The financial crisis of 1997 importantly affected income distribution in Malaysia. Reduction in business activities and retrenchments as a result of crisis led to an important decrease in mean income of the top 20 percent of households especially in urban areas. The effects of financial crisis on income distribution continued for several years. In fact, the income share of the highest 20 percent decreased from 54,3 percent in 1997 to 44,8 percent in 2004, while the income share of the lowest 20 percent increased from 4,4 percent to 6,5 percent in this period. However, from the table above we see that in the years following financial crisis the most prominent increases in income shares experienced by middle income groups. It is argued that the main income contraction in the highest 20 percent group came from the households in urban areas because the mean income of this group in rural areas remained relatively constant during the financial crisis period. On the other side, the mean income of the middle and bottom 40 percent of households in urban areas fell while those in rural areas experienced a rise in their incomes. Increasing palm oil prices and production of food crops in response to the higher costs of imports during the crisis years explain to some extent the income increases in rural areas for those income groups of households (Zin 2005). In general, it is seen from the Table 1 that even though the financial crisis in 1997 markedly diminished the rising income inequality in Malaysia, it again started to increase notably after the half of 2000s.

If we look at the poverty indicators of Malaysia, we see in general that from 1984 to 2009 poverty dramatically declined in the country. In particular, people who live with $1,25 a day declined steadily in course of time and in 2009 there was no people remained in this category. Also, poverty headcount ratio $2 a day did not change much and remained at 11-12 percent level from 1984 to 1995, but then between 1995-1997 it obviously decreased. It seems that the financial crisis in 1997 slightly inflated this ratio. In the last decade, this ratio dramatically decreased from 7,8 percent to 2,3 percent between 2004 and 2009. However, this period corresponds to increases in income inequality in Malaysia where the lowest 20 percent income group lost 2 percent in share of total income whereas the highest 20 percent gained about 6 percent share. If we generally observe the Gini index and poverty headcount ratios, we can see that changes in income distribution and poverty in Malaysia did not follow similar patterns throughout the period 1984-2009.

2.2 Indonesia

Table 2. Income distribution and poverty in Indonesia

	1984	1987	1990	1993	1996	1999	2002	2005	2006	2010
Gini Index	30,5	29,3	29,2	29,3	31,3	29,0	29,7	34,0		
Income share held by										
Highest 10%	24,9	24,6	24,7	25,0	26,6	25,1	25,6	28,5		
Highest 20%	39,5	38,8	38,9	39,1	40,7	38,9	39,6	42,8		
Lowest 10%	3,7	4,1	4,2	4,2	4,0	4,3	4,3	3,7		
Lowest 20%	8,7	9,4	9,4	9,5	9,0	9,6	9,5	8,3		
Second 20%	12,9	13,2	13,2	13,2	12,7	13,4	13,0	12,0		
Third 20%	16,9	16,8	16,8	16,7	16,3	16,8	16,5	15,8		
Fourth 20%	22,1	21,8	21,7	21,5	21,3	21,4	21,3	21,0		
GDP per capita ($)	454	494	592	707	848	747	816	915	954	1.144
Population (Million)	164,7	174,8	184,3	193,5	202,3	210,6	219,0	227,3	229,9	239,9
Poverty Headcount Ratio										
$1,25 a day (% of pop.)	62,8	68,2	54,3	54,4	43,4	47,7	29,3	21,4	28,6	18,1
$2 a day (% of pop.)	88,4	91,1	84,6	84,6	77,0	81,6	67,0	53,8	63,4	46,1

Source: World Bank

As we follow from the table above, from 1984 to 2002 income inequality in Indonesia did not change considerably given by Gini index that fluctuates around 30 which is relatively low in comparison to other countries in ASEAN-4. We also observe that the income shares of the highest and lowest groups did not change much in this period. It is argued that the high economic growth experienced by Indonesia during the Shoarto era (1965-1998) reduced poverty and narrowed income disparity in the country. There are several factors behind this phenomenon. First, the pace and pattern of economic growth were sufficiently widespread and so improved real earnings of most workers in lower-income groups. Second, the government was able to protect poor from adverse effects of public expenditure reductions. However, if one takes into account of consumption inequality, the situation is quite different as both urban and rural areas experienced greater consumption inequality especially in the 1990s (Zin 2005).

Furthermore, if we look at the figures of 1996 and 1999 in Table 2, we can see the effect of the financial crisis on income inequality. Like in the case of Malaysia but here at a lower degree, the financial crisis decreased income inequality in Indonesia as the income share of the highest 20 percent group diminished from 40,7 percent to 38,9 percent between 1996-

1999 and the income share of the lowest 20 percent group increased from 9 percent to 9,6 percent in this period. Therefore, the highest income group was affected worst from the financial crisis. However, after 2002 income inequality substantially increased in the country at a level that is not observed in the previous 20 years. In particular, the income share of the highest 20 percent group of households increased from 39,6 percent to 42,8 percent from 2002 to 2005, while the income share of the lowest 20 percent group of households decreased by 1,2 percent in that period, which is more than the decrease that experienced by the medium income groups.

Poverty headcount ratios of Indonesia indicate that in the period 1984-2010 poverty reduction seems to be attained even though poverty ratios are still high in comparison to Malaysia. Poverty headcount ratio of $1,25 a day dramatically decreased from 62,8 percent in 1984 to 18,1 percent in 2010, whereas the same ratio of $2 a day declined from 88,4 percent to 46,1 percent in the same period. These trends show a remarkable improvements in poverty reduction for Indonesia, however the problem still valid for the country given the fact that about half of the population lived with $2 a day in 2010. Moreover, it is seen that the financial crisis in 1997 inversely affected poverty ratios which increased about 4 percent between 1996 and 1999. When we particularly look at the last decade, we can say that the main decreases in poverty headcount ratios occurred in this period. It seems that in the 1980s and 1990s, there was relatively less reduction attained in poverty. Furthermore, if we take into account the very slight changes in Gini index of Indonesia throughout the period 1984-2005, we can argue that changes in income distribution and poverty followed different patterns as it has been observed in Malaysia.

2.3 Thailand

Table 3. Income distribution and poverty in Thailand

	1981	1988	1990	1992	1994	1996	1998	1999	2000	2002	2006	2009
Gini Index	45,2	43,8	45,3	47,9	43,5	42,9	41,5	43,1	42,8	42,0	42,4	40,0
Income share held by												
Highest 10%	35,5	35,3	36,1	38,7	34,9	34,3	32,3	34,0	33,8	33,4	33,3	31,5
Highest 20%	51,4	50,7	52,2	54,4	50,4	49,9	48,5	50,1	49,8	49,0	49,2	47,2
Lowest 10%	2,3	2,7	2,5	2,3	2,5	2,6	2,7	2,6	2,6	2,7	2,5	2,8
Lowest 20%	5,4	6,1	5,9	5,4	6,1	6,2	6,4	6,1	6,2	6,3	6,1	6,7
Second 20%	9,0	9,4	9,1	8,4	9,6	9,8	9,9	9,6	9,6	9,9	9,8	10,3
Third 20%	13,5	13,5	12,9	12,3	13,5	13,7	14,0	13,6	13,6	14,0	14,0	14,5
Fourth 20%	20,7	20,3	19,8	19,5	20,4	20,5	21,3	20,6	20,8	20,8	21,0	21,4

GDP per capita ($)	815	1.149	1.391	1.599	1.858	2.109	1.819	1.877	1.943	2.043	2.459	2.531
Population (Million)	48,5	55,4	57,1	58,2	59,1	60,3	61,7	62,4	63,2	64,6	67,3	68,7
Poverty H.count Ratio												
$1,25 a day (% of pop.)	21,9	17,2	11,6	8,6	4,1	2,5	2,1	3,2	3,0	1,6	1,0	0,4
$2 a day (% of pop.)	44,1	41,0	37,1	30,0	20,5	14,6	15,3	17,8	18,1	13,4	7,6	4,6

Source: World Bank

From the early 1960s, for more than three decades Thailand experienced high economic growth along with industrialization, but it also suffered high and rising income inequality in that period. Agricultural sector in Thailand played a key role in industrialization process, especially from the latter 1980s onwards, in such a way that providing surplus primary commodities for export and keeping industrial wages low due to cheap food supply and supplying abundant agricultural labor to work in factories. During the industrialization, the majority of the Thai population was in the agricultural sector and they did not much benefit from economic growth relative to the minority in the industrial and services sectors. Also, the export-led industrialization which was in favor of manufactured products affected household income distribution through its impact on the patterns of household income and consumption, and increased the incomes of non-agricultural households more than agricultural households. Therefore, in general income inequality inevitably increased in Thailand during the last three decades (Zin 2005).

