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GROWTH, POVERTY, AND LABOR MARKET RIGIDITY IN INDONESIA
A General Equilibrium Investigation

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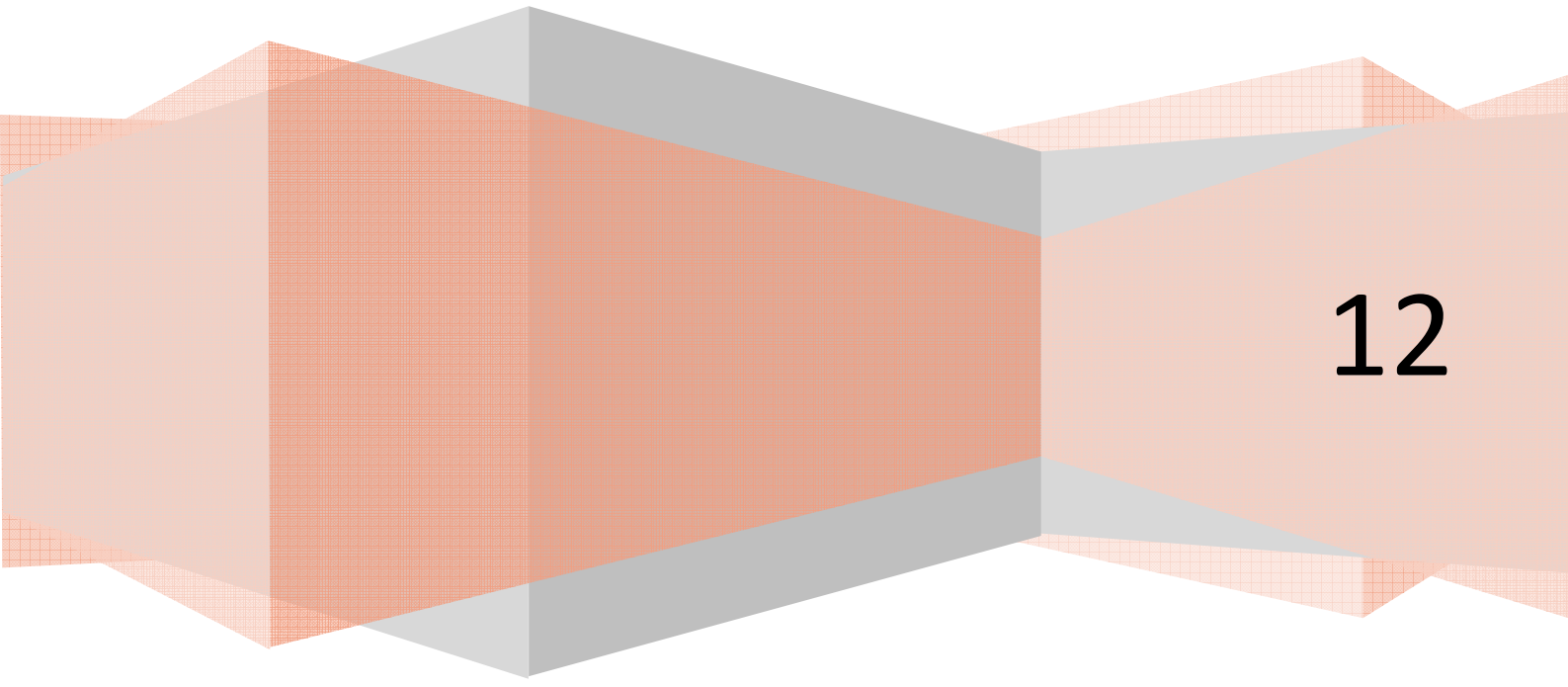

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GROWTH, POVERTY, AND LABOR MARKET RIGIDITY IN INDONESIA

A General Equilibrium Investigation

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ABSTRACT

In this paper, we argue that the intensification of capital use and an acceleration of real wage growth can be the main culprits of the "jobless growth" in Indonesian manufacturing sector for the period of 1999-2008, a period of recovery from the Asian Crisis. This can also endanger the poverty reduction aspiration during the same period. We simulate the situation using a Computable General Equilibrium model and find that the effect of the increased capital utilization and the acceleration of real wage growth are equally important in explaining the jobless-growth phenomenon. Increased capital utilization help the economy recover and reduces poverty but when constrained with the increasing real wage, the recovery and the rate of poverty reduction is slower. The situation is in favor of the non-poor because first, the poor is mainly dependent on non-formal employment, hence do not benefit from the increased real wage; second, the slower expansion of the manufacturing sector affect the rest of the economy affecting the real wage of the labor employed in other sectors, such as unskilled non-formal labor and agricultural labor upon which the poor are heavily dependent; and third, the income rise from increased capital utilization mainly benefits the urban non-poor.

Keywords: Growth, poverty, labor market, general equilibrium, Indonesia

JEL Code: O53, J21, I38

1. BACKGROUND AND MOTIVATION

Before the East Asian financial crisis, manufacturing sector was the primary source of the fast Indonesian economic growth. The growth of the manufacturing sector's GDP was 11.2% during 1990-1996 (while the average economic growth was 7.9%) and its employment growth was 6% (while the average national employment growth was only 2.3%).

Almost a decade after the crisis, the role of the manufacturing sector in generating employment seems to be halted. While its growth for the period of 2000-2008 was almost the same as national average (4.7%), its employment growth was only 0.9%[1].

Aswicahyono et al (2010) estimated that while during the period of 1990-1996, the implied output elasticity (percentage change in employment with respect to percentage change in output growth) of the manufacturing sector was 0.53, after the Asian financial crisis (2000-2008) it drop down to only 0.18. Aswicahyono et al (2010) refer to this situation as *the jobless growth*.

One of the important hypotheses on what had caused manufacturing sector to grow without creating much employment is higher labor market rigidity after the Asian Financial Crisis. Before the crisis period (during the Soeharto era), labor market was more flexible. Labor union was "managed" by the state; minimum wage was present but not strongly enforced (Aswicahyono et al., 2010). After the financial crisis, as the consequence of the political reform, the labor market regulation started to be tightened. Minimum wage increased by 90% in only three years from 1999-2002 (Aswicahyono et al., 2010).

From the result of the doing business survey of International Finance Corporation, Manning and Roesad (2006) conclude that the labor market in Indonesia is among the most rigid in Southeast Asia. Indonesian labor market rigidity (in which cost of hiring is one of them, and therefore minimum wage) is well above China, Malaysia, Thailand, Philippines, and even socialist Vietnam.

Since the start of the "New Order" government, up to and prior to the 1997 Indonesian economic crisis, it has brought about increase in income per capita by almost four times. The increasing income of the average Indonesian has also been accompanied by outstanding reduction in poverty. Number of poor people fell from 54.2 million people in 1976 (40.1% of total population) to become 22.5 million people (11.3% of total population) in 1996 (Alisjahbana, et al, 2003).

There is arguably some indications that the rate of poverty reduction in the period of the financial crisis is slower than the before the financial crisis. Therefore, although some of this stagnation in the poverty reduction aspiration may have been attributed to the Asian Financial Crisis, people starts to wonder that after more than a decade, there must have been something else behind this. Comparing the rate of poverty reduction for the last 11 years (2000-2011) with the rate of poverty reduction 1984-1996 (as shown in Table 1) suggest that the concern is quite well-founded. The *jobless-growth* in manufacturing sector may have also played a role too especially in the poverty reduction in urban areas. The link between poverty, manufacturing growth, and labor market need to be investigated more closely.

[1] Data source: ADB statistics

Table 1. Trend in poverty incidence and number of poor population

Number of poor population (million, %)	1984	1996	1984-'96[a] (%)	2000	2011	2000-'11[b] (%)
Urban	9.3	7.2	-2.1	12.3	11.1	-1.0
Rural	25.7	15.3	-4.2	26.4	19.0	-3.0
Urban + Rural	35.0	22.5	-3.6	38.7	30.0	-2.3
Poverty incidence (%)	**1984**	**1996**	**1984-'96[a] (%)**	**2000**	**2011**	**2000-'11[b] (%)**
Urban	23.1	9.7	-1.1	14.6	9.2	-0.5
Rural	21.2	12.3	-0.7	22.4	15.7	-0.6
Urban + Rural	21.6	11.3	-0.9	19.1	12.5	-0.6

Note: [a]) annualized change (%), [b]) average annual change
Source: BPS

To summarize, for almost a decade after the Asian financial crisis (2000-2008), manufacturing sector output grew by about 5.2%. If that growth had happened before the crisis, with the employment elasticity of 0.53, it would have generated 2.76% of employment growth. However, in reality it only generated 0.9% growth. To what extent this was caused by factors related to labor market rigidity is an important counter-factual question. In the meantime, poverty reduction during similar period seems not to be progressing satisfactorily. Poverty is closely linked with sectoral employment opportunities and to a large extent this has to do with the labor market condition including its regulation. A perspective which looks at the connection between labor market conditions, sectoral production, household employment and eventually poverty incidence is naturally a general equilibrium problem. To the best of our knowledge, no attempt has been made to look at this problem in Indonesia from a general equilibrium viewpoint.

2. RESEARCH QUESTIONS

In general, the question to be asked in this research is to what extent labor market rigidity, in particular real wage rigidity in certain segment of the labor market that can be attributed to the minimum wage regulation, play a role in the stagnation of manufacturing sector in creating employment and what the likely implication is on poverty in Indonesia. More specifically, the research questions are as follows:

1. What are the likely causes of the recent growth of the manufacturing sector, at sub-sectoral level, knowing that labor absorption is very low?
2. What is the economy wide impact of the growth in the manufacturing sector, at sub-sectoral level, on other variables in the economy such as output of other sector (non-manufacturing), GDP, as well as its poverty impact *under the condition of labor market rigidity (represented by constant or increasing real wage)*?
3. What is its impact (economy wide and poverty) on the same scenario above *under the condition of more flexible labor market (no real wage rigidity)?*
4. What is the implication of those different labor markets setting on the rate poverty reduction?