As we see from Table 3, Gini index of Thailand in the 1981-2009 period did not change markedly. We observe a rapid increase in Gini index in the late 1980s and early 1990s, which indicates increasing income inequality in the country. During those years, with labor intensive and export-led industrialization and high economic growth, underemployed labor in rural areas was being absorbed. As a result, Thailand changed from a labor-abundant to a labor-shortage economy and wages began to increase in both rural and urban areas. This should have decreased income inequality in the country; however it increased rapidly in the latter half of the 1980s and early 1990s. In fact, we see that the income of the highest 20 percent of household group increased from 50,7 percent to 54,4 percent while the income of the lowest 20 percent of household group decreased from 6,1 percent to 5,4 percent during the period 1988-1992. Therefore, increases in income inequality in this period stemmed from the gain of the top income groups and the loss of the middle and low income groups. The factor behind this situation might have been that the Thai economy was changing to a domestic-oriented economy during those years which led eventually to the bubble economy in following years

(Ikemoto & Uehara 2000). As we observe from Table 3, after reaching a peak point in 1992 Gini index significantly decreased until 1998. It seems that as a result of financial crisis in 1997, income inequality worsened in 1999, but then it improved in the early 2000s.

Poverty in Thailand dramatically declined during the last three decades, as we follow from the poverty indicators in Table 3. Poverty headcount ratio of $1,25 a day decreased from 21,9 percent to 0,4 percent in the period 1981-2009, whereas the same ratio of $2 a day decreased from 44,1 percent to 4,6 percent. We see that the main reduction in poverty in Thailand occurred in the 1980s and 1990s, given the fact that the country experienced about 20 percent and 30 percent decline in poverty headcount ratios of $1,25 a day and $2 a day respectively. Poverty reduction in the last decade also continued but at relatively low levels. It is also seen that the financial crisis of 1997 reversely affected the poverty reduction trend in the country and led to an increase in numbers of poor people in the following few years. As we have seen in Malaysia and Indonesia, changes in poverty did not follow the changes in income distribution as Gini index followed up-and-down trend in most of the period 1981-2009.

2.4 Philippines

Table 4. Income distribution and poverty in Philippines

	1985	1988	1991	1994	1997	2000	2003	2006	2009
Gini Index	41,0	40,6	43,8	42,9	46,2	46,1	44,5	44,0	43,0
Income share held by									
Highest 10%	32,7	32,1	34,7	33,6	36,6	36,4	34,3	33,9	33,6
Highest 20%	48,1	47,8	50,5	49,5	52,3	52,3	50,7	50,4	49,7
Lowest 10%	2,8	2,8	2,6	2,6	2,3	2,3	2,3	2,4	2,6
Lowest 20%	6,4	6,5	5,9	6,0	5,4	5,4	5,4	5,6	6,0
Second 20%	10,1	10,1	9,3	9,5	8,8	8,8	9,0	9,1	9,4
Third 20%	14,4	14,4	13,7	14,0	13,2	13,2	13,7	13,7	13,9
Fourth 20%	21,0	21,2	20,7	14,0	20,3	20,4	21,2	21,2	13,9
GDP per capita ($)	897	953	962	960	1.045	1.048	1.102	1.225	1.307
Population (Million)	54,1	58,6	63,1	67,7	72,4	77,3	82,3	87,1	91,7
Poverty Headcount Ratio									
$1,25 a day (% of pop.)	34,9	30,5	30,7	28,1	21,6	22,5	22,0	22,6	18,4
$2 a day (% of pop.)	61,9	56,9	55,4	52,6	43,8	44,8	43,8	45,0	41,5
Source: World Bank									

Philippines experienced a little structural transformation in comparison to other ASEAN-4 countries during the 1960s and 1970s. In the 1980s and 1990s, the country encountered with foreign debt problems, fiscal deficits and political crises. Therefore, the economy of

Philippines did not perform well and did not grow at high levels relative to its neighbor countries. It is argued that this comparatively low economic growth experienced during the 1980s and 1990s might explain why the impacts of the economic crisis in 1997 on the Philippines economy was much smaller than on its ASEAN neighbors (Krongkaew & Zin 2007). However, as we follow from the table above, Gini ratio increased substantially between 1994 and 1997. Even if we take Gini coefficient of 2000, there was a very high increase in income inequality during the crisis years, which is actually not seen in Malaysia, Indonesia and Thailand.

Gini index of Philippines for the period 1985-2009 shows that during the 1980s income inequality was relatively low, but in the 1990s it rapidly increased and then in the 2000s it noticeably declined. In general, during the three decades we cannot observe any particular trend in income distribution in Philippines. After the financial crisis Gini coefficient decreased till 2009, which indicates an improvement in income inequality in the last decade. Besides the factor of poor economic growth in the country, deterioration of income distribution in the 1990s is explained by the factor that the sectoral structure of production changed towards services that tended to favor mixed incomes, which in turn accrued mainly to higher income classes (Zin 2005). In fact, we observe that the income of the highest 20 percent household group rose by around 2 percent whereas the income of the lowest 20 percent and middle income household groups declined by about 0,5 percent during the 1990s. However in the 2000s, we see that this situation became reversed as income inequality considerably improved.

Among ASEAN-4 countries, Philippines is the country which experienced the lowest improvements in poverty reduction over the last three decades. Even though poverty ratios importantly declined in the country in the 1980s and 1990s, improving process in poverty alleviation diminished in the last decade. Poverty headcount ratio of $1,25 a day decreased from 34,9 percent to 18,4 percent between 1985 and 2009, whereas the same ratio of $2 a day declined from 61,9 percent to 41,5 percent. The main reduction in these ratios, by 12 and 15 percent respectively, occurred in years between 1985 and 2000. As we have observed in other ASEAN-4 countries, the financial crisis in 1997 increased poverty ratios in Philippines, but at relatively lower levels. Interestingly, even though poverty markedly decreased in 1980s and 1990s, income inequality importantly increased in these decades. Also we see that when poverty reduction process decelerated in the last decade, income distribution improved. As we

have seen previously in other ASEAN-4 countries, improvements in income distribution and poverty reduction did not follow similar patterns also in Philippines.

3. Theory

3.1 Theoretical Framework

Regarding the relation between economic growth and income distribution and poverty, modern economic growth theories propose that rapid growth causes high productive sectors to expand at the cost of primary sectors. If it is assumed that labor productivities are higher in non-primary sectors relative to primary sectors, then the large-scale migration of population from primary to non-primary sectors would raise the migrant's incomes. As a result of this structural change, inequality in income distribution and poverty will likely reduce. Basically in this growth process, accumulation of capital, growth of non-primary sector output and productivities, and migration of labor to non-primary sector activities are important factors. However, these theories could not explain the relationship in some developing and least developed countries where low incomes, large primary sectors, and low development of human resources pose challenges to growth (Chatterjee 1995).