3. METHODOLOGY

3.1. A GENERAL EQUILIBRIUM MODEL OF THE INDONESIAN ECONOMY

The main methodology to be used to answer the research questions discussed above is a Computable General Equilibrium (CGE) model called INDONESIA-E3[2]. The unique feature of this model which is very relevant in this study is the disaggregation of household by expenditure classes which allows for precise estimates of the distributional impact and poverty incidence. In the literature of the poverty impact analysis using CGE models, this class of model is called an integrated CGE model (Bourguignon et al, 2010). This class of model normally has disaggregated households which link each of the households to both sources of income (through market of factors of production) and expenditure (through market for commodities). What happened in the labor market (for example due to certain economic shocks affecting certain sectors in the economy) has direct links to income of each household in the model. This should be distinguished from other class of model which is called top-down, where the CGE model is separate from the poverty module, and between them is only one directional relationship. In the integrated model, there is no separation between CGE model and poverty module because all are in one model.

INDONESIA-E3 has been used in various research for example to analyze the distributional impact of fuel pricing reform (Yusuf & Resosudarmo, 2008); the poverty and distributional impact of carbon tax (Ministry of Finance of Indonesia, 2009); greenhouse gasses emission from land use change (Warr & Yusuf, 2010).

More specifically, INDONESIA-E3 has the following structure. More detailed exposition of the model can be found in Yusuf (2008).

1. A production structure that can be disaggregated into 181 sectors.
2. A household consumption demand system comprising of 200 households (100 urban and 100 rural grouped according to its level of per capita expenditure), derived from the linear expenditure system where its parameters are estimated econometrically.
3. A factor demand system, based on the assumption of CES production technology that relates the demand for each primary factor to industry outputs and prices of each of the primary factors, reflecting the assumption that factors of production may be substituted for one another in ways that depend on factor prices and on the elasticity of substitution between the factors.
4. A distinction between different kinds of labor which distinguishes skills and formal and informal as well as rural and urban labor (up to 16 labor classifications). In each industry, all four kinds of labor enter a CES production function to produce 'labor', which itself enters a further CES production function for industry output.
5. Leontief assumptions for the demand for intermediate goods. Each intermediate good in each industry is assumed to be demanded in fixed proportion to the gross output of the industry.
6. Demands for imported and domestically produced versions of each good, incorporating Armington elasticity of substitution between the two.

[2] E3 stands for Economy, Equity, and the Environment.

7. A set of export demand functions, indicating the elasticity of foreign demand for Indonesia's exports.
8. A set of equations determining the household incomes from their ownership of factors of production, reflecting data derived from the Social Accounting Matrix, the rates of return to these factors, and any net transfers from elsewhere in the system.
9. Rates of import tariffs, excise taxes and subsidies across commodities, rates of business taxes, value added taxes and corporate income taxes across industries and rates of personal income taxes across household types which reflect the structure of the Indonesian fiscal system, using data from the Indonesian Ministry of Finance.
10. A set of macroeconomic identities which ensure that standard macroeconomic accounting conventions are observed.

3.2. DATA: SOCIAL ACCOUNTING MATRIX

The integration of highly disaggregated households adequate for accurate distributional analysis is made possible by constructing an Indonesian Social Accounting Matrix (SAM) which serves as the core database to the CGE model. The SAM consists of up to 175 industries, 175 commodities, and 200 households (100 urban and 100 rural households grouped by percentile of real expenditure per capita). The data used for constructing the SAM include Indonesian Input-Output Table, official SAM, and most importantly household level survey data (SUSENAS). Detail construction of the SAM can be found in Yusuf, (2006) and its structure can be found in Table 2.

Table 2: The Structure of Indonesian Social Accounting Matrix

		Activities 1…175	Commodity		Factor		Ind. Tax	S-I	Households 1…200	Transfers	Enterprises	Gov't	ROW	TOTAL
			Domestic 1…175	Imported 1…175	labor 1…16	Capital								
Activities	1 … 175		MAKE Matrix											**Industry Sales**
Domestic Commo-dities	1 … 175	_Domestic Intermedi-ate Input						Domestic Invest-ment	Domestic Hou. Con-sumption			_Domeatic Gov't Lon-sumption	Export	**Total Dom. Demand**
Imported Commo-dities	1 … 175	Imported Intermedi-ate Input						Imported Invest-ment	Imported Hou. Con-sumption			Imported Gov't Con-sumption		**Total Import**
labour	1 … 16	Salary and Wages											labour used abroad	**Total labour Demand**
Capital		Non-labour											Cap. used abroad	**Capital Demand**
Ind. Tax		Tax/ Subsidy		Tariff										**Ind. Tax Reven.**
Urban HH	1 … 100				labour Income: Urban	Capital Income: Urban				Inter-Hous. Transfer			ROW transfer to HH	**Total Hous. Income**
Rural HH	1 … 100				labour Income: Rural	Capital Income: Rural				Inter-Hous.. Transfer			ROW transfer to HH	**Total Hous. Income**
Transfer									Transfer to HH					**Int. Hou. Transter**
S-I									Household Saving		Enterprise Saving	Gov't Saving		**Total Saving**
Govern-ment							Ind.Tax Revenue		Direct Tax		Ent. Trans. to Gov t	Inter G Transfer	ROW Tans. to Gov t	**Govt Revenue**
Enter-prises						Enter-Enter-					Inter Ent. itans.		ROW Trans. to Enter.	**Ente. Income**
ROW				Import	Foreign labour	Foreign Capital			HH Transfer to abroad		Ent Trans. to abroad	G. Transfer to abroad		**Forex Outflow**
TOTAL		**Industry Costs**	**Dom. Supply**	**Import Supply**	**labour Supply**	**Capital Supply**	**Ind. Tax Revenue**	**Total Invest.**	**Household Spending**	**Int. Hou. Transfer**	**Enter. Spending**	**Govern. Spending**	**Forex Inflow**	

3.3. FRAMEWORK, SCENARIOS AND SIMULATION STRATEGY

As will be elaborated in the later section, for the period after the Asian financial crisis (1999-2005), manufacturing sector experience the following adjustment.

1. Output or value added of the manufacturing sector mildly increased (for about 5% annually).
2. Employment in the manufacturing sector was stagnant (or increase for only less than 1%).
3. Real wage rose quite rapidly.

One plausible explanation on what had happened is that manufacturing sector experience a rapid increase in its capital intensity, as its output grows a lot higher than its employment. Figure 1 below may illustrate the case.

Figure 1. Output growth and stagnant employment (illustrative)

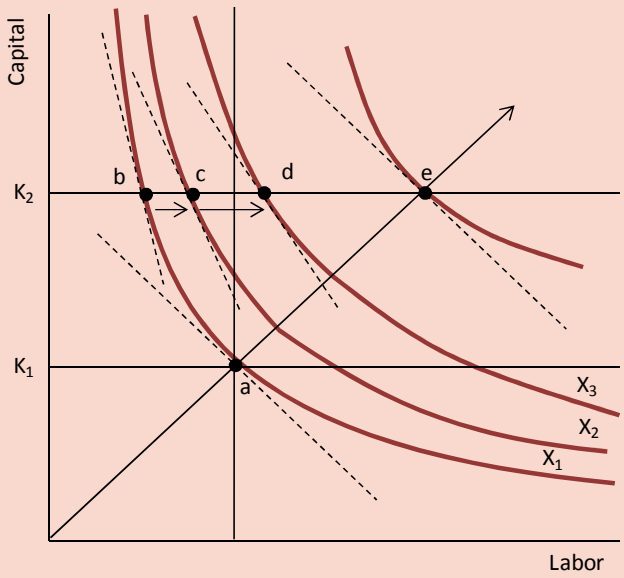


Figure 1 illustrates a manufacturing production isoquant map with typical constant returns to scale technology and specific capital (short run specificity of capital). Initially production level is at point a, with capital fixed at K_1. Capital then increase to K_2 (a situation in the period of economic recovery from the crisis, increased capital utilization) then instantly without changing output, production move to point b temporarily, where substitution effect takes place where labor is less demanded. Shortly after that, for example because zero profit condition takes place, output increases given the same amount of new capital. However, it is less clear where the final point will be. It could be b, c, or, even d. When point c is reached the new equilibrium is higher output with lower labor, but when point d is reached the new equilibrium is reached with higher output with higher labor. The slope of the isoquant in all those points reflect the relative input price (w/r) perceived by the firm. The firm's output expansion responding to the capital increase can only be achieved by hiring more labor and the extent to how much labor the firm can hire depend, among others, on the prevailing wage. The jobless growth can be best represented by the situation in point c, where output increase yet with lower labor usage.

Given the above initial framework, the research strategy to be followed is the following:

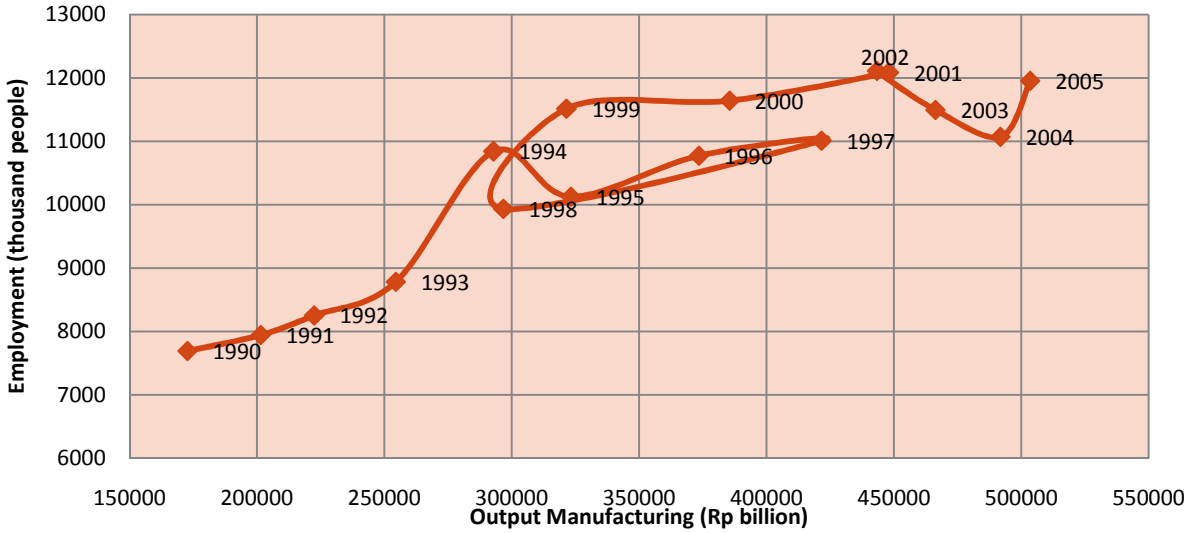
- First, using the statistics of survey of manufacturing establishment for the period under consideration, we will identify at greater detail sectoral level the growth in output and employment.
- Second, using the same set of data, we will investigate possibility and the extent of lower capital utilization rate. The information from the first and second steps will be used to construct set of simulation in the CGE model.
- Third, we will extend the INDONESIA-E3 CGE model to mimic as much as possible the labor market rigidity represented with sticky real wages and increasing real wage in the formal labor market.
- Forth, we will simulate the same scenario but with more flexibility in the labor market, by endogenizing real wage in the labor market and maintaining full employment assumption.

4. RESULT AND DISCUSSION

4.1 REVISITING THE JOBLESS GROWTH

We use both secondary data of sectoral value added and employment, as well as plant level survey of manufacturing establishment from the period of 1990 to 2008 to analyze in greater detail about output, employment, and capacity utilization in the manufacturing sector noting the likely differences in its characteristics between pre-Asian financial crisis and period after the crisis.

Our observation confirms the jobless growth phenomenon in manufacturing sector when we plotted the value added (in constant 2000[3] price) data against employment. Figure 2 shows the scatter diagram in its original unit, while Figure 3 shows the diagram in its logarithm. We added year as the label in the diagram to keep track with the evolution of both variables.



Source: ADB Statistics

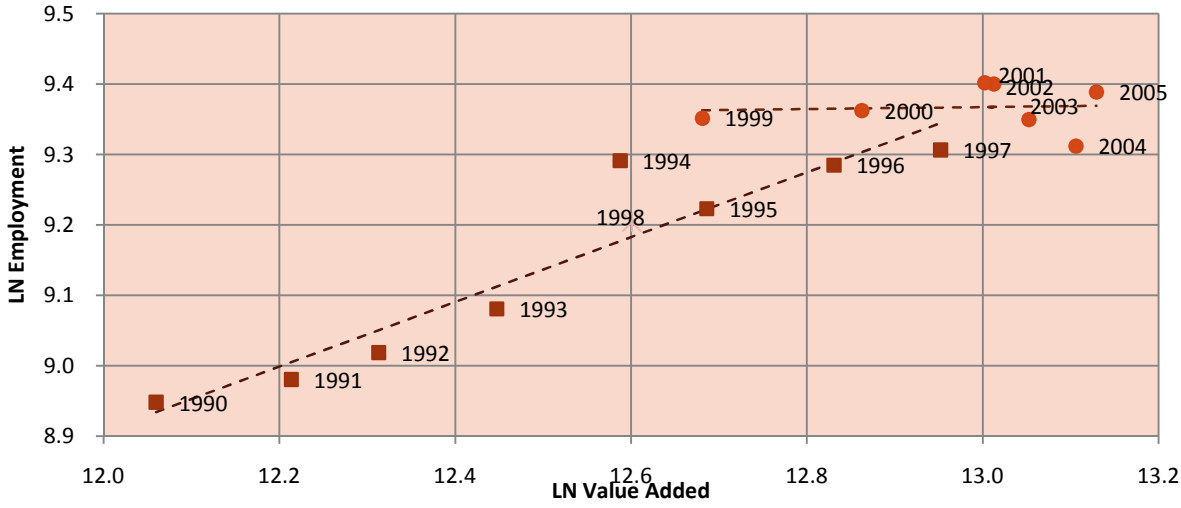
Figure 2. Manufacturing value added and employment

[3] We used the wholesale price index as the deflator.

As can be seen from Figure 2 above, from 1990 to 1996 Indonesian manufacturing sector grew rapidly together with its level of employment. In the course of Asian financial crisis, the output declined from 1997 to 1998 and its employment also fell significantly. From 1998 to 1999, it started to recover and the employment level reached its pre-crisis level. However, starting from 1999, while its output started to grow again, employment level was relatively stagnant. There was a stagnation of employment absorption in manufacturing sector despite the growth in its output during the post-crisis period.

Figure 3 below illustrate how output elasticity (of employment) as reflected by the slope of the trend line of the pre-crisis and post-crisis period, differ between those two periods. We calculated that the elasticity during 1990-1997 is 0.46 while for the period of 1999-2008 it is close to zero (0.014)[4].

On the contrary, in agriculture sector, it is observed (see Figure 4) that while its employment steadily decline in the pre-crisis period, in the post-crisis period, the employment stopped declining. Employment tends to increase in agriculture sector during the post-crisis period. This suggests that the new supply of labor force has been absorbed by the low-paying agriculture sector instead of traditionally being absorbed by manufacturing sector.



Source: Asian Development Bank 2009

Figure 3: Manufacturing output-employment elasticity before and after the crisis

[4] Our calculation (using value added data with constant price) intensify the degree of the jobless growth rate as Aswicahyono et al (2010) calculated the elasticity in post-crisis period to be in the magnitude of 0.18.

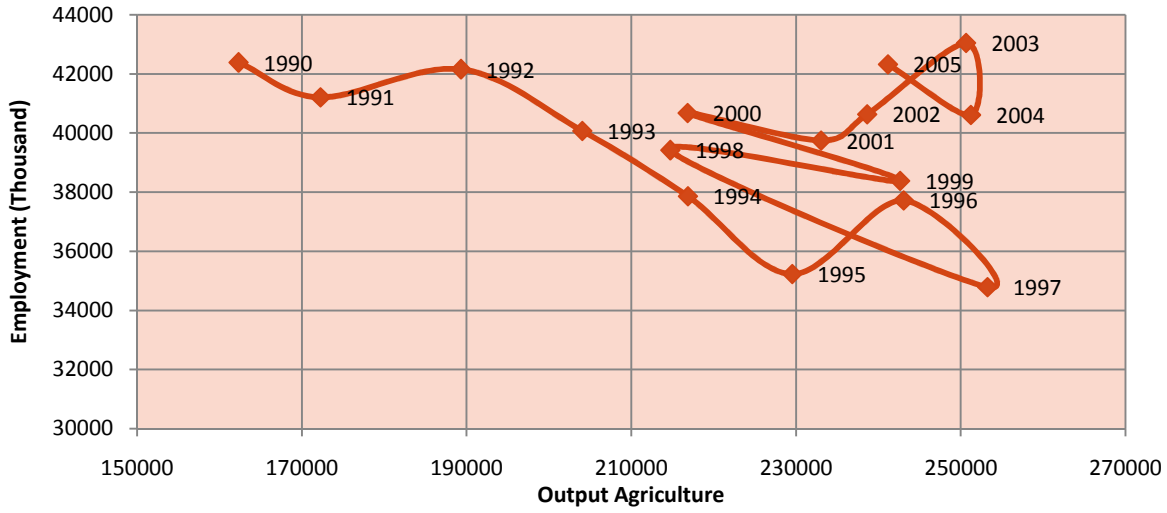


Figure 4. Agriculture value added and employment

We also analyze the plant-level data of the survey of manufacturing establishment for the period of 1990 to 2008 to get a sub-sector level detail. We divided the sub-sectors of the manufacturing into the following 5 categories[5].

1. Unskilled labor-intensive: ISIC 32 (textiles and garments), 332 (furniture), 342 (printing and publishing), and 39 (other manufacturing).
2. Resource based, labor-intensive: ISIC 31 (food and beverages) and 331 (wood products).
3. Resource based, capital-intensive: ISIC 341 (paper and paper products), 35 (chemicals, rubber, and plastics), 36 (non-metallic minerals), and 37 (basic metals).
4. Electronics: ISIC 383 (electrical machinery)[6].
5. Footloose capital-intensive: ISIC 381 (metal products), 382 (non-electrical machinery), 384 (transport equipment), and 385 (professional and scientific equipment).

Using this plant-level data we observed the following (see Figure A1-A5 in the appendix). First, the jobless-growth phenomenon happened in almost all sub-sectors (under the 5 categories above) within the manufacturing sector; Second, it happened most notably in the unskilled labor intensive manufacturing sector, yet not so much in the labor-intensive resource based sector.

These observations suggest that what happened in the unskilled labor-intensive manufacturing sector may explain why overall manufacturing sector slowed down in absorbing more labors. In the mean time, as many evidence suggested - see for example Alisjahbana & Yusuf (2004) - that resource based sector was relatively more resilient to economic crisis and it might helped, to some extent, absorb employment.

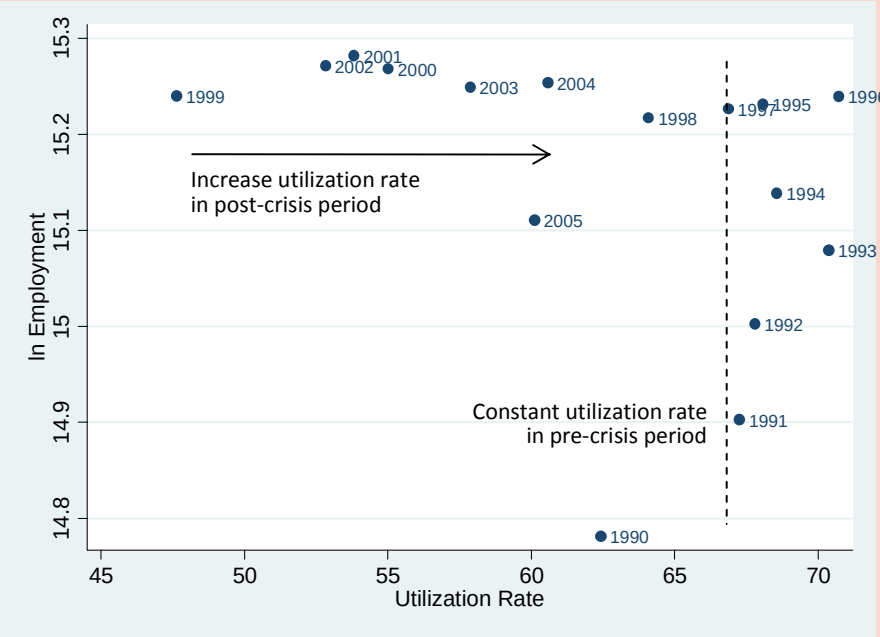
[5] The five categories are based on the following ISIC groups (and corresponding SITC groups for export statistics).

[6] Note that electronics is typically categorized as a high value added (R&D-intensive) activity. However, it is one of the few industries whose factor intensity ranking clearly shifts between low and high-income countries. In countries like Indonesia, electronics exports are dominated by labor-intensive assembly and packaging activities.