There are studies focusing on the trade-off between economic growth and income distribution, many of them partly derived from Kuznets' (1955) approach in this issue. Kuznets curve or the inverted-U shaped relation between per capita income levels and the extent of inequality in the overall distribution of income, suggests that at relatively low levels of per capita income, there is a tendency for income inequality to increase as per capita income increase; whereas at relatively higher income per capita income levels, there is a tendency for the extent of income inequality to narrow as per capita income increases (Dastidar 2004). In other words, Kuznets' hypothesis proposes that inequality rises in the initial stages of development and then it declines. In this approach, the driving force was assumed to be the structural change in a dual economy setting, where labor was shifted from a poor and relatively undifferentiated traditional sector to a more productive and more differentiated modern sector (Shorrocks and van der Hoeven 2004, p.258).

Furthermore, Lewis suggests that labor migration from traditional agriculture to modern industrial activities is the engine of economic development. However, according to his approach, the coexistence of the traditional sectors alongside the modern sectors is what makes development possible. In developing countries, while certain sectors have experienced substantial increases in productivity by linking up with global markets and accessing frontier

technologies, other sectors have not had similar opportunities. Even though the gaps between these sectors have widened, they also constitute a potential engine for economic growth. However, the thing is to ensure that the economy undergoes the right kind of structural change: a shift from the low productivity to the high productivity sectors (Rodrik 2011). In that regard, many studies which based on dual economy model of Lewis (1976) have concluded that even though the productivity gains in primary sectors have certain impacts on poverty reduction, the main impact come from the higher growth of industrial productivity (Acharya 2007).

3.2 Previous Research

Dastidar (2004) investigates the relationship between structural change and income distribution in a group of developing Asian and Latin American countries. The study concludes that structural change or the industrial transformation does not affect overall inequality, which gives little support to Kuznets' hypothesis. This result is explained based on structural characteristics peculiar to developing countries, like existence of an informal sector. The result that an agriculture-industry transition does not affect overall inequality is particularly important for Asian countries which underwent structural change and yet did not experience very much change in overall income inequality. Informal sector seems to be important in affecting the overall distribution of income in these countries.

Dastidar (2012) examines the relation between income distribution and structural transformation by carrying out an empirical analysis based on evidence from seventy-eight developed and developing countries. The results of study suggest that there are substantial differences as well as significant similarities between developing and developed countries regarding the distributional implications of changes in income per capita and of agriculture-industry and agriculture-service transitions. The study finds out that in developing countries, as long as industrial expansion occurs at the cost of agriculture, inequality does not increase, whereas in cases where industrial expansion occurs at the cost of services, overall inequality is even likely to fall. Accordingly the study asserts that industrialization is unlikely to worsen income distribution in poorer countries, and policies which encourage industrial expansion are likely to improve income distribution in developing countries.

Bourguignon and Morrision (1998) empirically look into reasons of differences in income distribution across developing countries by putting into evidence the major role played by the extent of economic dualism, proxied by the ratio of labor productivity in agriculture to that in the rest of the economy. The results suggest that in many developing countries, increasing the

level of productivity in agriculture sectors may have become the most efficient way of reducing inequality and poverty. In fact, the results are consistent with the results of study by Ravallion and Datt (1996), which find that in India agricultural and tertiary sector growth mattered more for poverty reduction than manufacturing sector growth.

3.3 Hypotheses

Based upon the theoretical considerations and previous research mentioned above, it can be proposed that 1) Structural change towards more productivity enhancing sectors, as a shift occurring from agriculture to industry and industry to services, might not be an important factor in reducing inequality and poverty in ASEAN-4 countries. Accordingly, it might not be expected that inequality rise in the initial stages of development and then declines as Kuznets proposed for developing countries. 2) In dual mechanism of economic systems where both traditional and modern sectors are present, improvements in traditional sectors like agriculture may have stronger impacts on decreasing poverty and income inequality than in industrial and services sectors.

4. Data

All the data regarding the study is taken from the World Bank Databank / World Development Indicators & Global Development Finance, which provide wide range of data on economic indicators of almost all countries. The study is likely to provide more coherent results and be able to make analyses more efficient by relying on one sufficient data resource. Because we have observed that there are several data sources which give very different values on certain economic indicators.

As it is seen in Chapter 2, we have mainly used data of Gini index for observing income distribution in each country. In order to get clearer picture of the phenomenon, we have also looked at data of income share held by highest 10-20%, lowest 10-20%, second-third-fourth 20%, which are given as percent of total population. For observing poverty in each country, we have looked at poverty headcount ratios of $1,25 a day and of $2 a day, which are given as percent of population. The study covers time periods of 1984-2010 for Indonesia, 1984-2009 for Malaysia, 1981-2009 for Thailand, 1985-2009 for Philippines regarding income distribution and poverty observations.

The data of the first analysis, which investigates the composition change in total output and total employment in ASEAN-4 countries in the last three decades, is taken from the same data

source of the World Bank. Particularly, in the first part of the analysis, the data of value added of agricultural, industrial, and services sector as percentage of total GDP have been used for the years 1980, 1990, 2000, and 2010. In the second part, the data of employment with regard to agricultural, industrial and services sectors as percentage of total employment have been used for the years 1980, 1990, 2000, and 2009.

Regarding the data in econometric analyses, we have used several economic indicators from the same data source of the World Bank. In analyzing the relationship between income distribution and structural change for all four ASEAN-4 countries, we have used data of Gini index as dependent variable, and have used data of agricultural sector value added in total GDP, industrial sector value added in total GDP, services sector value added in total GDP, and per capita GDP as independent variables. In analyzing the relationship between poverty and structural change, we have used data of poverty ratio of $2 a day as dependent variable, and have used data of agricultural sector value added in total GDP, industrial sector value added in total GDP, services sector value added in total GDP, per capita GDP, inflation, and population growth as explanatory variables.

We have had to limit our data range for econometric analyses mainly because of many missing observations in Gini index and poverty ratios for each country, which is generally not observed yearly basis and their time and number of observations varies depending on different countries. For the first analysis, we have used totally 39 observations which are composed by 8, 9, 13, and 9 observations of Indonesia, Malaysia, Thailand, and Philippines respectively. For the second analysis, we have included 44 observations, which are same with the observations used in the first analysis, but just 5 more observations of Indonesia have been added to this analysis.

Regarding the reliability of the data, we might say that even though we have used one of the well-known databases of the World Bank for development indicators, it has some lacking aspects especially for doing comparative analyses between countries. Most of the data in the World Bank database comes from the statistical systems of member countries; therefore the quality of the data depends on how well these national statistical systems perform. It is the fact that developing countries face several problems in providing reliable statistics due to under-investment in national statistical systems, which provides data of poor quality.[3] This problem might not be valid for ASEAN-4 countries. Nevertheless, we should take into

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[3] http://www.nsd.uib.no/macrodataguide/set.html?id=46&sub=1

consideration the data quality of the World Bank database that might varies across countries. However, when we compare it with other databases such as that of Asian Development Bank, it is more comprehensive in terms of providing wide range of variables and time periods.

5. Methods

The methodology of the study mainly consists of two different approaches. In the first approach, by referring some descriptive statistics analysis of sectoral composition change is carried out in order to investigate how sectoral shares in total output and employment changed in ASEAN-4 economies during the last three decades. Also, by referring and comparing the implications of the analyses and discussions done in Chapter 2, a general analysis is carried out in order to investigate how income distribution and poverty change with regard to structural change in ASEAN-4 economies in the last three decades. In the second approach, econometric models are used in order to analyze the relationship between structural change and income distribution, and the relationship between structural change and poverty in ASEAN-4 countries. In particular, the pooled OLS regression technique is adopted in estimation of econometric models.

5.1 Descriptive Statistics

Descriptive statistics regarding the shares of agriculture, industry and service sectors, GDP, and total employment in ASEAN-4 countries are used to do sectoral composition change analysis for the last three decades. Statistics are chosen for the years 1980, 1990, 2000 and 2010. Thus, one can easily follow the change in sectoral shares during the three decades. Firstly, the change in the sectoral composition of output as value added (% of GDP) is analyzed. Then, the change in sectoral shares of employment is analyzed. By doing these analyses, the paper would provide the extent to which and how structural change occurred in Malaysia, Thailand, Indonesia and Philippines in the last three decades. Secondly, the general analysis of the relationships between structural change and income distribution and poverty are sought to be done based upon theoretical considerations and information regarding income distribution and poverty mentioned in Chapter 2. This general analysis would give some insight on the relations between structural change and income distribution and poverty, and it would complement the econometric analyses done afterwards.