To get an idea on how utilization of capital plays a role in the low employment absorption of manufacturing sector growth, we plot the utilization (the measure of the intensity of using capital) rate against employment. At the overall manufacturing level (see Figure 5), it is clearly shown that while during the pre-crisis period, both employment and, to a lesser extent, utilization rate rose in supporting the rise in output, during the post-crisis period (1999-2005), it was the utilization rate only that grew leaving employment relatively stable. The increase in capital use, which had been idle during due to crisis is the main driver of manufacturing sector recovery. What happened was more or less the same across the sub-sectors in the manufacturing sectors (See Figure A5-A10).

The stagnation in the labor absorption of the manufacturing sector in the post crisis period was accompanied by the increase in the intensity of capital usage indicating that in general, manufacturing sector experience an increase in capital intensity or capital labor ratio. In the context of further analysis, if the beginning of the recovery period is used as the reference level, then what happened can be perceived as the large increase in capital stock as roughly illustrated conceptually in Figure 3.

Figure 5: Utilization rate & employment: overall manufacturing



Source: Survey of medium and large manufacturing establishment

The growth in real wage is also observed to be higher for the period of 1999-2005 compared to the pre-crisis period o 1990-1996. The acceleration in the trend of real wage between two periods can be seen from Figure below which shows the trend line of real wage which is steeper for the period of 1999-2005 compared to that of 1990-1996. As also concluded in the World Bank (2010) report, the increasing trend in the real wage is attributed to the rapid growth in the minimum wage (especially during 1999-2003), thanks to restoration of democracy and the subsequent proliferation of the labor unions.

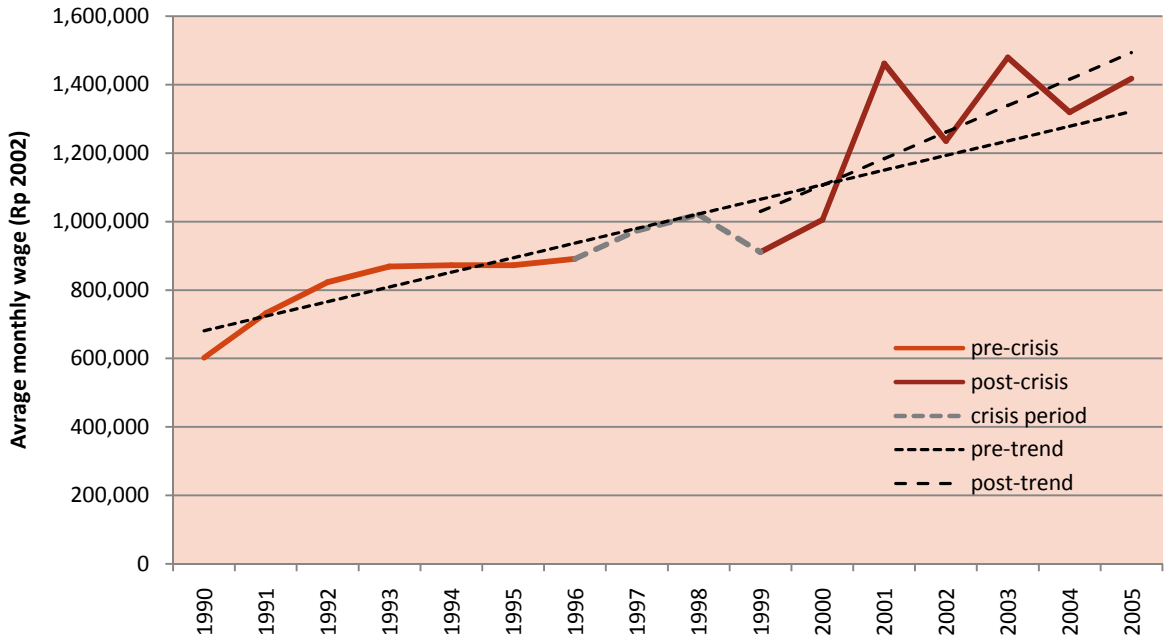


Figure 6. Trend of real wage (1990-2005)

4.2 GENERAL EQUILIBRIUM SIMULATIONS

4.2.1 SIMULATION STRATEGY

Three simulations using INDONESIA-E3 model will be attempted:

1. Simulation 1 – An increase in the capital stock of 5 sub-sectors of manufacturing under the condition of flexible labor market. The magnitude of the increase in the capital stock is approximated by observed change in the utilization rate of the manufacturing sectors over the period of 1999 – 2005, the post-crisis period. Utilization rate during the pre-crisis period (1990 – 1996) is relatively stable; therefore the change in the post-crisis period can be interpreted as change relative to baseline. The magnitude of the shock can be seen from Table 3. The assumption of flexible labor market condition is a condition of full employment of labor (in each category of labor) and real wage change is the equilibrating variable.
2. Simulation 2 – The same setting as in Simulation 1 except that the real wage is held fixed for formal labor. Fixed real wage means the nominal wage increase is the same as the increase in the consumers' price index.
3. Simulation 3 – The same setting as in Simulation 1 except that the real wage for formal labor is increased by roughly 3%. The 3% increase is an average deviation from baseline over 1999-2005. The baseline and non-baseline real wage is calculated using different annualized growth rate between pre and post crisis period.

For all the simulations, balanced trade or exogenous balance on current account is assumed. This ensures that the potential effects of the shock being analyzed do not flow to foreigners, through a

current account surplus, or that increases in domestic consumption are not achieved at the expense of borrowing from abroad (in the case of a current account deficit). For exactly the same reason, real government spending and real investment demand for each good are each fixed exogenously. With this setting, its full effect of the simulations will be channeled to the household expenditure, the proxy of welfare in our model (Warr & Yusuf, 2011, p. 311).

Table 3. The shocks to the capital utilization in 5 sub-manufacturing sectors

	Sub-sector of manufacturing	Increase in capital stock (% change relative to baseline)
1	Unskilled labor intensive	5.4
2	Resource-based labor intensive	2.5
3	Resource-based capital intensive	3.4
4	Electronics	8.8
5	Footloose capital intensive	4.5

Source: Statistics of medium of large establishment

4.2.2 SIMULATION RESULTS

Table 4 to Table 7 shows the result of three simulations describe above on relevant macroeconomic variables, sectoral variables such as output and employment, and poverty incidences.

Table 4 shows the impacts of the three simulations on several relevant macroeconomic variables and factor market variables. As can be seen from the table, simulation 1 (where labor markets are allowed to clear), the manufacturing sector recovery represented by an increase in the use of capital stock (being idled previously due to the financial crisis), GDP is 0.66% higher relative to baseline. Real household consumption increases by 0.93% relative to baseline. However, when real wage for formal sector employment is exogenously fixed in simulation 2, (an attempt to mimic the labor market rigidity where nominal wage is set to always follow the increase in the CPI), the increase in GDP is slightly slower. With this rigidity, GDP is only increased by 0.645% mostly attributed to the decline in economy-wide employment by -0.043% relative to baseline.

Incorporating the observation that real wage growth accelerated in post-crisis period by as much as 3% per year, in Simulation 3, the increase in the use of capital stock in the manufacturing sector is accompanied by an increase in real wage of formal sector employment by 3% above the baseline. The result suggests quite a contrasting story. Overall employment falls by -1.26% below the baseline contributing to an increase in GDP way lower (0.06%) than the previous 2 simulations discussed above.

Table 4. Simulated impact on macroeconomic variables, and poverty incidences

	Simulation 1	Simulation 2	Simulation 3
	Increased capital with no real wage rigidity	Increased capital with real wage rigidity	Increased capital with increased real wage
Macro (% change)			
Real GDP	0.66	0.64	0.06
Employment	0.00	-0.04	-1.26
Real HH Consumption	0.93	0.91	0.06
Export Volume index	1.18	1.09	0.53
Import Volume index	1.42	1.30	0.65
GDP Price Index	0.93	0.80	0.84
Consumer Price Index	1.21	1.04	0.82
Real Factor Return (% change)			
Labor: Agriculture Labor	1.96	1.87	-0.35
Unskilled-Formal	-2.05	0.00	3.00
Unskilled-Non Formal	-1.09	-0.97	-2.86
Skilled-Formal	1.33	0.00	3.00
Skilled-Non Formal	2.11	2.09	-0.71
Capital	-1.23	-1.17	-1.21
Land	2.37	2.23	-0.28
Change in Nominal GDP (Billion IDR)			
Consumption	30,112	27,430	12,339
Investment	763	1,456	2,900
Stock of Capital	-154	-186	11
Government	2,987	1,981	3,671
Net Export	0	0	0
Total	*33,708*	*30,681*	*18,920*
Poverty incidence (%)			
Urban: Ex-ante	13.60	13.60	13.60
Ex-post	13.35	13.30	13.68
Change	-0.25	-0.30	0.08
Rural: Ex-ante	20.20	20.20	20.20
Ex-post	19.37	19.37	20.26
Change	-0.83	-0.83	0.06
Total: Ex-ante	16.91	16.91	16.91
Ex-post	16.37	16.35	16.99
Change	-0.54	-0.57	0.07

Source: Author's calculation

Table 5. Simulated impact on sectoral output

	Simulation 1	Simulation 2	Simulation 3
	Increased capital with no real wage rigidity	Increased capital with real wage rigidity	Increased capital with increased real wage
Output (% change)			
AGRICULTURE	***0.03***	***0.03***	***-0.04***
Food Crops	-0.05	-0.04	-0.07
Estate Crops	0.07	0.04	0.08
Livestock	0.16	0.18	-0.11
EXTRACTIVE	***0.05***	***0.03***	***-0.05***
Forest	0.71	0.60	0.24
Fish	-0.01	0.00	-0.04
Mining	-0.01	-0.02	-0.09
MANUFACTURE	***1.81***	***1.61***	***0.80***
Unskilled-Labor Intensive	2.37	1.94	0.98
Resources based, Labor-intensive	0.49	0.41	-0.04
Resources based, Capital-intensive	2.05	1.86	1.03
Electronics	5.14	5.14	3.94
Footloose, Capital-intensive	1.96	1.71	0.53
OTHER INDUSTRY	***0.32***	***0.39***	***-0.27***
Utilities	0.89	0.83	0.15
Construction	0.04	0.04	-0.02
Trade	0.30	0.37	-0.15
Hotel & restaurant	-0.09	0.09	-0.47
Transportation	0.92	0.82	-0.10
Services	0.30	0.44	-0.49