5.2 Econometric Models

For the analysis of the relationship between structural change and income distribution, the following econometric model is proposed:

$$\text{Gini} = \alpha + \beta_1 * A + \beta_2 * I + \beta_3 * G + e + \varepsilon \qquad (1)$$

$$\text{Gini} = \alpha + \beta_1 * A + \beta_2 * S + \beta_3 * G + e + \varepsilon \qquad (2)$$

$$\text{Gini} = \alpha + \beta_1 * I + \beta_2 * S + \beta_3 * G + e + \varepsilon \qquad (3)$$

Where

Gini: Gini index; measuring income inequality in the economy (Percentile scale)

A: Value added in agricultural sector, expressed as percentage of GDP

I: Value added in industrial sector, expressed as percentage of GDP

S: Value added in services sector, expressed as percentage of GDP

G: GDP per capita (Constant 2000 US$)

e: Country specific error term

ε: Random error term

Equation 1, 2 and 3 respectively captures the effects of agriculture-service transition, industry-service transition; agriculture-industry transition, service-industry transition; industry-agriculture transition, service-industry transition on income distribution.

Since we have unbalanced panel data which include unequal number of observations for each country and time series, we cluster the observations for four countries in the regressions. In order to get consistent and efficient estimates of parameters, the equations are estimated by the pooled OLS (ordinary least square) technique and corrected for possible heteroskedasticity by using cluster-robust standard errors. By clustering observations and using all four countries as reference category in our model, we can take into account the errors, which are country specific and reducing the overall error term, on an individual country basis. Thus, we will likely to get estimation of standard errors which are robust to any correlation within the observations of each country.[4]

For the analysis of the relationship between structural change and poverty, the following econometric model is proposed:

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[4] http://www.stata.com/support/faqs/stat/xtgls_rob.html

Poverty = α + β₁*A + β₂*I + β₃*G + β₄*Inf + β₅*PopGr + e + ε   (4)

$$Poverty = \alpha + \beta_1 {*} A + \beta_2 {*} I + \beta_3 {*} G + \beta_4 {*} Inf + \beta_5 {*} PopGr + e + \varepsilon \qquad (4)$$

$$Poverty = \alpha + \beta_1 {*} A + \beta_2 {*} S + \beta_3 {*} G + \beta_4 {*} Inf + \beta_5 {*} PopGr + e + \varepsilon \qquad (5)$$

$$Poverty = \alpha + \beta_1 {*} I + \beta_2 {*} S + \beta_3 {*} G + \beta_4 {*} Inf + \beta_5 {*} PopGr + e + \varepsilon \qquad (6)$$

Where

Poverty: Poverty ratio 2$ (Percentage of total population)

A: Value added in agricultural sector, expressed as percentage of GDP

I: Value added in industrial sector, expressed as percentage of GDP

S: Value added in services sector, expressed as percentage of GDP

G: GDP per capita (Constant 2000 US$)

Inf: Inflation

PopGr: Population growth

e: Country specific error term

ε : Random error term

Equation 4, 5 and 6 respectively captures the effects of agriculture-service transition, industry-service transition; agriculture-industry transition, service-industry transition; industry-agriculture transition, service-industry transition on poverty.

We have also unbalanced panel data for this analysis. Therefore, in order to have consistent and efficient estimates of parameters, we adopt the same techniques and follow the steps that we use in the previous econometric analysis.

6. Analyses and Results

6.1 Analysis of Sectoral Composition Change in Output and Employment

In order to observe the structural change in ASEAN-4 countries during the period 1980-2010, we will do an analysis of sectoral composition change that enables us to see how sectoral composition of total output and employment changed. Firstly, we will look at the shares of agricultural, industrial and service sectors in total GDP of these countries and will see how the change occurred among these sectors during the last three decades. Secondly, we will observe the change in both shares and levels of employment in these sectors.

Table 5. Sectoral composition of Output as value added (% GDP)

	Malaysia				Indonesia				Thailand				Philippines			
	1980	1990	2000	2010	1980	1990	2000	2010	1980	1990	2000	2010	1980	1990	2000	2010
Agriculture	21	16	9	7	25	20	16	13	17	12	9	7	16	15	14	12
Industry	38	42	48	41	38	41	46	41	29	36	42	46	40	35	34	32
Services	41	42	43	52	37	39	38	46	54	52	49	47	44	50	52	56

Source: World Bank

As we see from the table above, sectoral composition of total output dramatically changed in ASEAN-4 countries during the last three decades, even though the structural change seemed to occur through different patterns in each country.

In Malaysia, the share of agricultural sector decreased twofold whereas the share of services sector increased more relative to industrial sector in the last three decades. Especially in the last decade, we observe a dramatic expansion of services sector in Malaysia, which importantly reduced the shares of industry in the country. Agricultural sector in Indonesia also experienced a profound decline in its share of total output within the three decades period. From 1980 to 2000, industrial sector raised its share while the share of service sector did not change noticeably. In the last decade, however, this trend changed and service sector surpassed industrial sector, as it happened in Malaysia. In Thailand, the share of agricultural sector declined around 10 percent, while the share of industry increased more than 15 percent within the last three decades. Importantly, during this period the share of services sector declined and eventually lost its leading position to industrial sector in country's total output. Sectoral composition change during the last three decades in Philippines occurred quite different in comparison to other three countries. The share of agricultural sector in total value added output did not decline to a great extent. Interestingly, the share of industrial sector continually decreased from 1980 to 2010. It is obvious that the service sector gained substantial share and came forward in the Philippines' economy in this period, while the change occurred mostly from industry to services sector.

Table 6. Sectoral shares of Employment (%)

	Malaysia				Indonesia				Thailand				Philippines			
	1980	1990	2000	2009	1980	1990	2000	2009	1980	1990	2000	2009	1980	1990	2000	2010
Agriculture	37	26	18	14	56	56	45	40	71	64	49	42	52	45	37	35
Industry	24	28	32	26	13	14	17	19	10	14	19	20	15	15	16	15
Services	39	46	50	60	31	30	38	41	19	22	32	38	33	40	47	50

Source: World Bank

We should also look at the changing shares and levels of sectors in total employment in order to accurately investigate the structural change that occurred in ASEAN-4 countries during the last three decades.

**Figure 1. Employment in total economy and in sectors, Malaysia, 1980-2008**
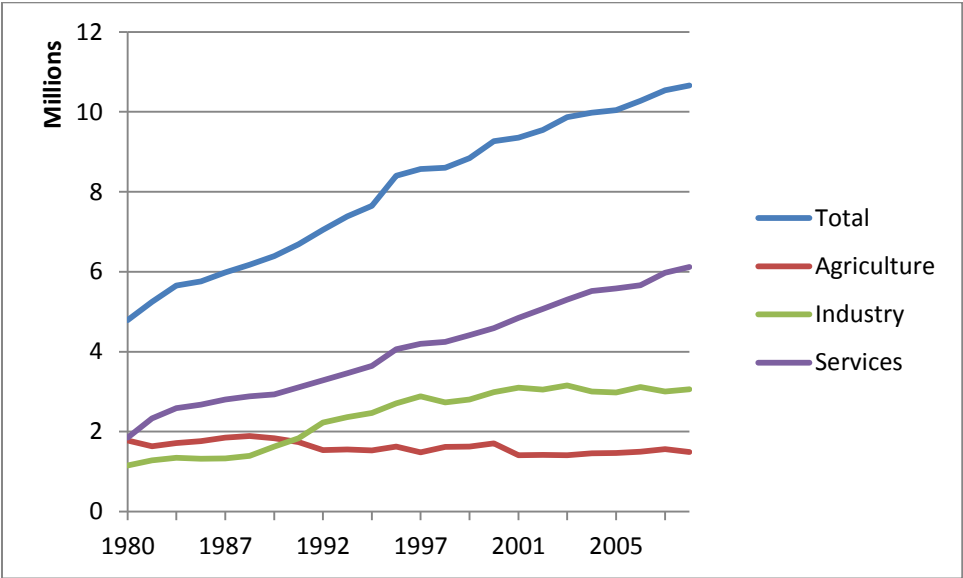
Source: ILO, Laborsta.

We see from Table 6 that agricultural sector's share in Malaysian total employment decreased more than double whereas the share of services sector increased more than 20 percent from 1980 to 2009. The share of industrial sector increased in the first two decades, but in the last decade it obviously declined. Also we observe in Figure 1 that employment in total economy more than doubled within the three decades. While employment in industry and services increased, employment in agriculture slightly decreased over the period 1980-2008. In the 1980s and 1990s, employment in industry and services importantly expanded. Employment in services sector more or less maintained its trend in the last decade; however in industrial sector employment level became stagnated especially after the financial crisis. In fact, the last

decade can be seen as an important decade for services sector in Malaysia because while the share of industry and agriculture in total employment declined and actual employment stagnated in these sectors, services sector substantially increased both its shares and levels in total employment.

Figure 2. Employment in total economy and in sectors, Indonesia, 1980-2008
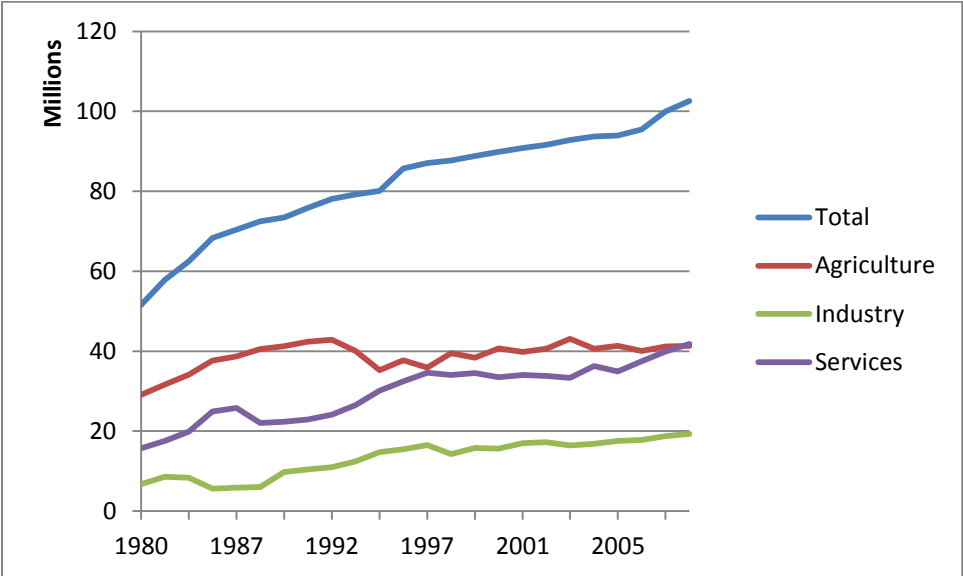
Source: ILO, Laborsta.

In Indonesia, employment shares of agricultural sector declined whereas the share of industry and services sectors increased in the last three decades. Agriculture and services sectors maintained its importance in employment shares during that period. (Table 6). We see from Figure 2 that total employment more or less doubled within the period 1980-2008 and the main contribution in this expansion came from services sector. In 1990s, employment in services sector significantly increased till the financial crisis, which led to a decline in employment levels in following few years. However, in the last decade it outstripped agriculture in terms of both share and level in total employment. Also, even though industrial sector experienced relatively less gains in its employment share during the three decades, employment in industry increased around twofold in this period. It seems that the structural change mainly started in the 1990s and thereafter one can observe that the share of agriculture substantially decreased while the share of services sector importantly increased in terms of both output and employment.

Figure 3. Employment in total economy and in sectors, Thailand, 1980-2008
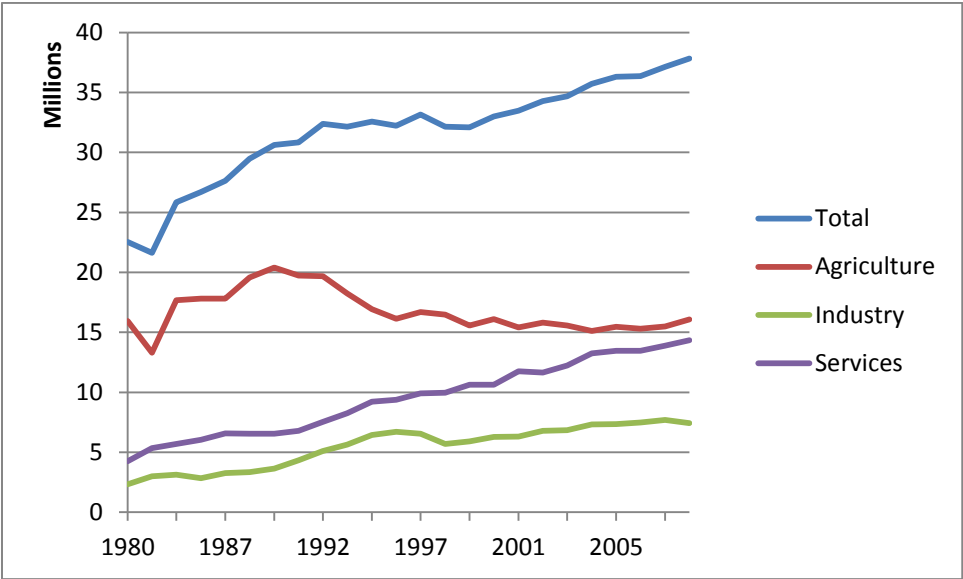
Source: ILO, Laborsta.

In Thailand, the share of agricultural sector obviously decreased while the share of industry and services sectors importantly increased from 1980 to 2009. (Table 6). Also from Figure 3 we see that total employment increased about 60 percent. In fact, services sector experienced the most prominent increase in employment level in this period. However, even though agricultural sector has experienced substantial decrease in employment from the 1990s, it still has the highest employment share and level in the country. It is interesting that the employment in services sector increased twofold and its share doubled but the share of services in total value-added of the country decreased during the last three decades. It might mean that new employment in services sector opened or concentrated more in low value-added segments of the sector. For industrial sector, we can say that this sector was higher value-added given its lower level of employment share and level, and its high level of output share.

Figure 4. Employment in total economy and in sectors, Philippines, 1980-2008
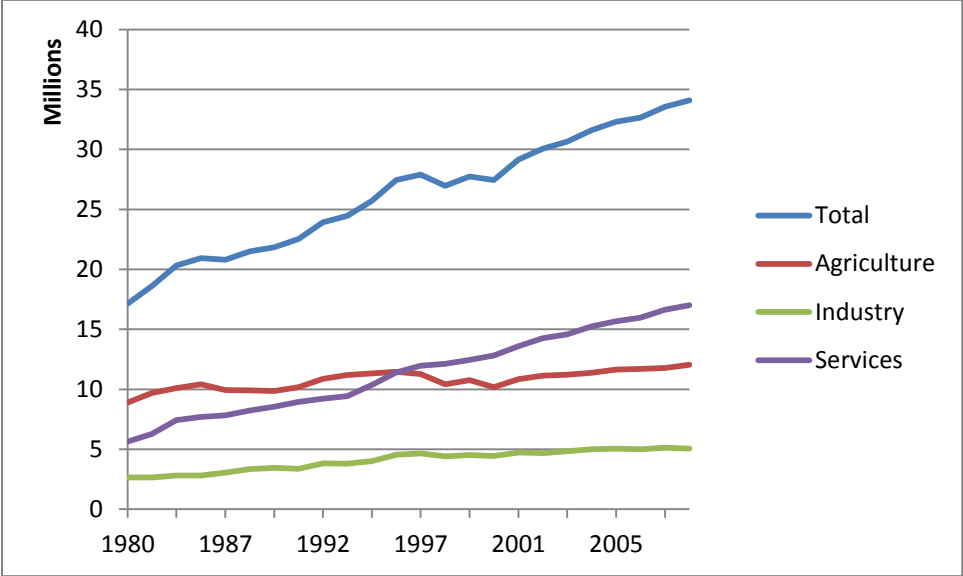
Source: ILO, Laborsta.