Source: Author's calculation

Table 6. Simulated impact on sectoral employment

	Simulation 1	Simulation 2	Simulation 3
	Increased capital with no real wage rigidity	Increased capital with real wage rigidity	Increased capital with increased real wage
Sectoral Employment (% change)			
AGRICULTURE	*0.00*	*0.00*	*-0.06*
Food Crops	-0.09	-0.07	-0.11
Estate Crops	0.04	0.01	0.09
Livestock	0.20	0.22	-0.14
EXTRACTIVE	*0.20*	*0.12*	*-0.20*
Forest	1.58	1.33	0.52
Fish	-0.04	-0.01	-0.07
Mining	-0.05	-0.16	-0.56
MANUFACTURE	*-1.41*	*-1.99*	*-4.21*
Unskilled-Labor Intensive	-1.21	-2.19	-4.35
Resources based, Labor-intensive	-1.87	-2.07	-3.07
Resources based, Capital-intensive	-0.97	-1.70	-4.77
Electronics	-2.97	-3.01	-7.11
Footloose, Capital-intensive	-1.29	-1.94	-4.87
OTHER INDUSTRY	*0.53*	*0.69*	*-0.61*
Utilities	6.00	5.55	0.45
Construction	0.04	0.00	-0.16
Trade	0.48	0.62	-0.30
Hotel & restaurant	-0.12	0.12	-0.62
Transportation	1.96	1.73	-0.34
Services	0.54	0.83	-0.98

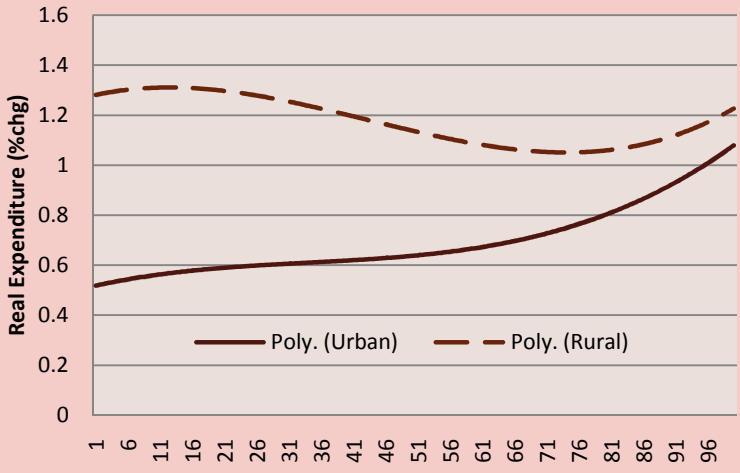
Source: Author's calculation

Table 7. Decomposition of change in real expenditure of the marginally poor (IDR Billion)

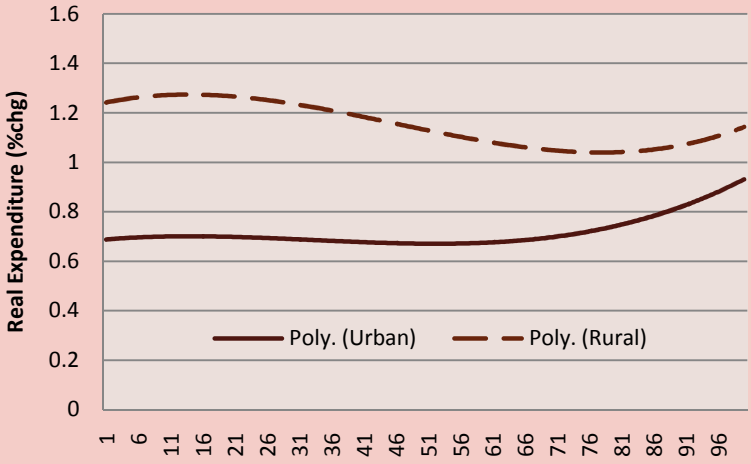
	Simulation 1	Simulation 2	Simulation 3
	Increased capital with no real wage rigidity	Increased capital with real wage rigidity	Increased capital with increased real wage
Urban poor (H13)			
Wage Income			
Agriculture Labor	22.15	20.18	2.93
Unskill-Formal	-8.72	2.55	10.02
Unskill-Non Formal	0.50	0.30	-9.63
Skill-Formal	19.32	10.90	15.96
Skill-Non Formal	23.17	21.69	0.62
Capital	14.61	13.35	10.42
Land	4.63	4.22	0.67
Others (Transfers)	-0.75	-0.71	-0.37
Total Income	96.00	95.68	32.24
Saving	-15.39	-14.08	2.11
Nominal consumption	131.64	127.74	29.51
Living cost	73.81	63.10	40.01
Real expenditure	33.28	39.63	-7.50
Rural poor (H20)			
Wage Income			
Agriculture Labor	76.53	68.57	8.56
Unskill-Formal	-4.60	1.31	5.04
Unskill-Non Formal	0.29	0.18	-5.69
Skill-Formal	4.87	2.83	4.07
Skill-Non Formal	5.31	4.99	0.15
Capital	13.75	12.57	9.82
Land	4.37	3.98	0.63
Others (Transfers)	0.78	0.62	0.73
Total Income	123.17	117.51	24.78
Saving	-14.02	-12.89	1.50
Nominal consumption	159.55	149.68	22.94
Living cost	64.14	57.52	27.67
Real expenditure	58.13	58.52	-3.71

Source: Author's calculation

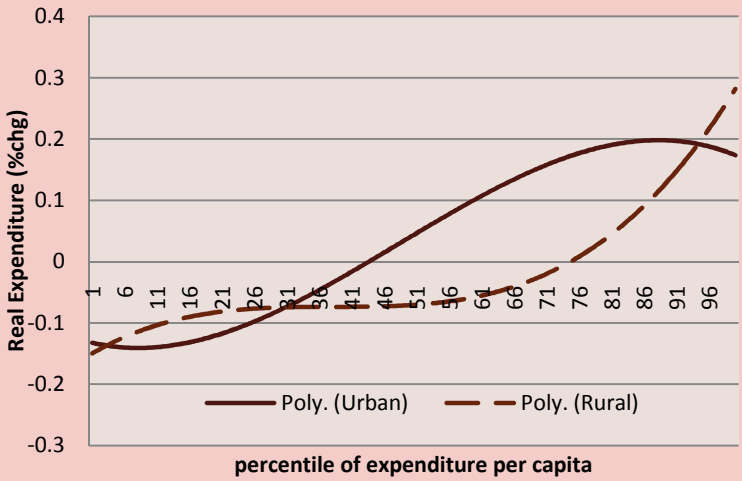
Figure 7. Simulated impact on household's real expenditure (Incidence curve)



Simulation 1



Simulation 2



Simulation 3

Source: Author's calculation

The jobless-growth phenomenon is clearly illustrated in what happens at sectoral level (Table 5 and 6), particularly, in the manufacturing sector. In Simulation 2, manufacturing sector's output increase by 1.6% relative to baseline, yet its employment falls by 2% below its baseline. Comparison between Simulation 2 and Simulation 1 suggests that the capital-driven recovery in the manufacturing sector stills tend to slow down employment absorption in manufacturing sector, whether or not real wage is fixed exogenously. Economy-wide, however, the economy performs better when labor market is flexible because more labor can be absorbed in non-manufacturing sector particularly other industries such as utilities, transportation, trade, services, and to a lesser extent, agriculture. The fact that agriculture seems to absorb relatively lower employment than service sectors is because it does not depend much on formal sector workers that are laid-off from manufacturing sectors.

It should be clarified that first, the formal-informal distinction is about type of labor not sector. Second, we assume the length of run of the simulation is in such a period where informal labor market always clear (where wage is the clearing instrument) while in formal labor market, demand is the clearing instrument (real wage is fixed). This is a dualistic situation of labor market in Indonesia (Manning and Roesad, 2006; Basri and Patunru, 2006). In this manner we implicitly assume that mobility among labor type (formal informal labor) does not happen in during the length of run of the simulation. Mobility of labor across formal-informal type can happen in the longer run. When we simulate increase in capital, for example, formal labor cannot move to be informal labor and work receiving lower wage. It should be emphasized though that they can move to different economic sectors where shocks are not applied. The fact that they cannot change labor type is pointed.

A 3% increase in real wage of formal labor employment has a huge effect on manufacturing sector's output and employment as well as to the rest of the economy. A capital-driven recovery combined with a 3% increase in real wage reduces manufacturing employment roughly two times compared the simulation without the real wage increase. The increase in the manufacturing sector is also reduced by only a half of the increase without the real wage shock. These results give rise to at least two important insights.

The phenomenon of jobless growth in Indonesian manufacturing sector can be a result of two factors that works at the same time. First is the increase in capital utilization as economy especially manufacturing sector was recovering from the Asian financial crisis leaving capital stock are more widely and cheaply available. This is clearly observed from the data taken from survey of medium and large manufacturing establishment as explained earlier. This tends to increase the manufacturing sector's capital intensity leaving lower employment absorption in the recovery. Second is the acceleration in the growth of real wages which some estimates suggest that it accelerate by roughly 3% per year. If a 3% per year increase (relative to baseline or normal increase) in real wage occurred during the post-crisis period (1999-2005) is a reliable observation, then the jobless growth in manufacturing occur during that same period could have been markedly attenuated if not eliminated. The simulations also suggest that the contribution of the first and second factor is roughly in the same magnitude, contributing roughly 50% each on the slowing down of employment growth in manufacturing sector.

Figure 7 shows how each of the three simulations affect welfare of different households (represented by their real consumption expenditure). Each of the figure represent the incidence curve where percentage change in real expenditure is plotted against percentile of expenditure per

capita (100 percentile), from the poorest 1% to the richest 1% in urban and rural areas. From these incidence curves, we can easily determine whether the simulation being analyzed progressive (reducing inequality), regressive (increasing inequality), or neutral. A downward-sloping incidence curve implies a decline in inequality because proportional change in the poor's welfare is higher than that of the rich, and vice versa.

From Figure 7, we can see that Simulation 1 and Simulation 2 are relatively neutral especially for rural areas. In urban area, Simulation 1 however is noticeably regressive, where richer households' tend to experience higher increase in their real expenditure than the poor. However, as a result of Simulation 1 and Simulation 2, the percentage change in the real expenditure of rural households is always higher than urban household, despite both being positive. This can be explained by what happens to the return of different types of factor of production (shown in Table 4). As a result of the capital-driven expansion of the manufacturing sectors, non-manufacturing sector, particularly agriculture sector such as livestock, and estate crops, as well as forestry expand. The expansion of these sectors cannot be driven by capital or land utilization (by model's assumption) and can only be fueled by adding more labor to those sectors. As a result, real wages in those sectors, such as agriculture labor, rise. These agriculture labor incomes constitute a dominant source income of the rural households (especially the rural poor). In urban areas, however, because most households rely on formal labor income employed in manufacturing sectors, the capital intensification to some extent reduce their labor income. An increase in capital utilization translate into an increase in income of pre-dominantly richer households as can be seen from the upward sloping incidence curve of urban households in both Simulation 1 and Simulation 2.