Philippines experienced more or less similar sectoral composition change in employment with Indonesia during the last three decades. (Table 6). The share of agriculture in employment substantially decreased in this period, even though its employment level did not change very much and remained at modest levels. However, while the share of services sector in employment increased excessively, the share of industrial sector did not change despite the fact that its employment level doubled in that period. Also total employment doubled in the three decades, and the most important contribution came from employment increases in services sector. It seems that in course of time services sector increased the gap with industrial sector in terms of shares in total output by importantly increasing its employment level and shares while industrial sector increasing its employment level slightly. Overall, services sector gained significance in the economy of Philippines in the last three decades period given its highly increasing shares in total employment and output.

In general, we observe a clear decline in agriculture's share in both output and employment compositions of ASEAN-4 countries in the last three decades. However, even though the decline is most obviously seen in Malaysia, agricultural sector continued its importance in other ASEAN-4 countries with relatively higher shares in employment. In fact, by the year of 2009, in Thailand agriculture has the highest shares in total employment, and in Indonesia and Philippines it is the second sector in employment shares. Except Malaysia, industrial sector maintained to be the third sector in terms of employment shares and levels during three

decades, though it was the second sector in total output shares in all these countries. In this period, the most important increase in output and employment shares occurred in services sector, except Thailand where this sector reduced its share in total output despite maintaining its leading position in country's economy. Overall, we can argue that ASEAN-4 countries experienced a structural change in such a way that a shift occurred from low-productive agriculture sector to high-productive services sector. However, given relatively higher shares of employment in agriculture sector of Thailand, Indonesia and Philippines, the change did not occur in these countries as much as in Malaysia.

6.2 Analysis of the Relationship between Structural Change and Income Distribution / Poverty

6.2.1 Malaysia

In Malaysia, we can clearly follow the process of structural change during the last three decades. Firstly, industrial sector took shares from agricultural sector in both total output and employment in the 1980s and 1990s. Secondly, services sector gained important shares from industrial sector in total output and employment. Within this process, we generally observe permanent decreases in agricultural sector shares and also permanent increases in services sector shares in Malaysian economy. Industrial sector, however, had a decline in its share with the beginning of 2000s. Overall, it can be asserted that Malaysia experienced a structural change with having a shift from low productivity sectors to high productivity sectors in the last three decades.

Income distribution in Malaysia during the 1980s and 1990s did not change very much given by the Gini index which took value within 46-48 percent range. These decades corresponds to the rapid industrialization in the country where the shares of agricultural sector in total output and employment were gradually taken by industrial sector. Therefore, income inequality should have been declined in these decades if one considers the structural change that took place in the country. Based upon the theoretical framework of this study, we think that as shift occurs from primary to non-primary sectors, inequality in income distribution will likely to reduce. Even though income inequality decreased in the 1980s, it raised in the 1990s till the years of the financial crisis which importantly improved income distribution in the country. In the 2000s, which is the period that services became prominent in the Malaysian economy, income inequality rapidly decreased at the beginning and then significantly increased. There

is actually not such an obvious trend for the relation between structural change and income distribution in this decade. (Table 1).

In general, regarding the income distribution and structural change relationship, we can argue the opposite of the Kuznets' hypothesis in Malaysia. Because we have observed that at relatively low levels of per capita income in the 1980s, income inequality decreased as per capita income increased, whereas at relatively higher income per capita levels in the 1990s and 2000s, income inequality increased. We might exclude the last decade, because it seems that the financial crisis in 1997 significantly affected income distribution in following years. Possibly due to the crisis, we cannot clearly observe the effects of transition to services sector on income distribution in the last decade.

Poverty reduction in Malaysia has been successfully attained during the last three decades. Now, very minor part of the Malaysian population lives under poverty. It seems that in the 1980s and 1990s –until the financial crisis in 1997- while the industrialization was taking place, poverty ratio of $1,25 a day declined more rapidly than in the 2000s while the service transition occurring in the Malaysian economy. This observation to some extent supports the findings of many studies based on Lewis approach, which conclude that the main impact on poverty reduction come from productivity gains in industrial sectors rather than productivity growth in primary sectors. However, the increasing importance of services sector in the last decade should be not neglected in poverty reduction process. After recovering the negative impacts of the financial crisis, Malaysia was able to decrease its poverty ratio of $2 a day to 2,3 percent. (Table 1). In general, we can assert that having shift from agriculture to industry, and then industry to services have importantly contributed to poverty reduction in Malaysia during the last three decades.

6.2.2 Indonesia

In Indonesia, structural change can be observed but not as clear as in Malaysia. The share of agricultural sector importantly declined during the last three decades, even though the employment share of this sector remained at relatively high levels. The main change in sectoral composition of both output and employment occurred in the 1990s when the effects of industrialization process were widely seen in the Indonesian economy. In this decade, services sector experienced expansion in its employment share, but this expansion seemed not to contribute to its output levels possibly due to having increasingly more low value-added segments. However, in the 2000s services sector in terms of its share in total output surpassed

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industry sector which significantly contracted. It seems that high value-added segments played an important role for services sector in becoming the first sector in the economy in the last decade. In general, we can say that Indonesia experienced structural change in the last three decades; however agriculture still has relatively high shares in both employment and output.

Income distribution in Indonesia in the 1980s and 1990s did not change to a considerable extent as Gini index fluctuates around 30. However, for each two decade we have observed different trends in income distribution. Particularly, while income equality improved in the 1980s, it deteriorated in the 1990s till the financial crisis. As we have seen above, industrial sector increased its importance in the 1980s and especially in the 1990s. Based on our theoretical framework, we can expect that inequality in distribution of income should have been reduced in these two decades. We have observed this in the 1980s; however we have seen the reverse pattern in the 1990s as we have also observed in Malaysia. Expansion in terms of both output and employment in low value-added segments of industry sectors might have been the cause of the increase in income inequality in this decade. The financial crisis of 1997 increased income equality in the country. In the last decade when the services sector gained important shares in the economy, income distribution significantly deteriorated. Therefore, we can say that shifting to services sector reversely affected income distribution in Indonesia. Furthermore, we have seen that at relatively low levels of per capita income in the 1980s, inequality declined as per capita income increases, whereas at relatively higher income per capita in the 1990s and 2000s, income inequality increased as per capita income increases. (Table 2). This finding actually contradicts with the hypothesis of Kuznets.

Indonesia has achieved important progress in poverty reduction during the last three decades. However, about half of the population still lives with $2 a day. In the 1980s and 1990s when the industrial sector became prominent in the economy, poverty ratios did not diminish significantly. The main reduction in poverty ratios attained in the last decade. (Table 2). This is actually the opposite of what we have observed in Malaysia. It seems that in Indonesia increasing importance and weight of services sector have contributed to poverty reduction more in comparison to that of industry sector. Therefore, we can find no support to Lewis argument in this case where the main impact on poverty reduction has come from the gains in services sector, rather than from the improvements in industrial sector.

6.2.3 Thailand

In Thailand, structural change occurred quite differently in comparison to Malaysia and Indonesia in the last three decades. The share of agriculture and services in total output decreased while the share of industry sector increased. Even though the employment share of services sector rose permanently in the three decades, its output share markedly decreased. It might mean that services sector had more low value-added segments in course of time. Industrial sector, on the other hand, seemed to be higher value-added given its low level of employment share and its high level of output share. Also, the employment share of agriculture sector still remains at very high levels though its output share declined to very low levels. In general, we can say that structural change in Thailand occurred like a shift from agriculture to industry and services. However we cannot completely observe the transition from industrial sector to services, because services sector was the leading sector in the Thai economy during the last three decades. Therefore, the expansion of industrial sector was of importance for the structural change process in the country.