As a result of the positive increase in the real expenditure of all households both in urban and rural areas, poverty incidence falls in both Simulation 1 and Simulation 2 (Table 3). Total poverty incidence decline by -0.54% and -0.57% in Simulation 1 and Simulation 2 respectively. However, the reduction in poverty incidence is much bigger in rural than urban areas. As previously discussed, this is because in general expenditure of rural households increase by bigger proportion than expenditure of urban households including the lower income households.

To understand more closely what drive the change in poverty incidence, it is useful to do a decomposition analysis. The idea of a decomposition analysis is how to explain the driving forces behind change in poverty incidence by looking at what happen to the real expenditure of the marginally poor household. The change in the real expenditure of any household (including poor households) is a result of various factors most importantly the change in their income (including of each income component coming from various returns to factor of production, as well as transfers) and also their living cost. When, let's say income of a specific households increase but because commodity prices also rise such that this rise in the cost of living is higher than the increase in their income, the real expenditure of this household could fall.

Warr, et al (2012) explained more formally using the following equation[7]:

$$\Delta\tilde{E}_h = \Delta Y_h^f - \Delta S_h - \sum_{i=1}^{I} E_h^i p^i, \quad (1)$$

[7] See Warr, et al (2012, pp. 10-11) for more detailed derivation.

where $\Delta\widetilde{E}_h^{\,i}$ is the nominal (absolute) change in real expenditure of household h, decomposable into ΔY_h^f, the nominal change in household h's factor income (which is also decomposable into its component such as labor income, capital income and so on), minus household h's saving, ΔS_h, and minus the nominal (absolute) change in the cost of living specific to household h. The cost of living is the summation of the change in the cost of living due to the percentage change in the price of commodities i, p^i, multiplied by its initial expenditure E_h^i. Table 7 shows the result of the decomposition analysis of the change in real expenditure of the marginally urban (percentile 13) and rural (percentile 20) household.

As can be seen from Table 7, for both urban and rural poor households, almost half of the increase in income is taken away by the increase in the cost of living. Simulation 1 and Simulation 2 is rather inflationary, increasing economy-wide Consumer Price Index by 1.2 and 1.0 percent respectively. However, the change in nominal consumption is still bigger than the increase in their cost of living, leaving both household's real expenditure rise, contributing to the decline in the poverty incidence. For the rural poor, agricultural labor income is the dominant factor in their total income (roughly 60%). For the urban poor, in Simulation 1, the dominant factor that contributes to their increase in total income is income from formal skilled labor (17%).

Simulation 3, namely simulating an increase in the capital utilization in manufacturing sector, accompanied by an increase in the real wage of formal labor employment suggests a rather different story. The impact is notably regressive (positively-sloped incidence curves) for both urban and rural areas. Majority of rural households, except the richest 40% and beyond, experiences a falling real expenditure. While the real expenditure of the poorest 40% in urban area also declines.

A closer look from the simulation results suggests that the main explanation of the regressivity (positively-sloped incidence curves) is the regressivity of the income change, not the living cost. It turns out that the increase in the real wage of formal employment combined with the rise in income from the increased utilization of capital in the manufacturing sector is not pro-poor. The middle class and richer households in urban areas and richer households in rural areas enjoy much of the income changes. To make thing worse, the increase in the income of the poor in urban and rural areas cannot compensate the increase in the cost of living due to the inflationary effect of the shocks. As a result both urban and rural lower income households experience a decline in their real expenditure.

The direct implication of the situation described previously is that poverty incidence both increase in urban and rural areas. Poverty incidence increases by 0.081% and 0.062% in urban and rural area, respectively (Table 6). Whether or not this is the explanation of the slowing down in the pace of poverty reduction during the post-crisis period remains to be investigated more thoroughly, especially by other kind of analysis. However, a general equilibrium analysis like this can offer an insight on the possible linkage between jobless growth in manufacturing sectors and poverty incidence in Indonesia.

The increase in real wage of formal labor employment is not pro-poor because it does not benefit the poor as the poor is mainly dependent on non-formal employment. Moreover, the capital-driven jobless-recovery of manufacturing sector has an adverse effect into the rest of the economy by

slowing down the recovery of other non-manufacturing sector affecting the real wage of the labor employed in those sectors, including unskilled non-formal labor and agricultural labor upon which the poor are heavily dependent.

4.2.3 SENSITIVITY ANALYSIS

The elasticity of substitution differs across sector and was taken from the GTAP database. We conducted the sensitivity analysis by changing the elasticity of substitution among primary factors (in the relevant sectors that are our focus of analysis i.e., sub-sector manufacturing of Unskilled labor intensive, Resource-based labor intensive, Resource-based capital intensive, Electronics, Footloose capital intensive). We re-run the simulations with the elasticity of 25% lower and 25% higher than the baseline parameter. We report this in table A.1-A.4 in the appendix 2.

The result generally suggests that the magnitude of the impact is quite sensitive for some variables, yet not too sensitive for others, to the changing parameter yet it is not changing the general conclusion. For example, lowering the elasticity by 25% reduced the impact on aggregate employment (simulation 3) from -1.26% to -1.05%. Increasing the elasticity by 25% increases the impact on aggregate employment from -1.26% to -1.41%. The sign, however, is unchanged. Impact on poverty, however, is rather insensitive. For simulation 1, for example, reducing elasticity by 25% gives slightly same results of -0.54% to -0.55%. While when we increase the elasticity by 25%, the percentage change of poverty does not vary. We add this sensitivity analysis in the appendix.

5. CONCLUDING REMARKS

For almost a decade after the Asian financial crisis (2000-2008), manufacturing sector output grew by about 5.2%. If the employment elasticity had been 0.53 (estimated from the pre-crisis period), it would have generated 2.76% of employment growth. However, in reality it generated almost no growth in manufacturing employment. During the same period, poverty reduction seems not to be progressing satisfactorily. As poverty is closely linked with sectoral employment opportunities which to a larger extent is influenced by the labor market condition, understanding the linkage among them is always an academically interesting exploration as well as policy-relevant. A perspective which looks at the connection between labor market conditions, sectoral production, household employment and eventually poverty incidence is naturally a general equilibrium problem.

With the objective to understand the extent to which labor market rigidity, in real wage rigidity in certain segment of the labor market, play a role in the stagnation of manufacturing sector in creating employment and what its likely implication is on poverty in Indonesia, this study use a Computable General Equilibrium model of an Indonesian economy, called INDONESIA-E3 to explore this issue and attempt to offer better understanding using a theoretically-coherent as well as data-consistent framework. INDONESIA-E3 model is unique in its power to understand the distributional elements of an economy-wide analysis because of its disaggregation of household by expenditure classes which allows for precise estimates of the distributional impact and poverty incidence.

Analyzing the firm-level data of the survey of manufacturing establishment with special focus on comparing the pre-crisis period (1990-1996) and the post-crisis period (1999-2005), we come up to at least three main observations. First, jobless growth rate happened in the post crisis period in the manufacturing sectors where we calculated that the employment elasticity for the period of 1999-2008 is close to zero (0.014). Second, we observed that during the recovery period of 1999-2005, utilization rate in all sub-sector of manufacturing increase quite rapidly indicating the intensification of capital in the output expansion of those sectors. Thirdly, confirming what others has found - such as World Bank (2010) – real wage increased faster in the post-crisis period.

We then use the above observation to simulate three different scenarios using the CGE model: (1) an increase in the capital utilization in manufacturing sector under a condition of a flexible labor market; (2) the same scenario but with real wage rigidity; and (3) the same capital utilization scenario but with increasing real wage. The magnitude of all those shocks is based on the change we observe from the data. The result offers the following insights.

From the simulations, we find that the effect of an increased capital utilization and accelerated real wage growth on the slowing down of employment absorption (despite expanding output) is roughly the same size. This indicates that both are equally important in explaining the jobless-growth phenomenon. More flexible labor market would help by allowing manufacturing sector absorb more labor than it would have otherwise with real wage rigidity. Increased capital utilization in the recovery period is inevitable and indeed help the economy grows and reduce poverty. However, when constrained with an increasing real wage, the recovery as well as the rate of poverty reduction is slower. Both the increased capital utilization and increased real wage works in favor of the non-poor for three accounts.

From the distribution perspective, both factors (increase capital utilization of manufacturing sector and increase in the real wage of formal employment) works not in the favor of the poor. The effect is regressive and slightly income inequalizing, but most importantly tend to increase poverty incidence. The acceleration in the growth of real wage of formal labor does not benefit the poor who mainly depend on non-formal employment. Meanwhile, the capital-driven jobless-recovery of manufacturing sector has an adverse effect into the rest of the economy by slowing down the recovery of other non-manufacturing sector affecting the real wage of the labor employed in those sectors, including unskilled non-formal labor and agricultural labor upon which the poor are heavily dependent. This inherently general equilibrium linkages is hoped to be able to offer another explanation not only on the jobless-growth phenomenon in Indonesian manufacturing sector in the post Asian financial crisis period but also offer its likely implication on the rate of poverty alleviation which happen also to slow down during the same period.

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APPENDIX 1: FIGURE A1-A10

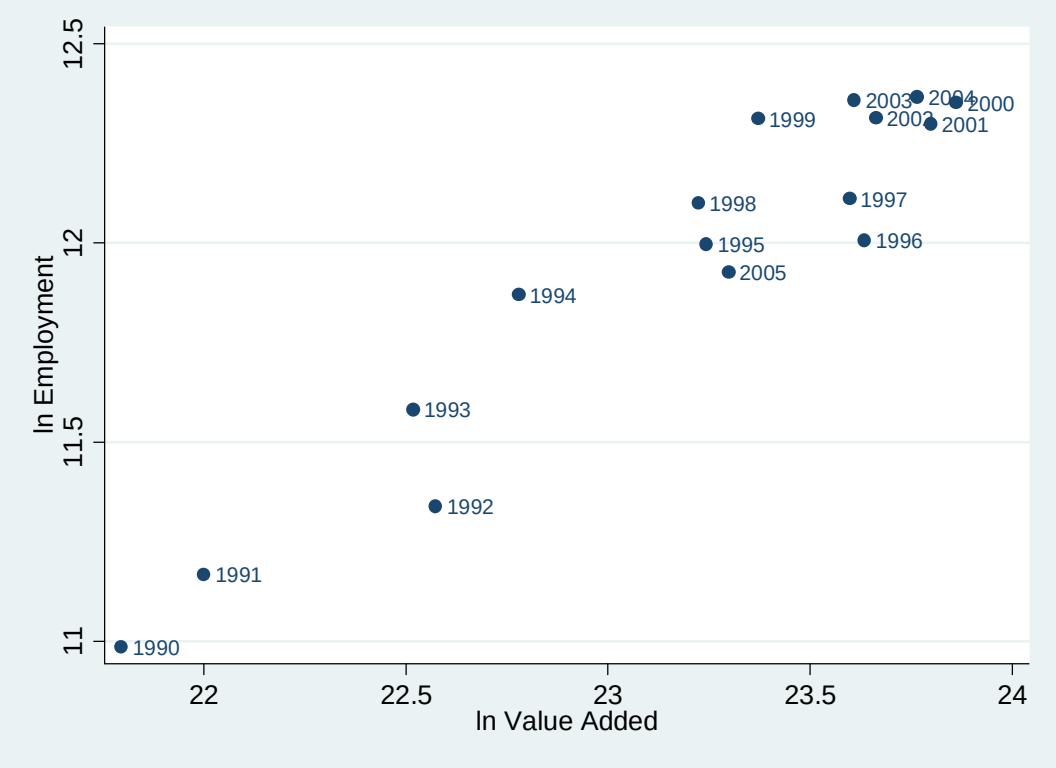

Figure A1: Value added & employment: Unskilled labour-intensive

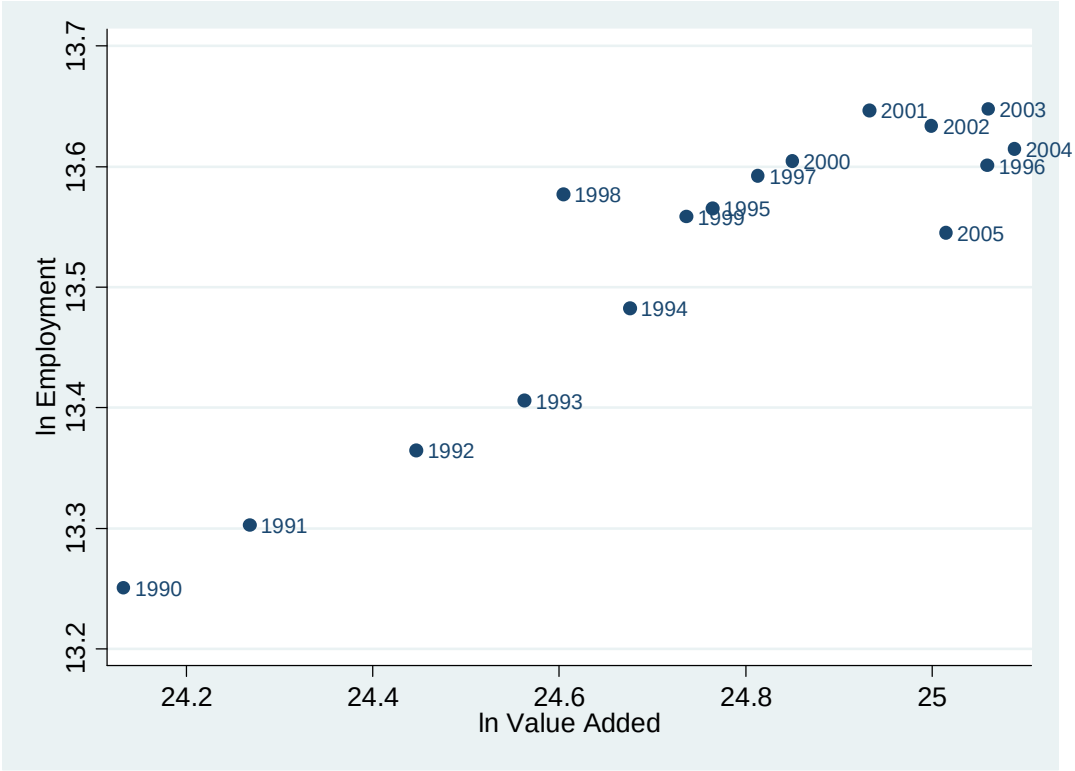

Figure A2: value added & employment - Resource based, labour-intensive

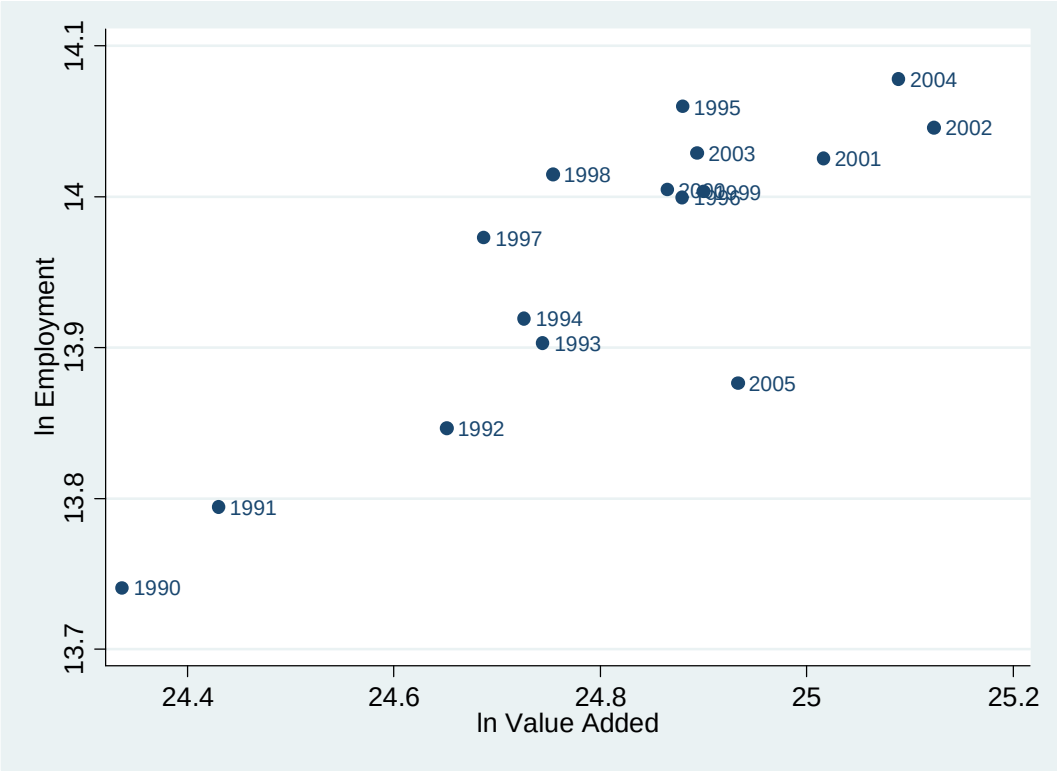

Figure A3: Value added & employment - Resource based, capital-intensive

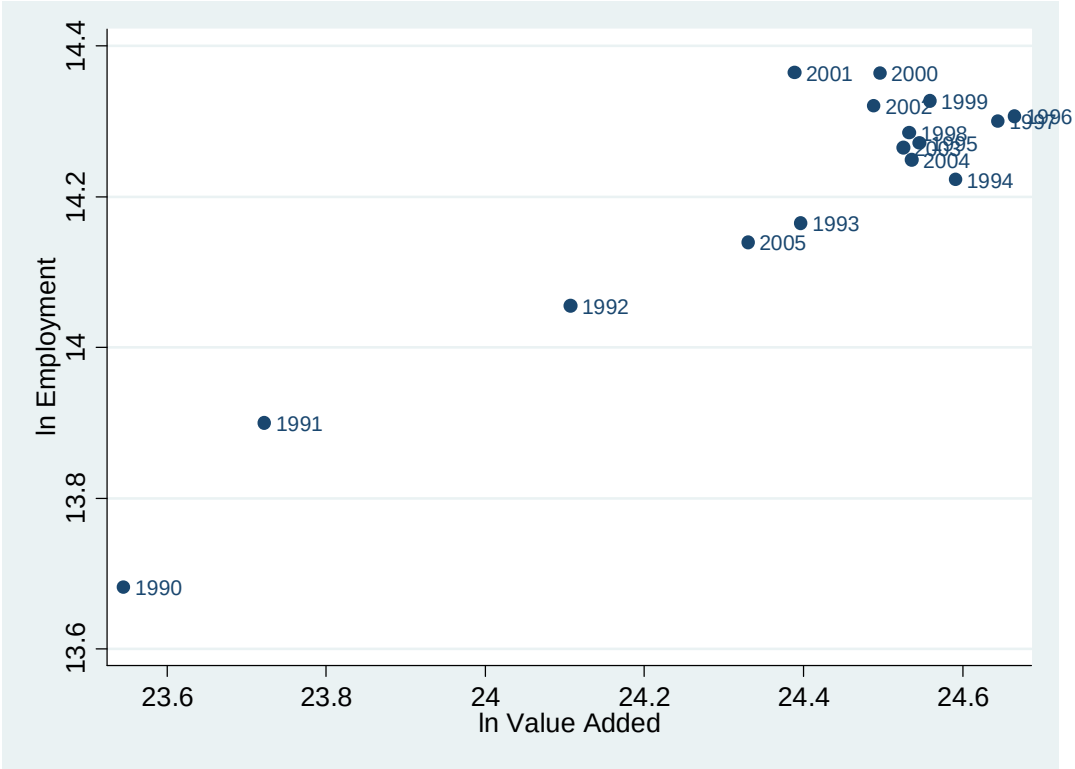

Figure A4: Value added & employment - Electronics

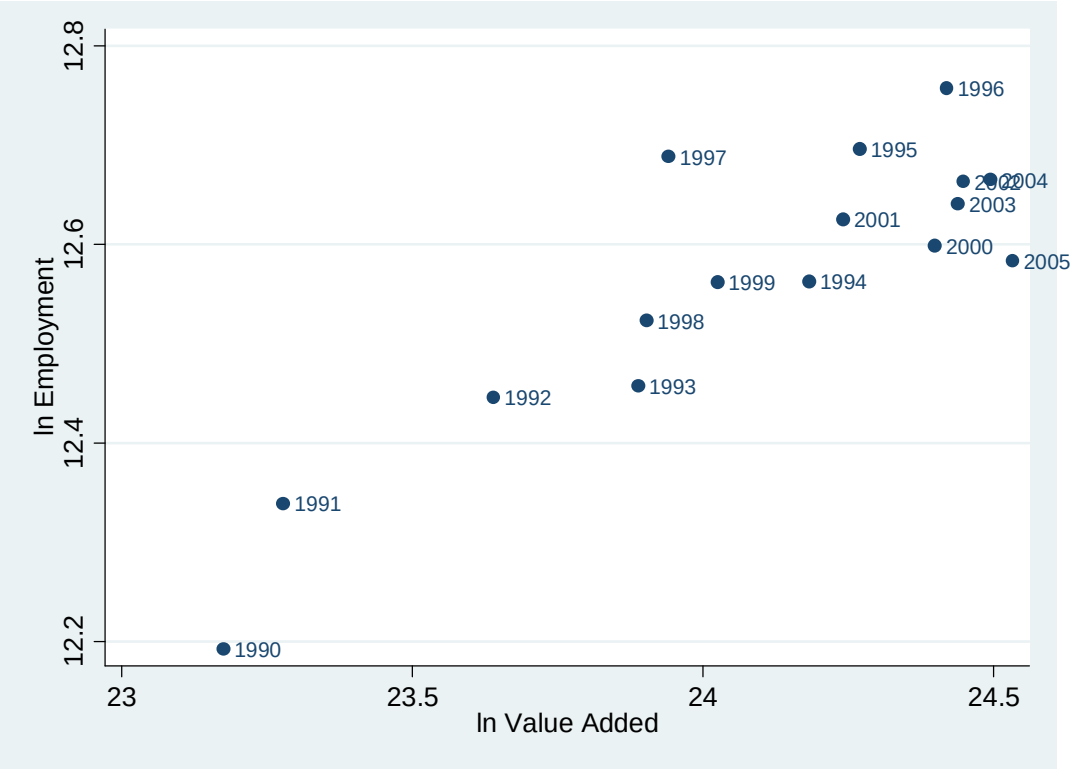