Income distribution in Thailand also has a different picture compare to previous countries. In the 1980s, equality in distribution of income improved in the country. However, in the late 1980s and the beginning of the 1990s, income inequality rapidly increased. In the 1990s, we have generally observed a decline in income inequality which mainly stemmed from the increases in shares of medium income groups. The financial crisis increased inequality, and then in the 2000s it slightly decreased. Our theoretical framework suggests that income inequality should decline as shift occurring from agriculture to industrial sector. Except the years between 1988 and 1992 and the years of financial crisis, we can observe this phenomenon in the three decades given increasing share of industry in the Thai economy. In that respect, we find support to the theory. In the 1990s, even though services sector importantly lost its output share, expansion in its employment shares would have contributed to improvement in income distribution. (Table 3). Therefore, increasing weight of services sector positively affected income distribution in Thailand. Moreover, we cannot make a clear statement about the Kuznets' hypothesis in the country's case because income distribution did not display a clear trend.

Poverty reduction in Thailand was successfully attained during the last three decades. The main reduction in poverty occurred in the 1980s and 1990s. Therefore, industrialization in these decades should have importantly contributed to poverty reduction. It can be said that

rapid increases in employment share of services sector in the 1990s decreased poverty. It should also be noted that even though the employment share of agricultural sector remained very high as about 40 percent, Thailand achieved to decrease its poverty ratios substantially. (Table 3). It means that in order to reduce poverty, it is not necessary to have huge labor migration from agriculture to industrial sector. Shifting to industry and services sectors might be very important in reducing poverty, but improvements in agriculture, which is the sector that is likely to have more poor people, can also be very important in that.

6.2.4 Philippines

In Philippines, structural change occurred quite different in comparison to other three countries during the last three decades. The share of agricultural sector in output and employment decreased whereas the share of services substantially increased. Interestingly, industrial sector lost its share in total output and experienced almost no change in its employment share even though its employment level doubled in the three decades. It seems that services sector importantly strengthened its position in the economy by substantially increasing its share of both output and employment during this period. Therefore, we can say that services sector played the leading role in structural change process in Philippines during the last three decades.

Income distribution in Philippines did not follow any particular trend in the three decades period. In the 1980s, income inequality was relatively low and in the 1990s and 2000s it highly increased. The main increase in inequality occurred between 1994 and 1997, before the financial crisis. Then it decreased but remained at higher levels. (Table 4). As we have seen above, services sector rather than industrial sector played the most important role in structural change. Therefore, in the 1980s when a shift occurred from agriculture to services, income inequality remained at low levels. In the 1990s this shift continued but in terms of value-added output, the share of services very slightly increased while its share in employment rapidly increased. It might mean that services sector engaged more in low value-added segments during this decade. Due to the up-and-down trends in income distribution, it might be good approach to look at structural change over the last three decades from a general point of view. The Philippines' economy experienced an important shift from agriculture to services, whereas income distribution deteriorated in general in this period. Therefore, we cannot find support to the theory which suggests that income inequality should decrease as shift occurred from low productive to high productive sectors. In Philippines, we could not

observe a clear contribution of services sector to income equality. Also, we cannot discuss the Kuznets' hypothesis in Philippines due to a very diverse pattern in income distribution and very low income per capita growth rates of the country.

In Philippines poverty importantly reduced in the last three decades, however reduction was attained with less improvement relative to other ASEAN-4 countries. Important portion of the population still live at poverty lines. The main reduction in poverty occurred in the 1980s and especially in the 1990s. (Table 4). During these decades, services sector became prominent in the economy of Philippines. Therefore, transition to services sector was likely to contribute poverty reduction in the country. However, its effects seemed to remain limited due to a relatively low industrialization process. It can be argued that besides increasing services' share in the economy, facilitating industrialization towards higher levels with increasing shares of industry, poverty might have been reduced more rapidly.

6.3 Regression Analysis

6.3.1 Relationship between structural change and income distribution

The results of econometric analysis regarding the relationship between structural change and income distribution in group of ASEAN-4 countries are provided below. For this analysis, we have estimated three models formulated in section 5.2.

Table 7. Pooled OLS Regression Results

	Dependent variable: Gini coefficient					
Explanatory Variables	Model 1		Model 2		Model 3	
A	-0,342	(0,286)	0,850*	(0,225)		
I	-1,193*	(0,123)			-0,850*	(0,225)
S			1,193*	(0,123)	0,342	(0,286)
pcGDP	0,004*	(0,000)	0,004*	(0,000)	0,004*	(0,000)
Constant	85,207	(8,097)	-34,096	(5,995)	50,971	(21,874)
Nob	39		39		39	
R^2	0,7165		0,7165		0,7165	

Notes: Figures in parentheses are robust standard errors and * indicate 5% statistical significance level.

From the results above, we can infer several implications about the impacts of agriculture-service transition, industry-service transition, agriculture-industry transition, and service-industry transition on income distribution in ASEAN-4 countries. We can think of these transitions in our models like: Agriculture-service transition means a fall in the agriculture

share and a corresponding increase in the share of service in total value added, holding the share of industry constant. Accordingly, we can see the effects of that transition on Gini coefficient (for group of ASEAN-4 countries).

The results of first regression show that the coefficient of I is statistically significant while the coefficient of A is not. This means that agriculture-service transition does not have an impact on income distribution, whereas industry-service transition importantly affects income equality in ASEAN-4 countries. Particularly, industry-service transition (a fall in the share of industry and a corresponding increase in the share of service, holding the share of agriculture constant) would increase inequality in income distribution.

In second regression, we see that the coefficients of both A and S are statistically significant. Therefore, we can say that agriculture-industry transition and service-industry transition have positive impacts on income distribution. In particular, agriculture-industry transition (a fall in the share of agriculture and a corresponding increase in the share of industry, holding the share of service constant) and service-industry transition (a fall in the share of service and a corresponding increase in the share of industry, holding the share of agriculture constant) would reduce income inequality in ASEAN-4 countries.

We have also conducted regression for Model 3 in order to compare income inequality within sectors. Constant term in each regression indicates the level of inequality when the value added output shares of the sectors that included in regression are zero. We can observe inequality within service, industry and agriculture sector respectively from the regression results in the table above. According to these results, inequality is lowest within industrial sector (Constant= 85,207) whereas it is highest within service sector (Constant= -34,096). Even though it is not statistically significant, inequality within agriculture sector (Constant= 50,971) is more than that within industrial sector. This actually contradicts with Kuznets' assumption regarding the relation between structural change and income distribution that inequality within the agricultural sector is lower than that within the non-agricultural sector.

6.3.2 Relationship between structural change and poverty

Regarding the relationship between structural change and poverty in ASEAN-4 countries, we have conducted regression analyses on three models formulated in section 5.2. The results of regressions are presented below.

Table 8. Pooled OLS Regression Results

Explanatory Variables	Model 1		Model 2		Model 3	
Dependent variable: Poverty ratio $2						
A	3,126*	(0,816)	2,724*	(0,655)		
I	0,401	(0,543)			-2,724*	(0,655)
S			-0,401	(0,543)	-3,126*	(0,816)
pcGDP	0,000	(0,000)	0,000	(0,000)	0,000	(0,000)
Inf	-0,162	(0,029)	-0,162	(0,003)	-0,162	(0,003)
PopGr	0,013*	(0,005)	0,013*	(0,010)	0,013*	(0,010)
Constant	0,044	(0,195)	1,572	(0,369)	4,338*	(0,660)
Nob	44		44		44	
R²	0,7548		0,7548		0,7548	

Notes: Figures in parentheses are robust standard errors and * indicate 5% statistical significance level.

Regarding the relationship between structural change and poverty, in the first regression only the coefficient of A is statistically significant. It is seen that A is positively related to poverty. It means that if the share of agriculture in total value added output increase, poverty would rise. Also it implies that agriculture-service transition would decrease poverty ratio in ASEAN-4 countries. We found no important relationship in this regression between industry-service transition and poverty.

From the results of the second regression, we see that the coefficient of A is statistically significant and is positively related to poverty. Therefore, we can say that agriculture-industry transition would reduce poverty in ASEAN-4 countries. However, for service-industry transition we cannot make that statement due to its insignificant coefficient.

In third regression, we can get an idea about the relation between the share of industry and services and poverty. We see that the coefficients of both I and S are negative and statistically significant. It means that increase in the share of both sectors would reduce poverty in ASEAN-4 countries. Furthermore, we can also make statement about poverty within sectors by looking at the constant terms in each regression. Accordingly, we can say that poverty within the agricultural sector is highest (C=4,338), whereas it is lowest within the service sector (C=0,044).

6.3.3 Summary Results

We can summarize the results of our empirical analysis as follows:

- Industry-service transition increases income inequality, whereas agriculture-service transition does not have an important effect on income distribution in ASEAN-4 countries. Furthermore, agriculture-industry transition and service-industry transition reduce income inequality.
- Income inequality within industry sector is lowest, whereas it is highest within service sector. According to Kuznets' assumption, inequality within agricultural sector should be more than that within non-agricultural sector; however the results of regressions provide the opposite of it.
- Agriculture-service transition reduces poverty, whereas industry-service transition does not affect poverty reduction significantly in ASEAN-4 countries. Also, agriculture-industry transition reduces poverty, whereas service-industry transition does not have an important impact on poverty.
- Poverty within agricultural sector is highest, whereas it is lowest within service sector.

7. Conclusion

The main objective of this study has been to analyze the relationship between structural change and income distribution and poverty in ASEAN-4 countries -Malaysia, Indonesia, Thailand and Philippines- over the last three decades. The study has particularly sought to find out extent to which and how structural change occurred and how this change affected income distribution and poverty reduction in these countries.

In the study, we have adopted two methods and have done accordingly three analyses in order to cover the issue from different perspectives. The first method includes analyses based on descriptive statistics. In this method, firstly we have done the analysis of structural change by observing sectoral composition change in total output and employment levels in ASEAN-4 countries in the period 1980-2010. Secondly, we have done the analysis of the relationship between structural change and income distribution and poverty in ASEAN-4 countries comparatively by relying on descriptive statistics given in Chapter 2, and on the analysis of structural change. The second method includes econometric analyses. In particular, we have done pooled OLS regression analyses in order to investigate the relationship between structural change and income distribution and poverty in ASEAN-4 countries over the last

three decades. Unlike the first method, this method has given more general results because the regression analyses have been conducted by clustering four countries and considering them as group rather than individual countries.

From the first and the second analyses, we can provide important conclusions for each ASEAN-4 country regarding the relationship between structural change and income distribution and poverty.

For Malaysia, we cannot say that structural change that occurred in the last three decades improved income distribution in the country. We have not observed any obvious relation between transition to industry / services sectors and income distribution. Moreover, we have found that at relatively high levels of per capita income, income inequality increased as per capita income increases, which is actually the opposite of what Kuznets' hypothesis suggests. These results to some extent supports the study of Dastidar (2004) which found that structural change does not affect overall inequality in developing and Asian countries, and that give little support to Kuznets' hypothesis. Also our findings for Malaysia are inconsistent with the results of study by Dastidar (2012) which found that as long as industrial expansion occurs at the cost of agriculture, inequality does not increase. Regarding poverty, we have observed that rapid industrialization made significant contribution to poverty reduction during the 1980s and 1990s. We have also concluded that even though service transition importantly reduced poverty in the country during the last decade, the main impact on poverty reduction came from gains in industrial sector rather than in primary sectors, which actually supports Lewis' hypothesis. These results also incompatible with the findings of Bourguignon and Morrision (1998) which suggested that main contribution on reducing inequality and poverty come from productivity gains in agriculture sector.

For Indonesia, we cannot say that income distribution was improved due to structural change that occurred in the last three decades. There was no particular trend observed regarding this relationship in the country. However, we might argue in particular that transition to services sector reversely affected income distribution as it has been observed for the last decade. Moreover, we have found out that at relatively low levels of per capita income, inequality declined as per capita income increases, whereas at relatively higher income per capita, income inequality increased as per capita income increases, which opposes to the Kuznets' hypothesis. In general, we have found no particular support to results of studies by Dastidar (2004, 2012). Regarding the poverty relationship, we have observed more or less the opposite

of Malaysian case. That is, we have found that the main reduction in poverty was attained by having a transition to services sector rather than by having a transition to industrial sector. Therefore, we have not found support to the Lewis' hypothesis. Also, this result of our study supports the findings of Ravallion and Datt (1996), which found in the case of India that tertiary sector growth mattered more for poverty reduction than manufacturing sector growth.

For Thailand, we can assert that in general structural change positively affected income distribution in the last three decades. We have observed that transition to industry and services reduced income inequality in the country. Therefore, we have found support to theory that suggests income inequality declines as shift occurs from agriculture to industry, and industry to services. However, we could not make any statement about validity of the Kuznets' hypothesis due to divergent trend in per capita income levels especially after the financial crisis. In general, these results are inconsistent with the findings of the studies by Dastidar (2004, 2012). Regarding the poverty relationship, we have concluded that industrialization and transition to services sector in respect to employment importantly contributed to poverty reduction in the country. The interesting fact for Thailand is that even though the country succeeded in poverty reduction during the last three decades, the employment share of agricultural sector remained at relatively high level. It implies that huge labor migration might not be needed from agriculture to industrial and services sectors for poverty reduction, as the theory suggests. However, in case of Thailand we have not found support to findings of Bourguignon and Morrision (1998), which asserted that productivity gains in agriculture sector might be the most efficient way of reducing inequality and poverty.

For Philippines, we can argue that structural change reversely affected income distribution during the last three decades. The country experienced an important shift from agriculture to services sector but it seems that this shift did not improve income distribution. Also, we could not verify Kuznets hypothesis given the country's very divergent income distribution pattern and low income per capita growth. Poverty, on the other hand, was reduced considerably even though it still at higher levels compare to other ASEAN-4 countries. Moreover, we have concluded that service transition, rather than industrialization, likely to had important effects on poverty alleviation in the country. Therefore, we have not found support to Lewis' hypothesis in Philippines. Also, this result to some extent consistent with the findings of Ravallion and Datt (1996) for the case of India where agricultural and tertiary sector growth mattered more for poverty reduction than manufacturing sector growth. We have also stated that lack of industrialization process would have limited the success in poverty reduction.

This might point out the importance of the direction of structural change in reducing poverty. Therefore, it can be argued that if Philippines experienced transition to industrial sector at higher levels, it would have succeeded more in poverty reduction.

From the third analysis, at ASEAN-4 group level we have concluded that transition from agriculture to industry and from services to industry would reduce income inequality, whereas transition from industry to services would increase it. These results seem to support our arguments in the first and second analyses for Indonesia where we have found service transition increased income inequality, and for Thailand where we have seen that transition to industry reduced inequality. Regarding the relationship between structural change and poverty, from the last analysis we have found that transition from agriculture to industry and services would reduce poverty. These results in general support the implications from the first and second analyses for all four countries. The difference is that while in Malaysia and Thailand industry transition was more important in reducing poverty, in Indonesia and Philippines service transition played more important role in poverty alleviation. In general, we can say that structural change has had both positive and negative effects on income distribution, whereas it significantly contributed to poverty reduction in ASEAN-4 countries during the last three decades. In conclusion, we cannot find supportive results for the first hypothesis of the study which suggests that structural change might not be an important factor in reducing inequality and poverty, and for the second hypothesis which asserts that improvements in agriculture sector might have stronger impacts on income distribution and poverty reduction than in industrial sector.

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