Figure A5: Value added & employment - Footloose capital-intensive

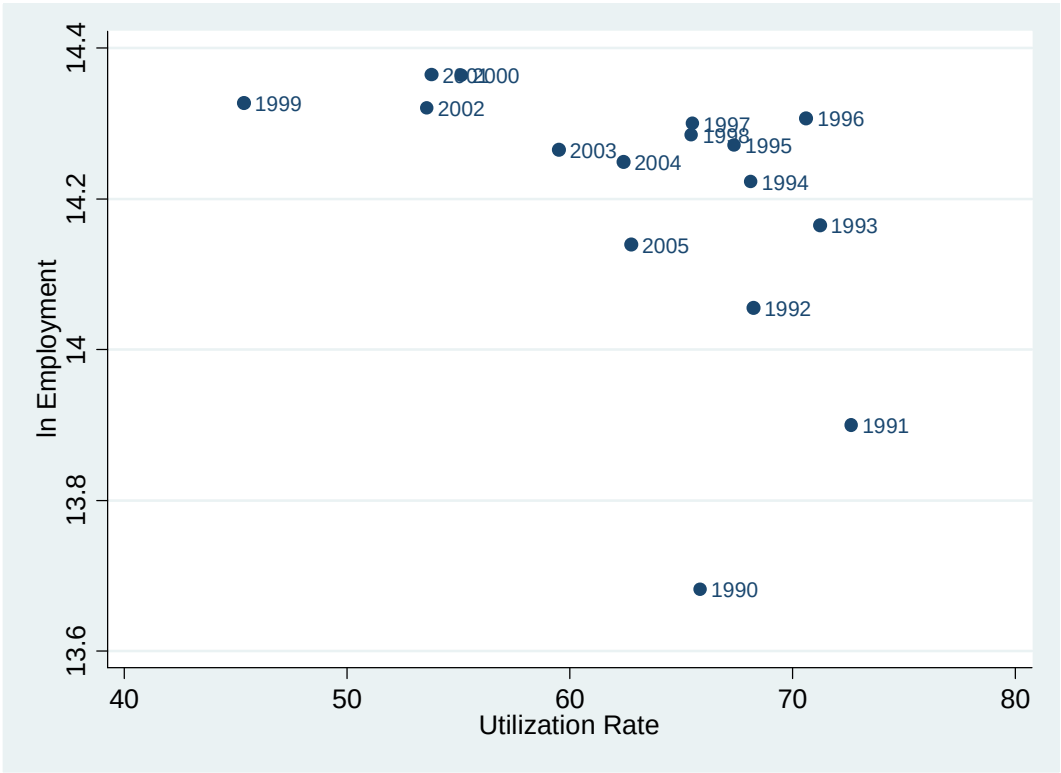

Figure A6: Utilization rate and employment - unskilled labor intensive

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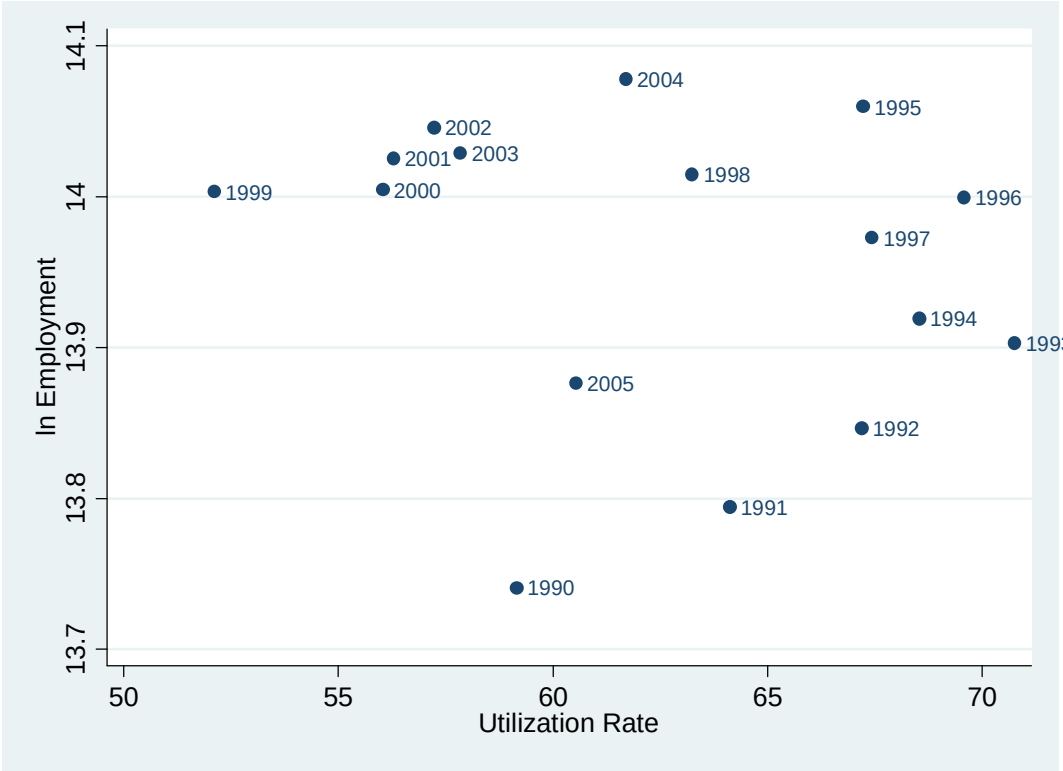


Figure A7: Utilization rate and employment - labor intensive resource based

Figure A8: Utilization rate and employment - capital intensive resource based

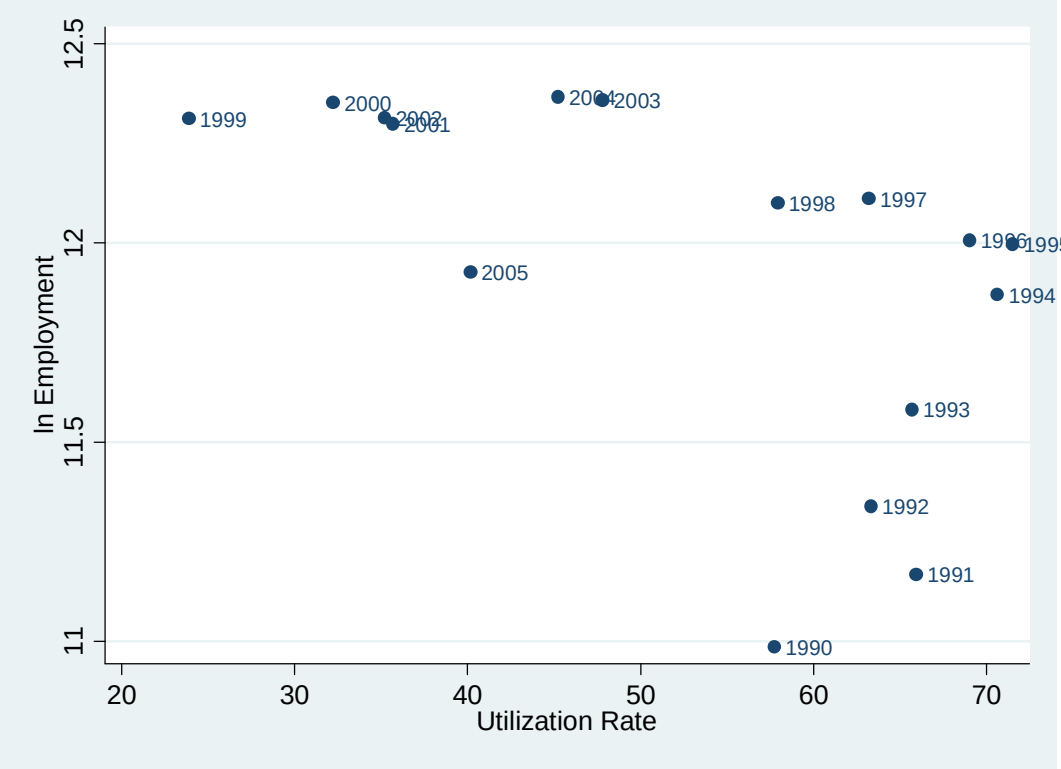


Figure A9: Utilization rate and employment - electronic

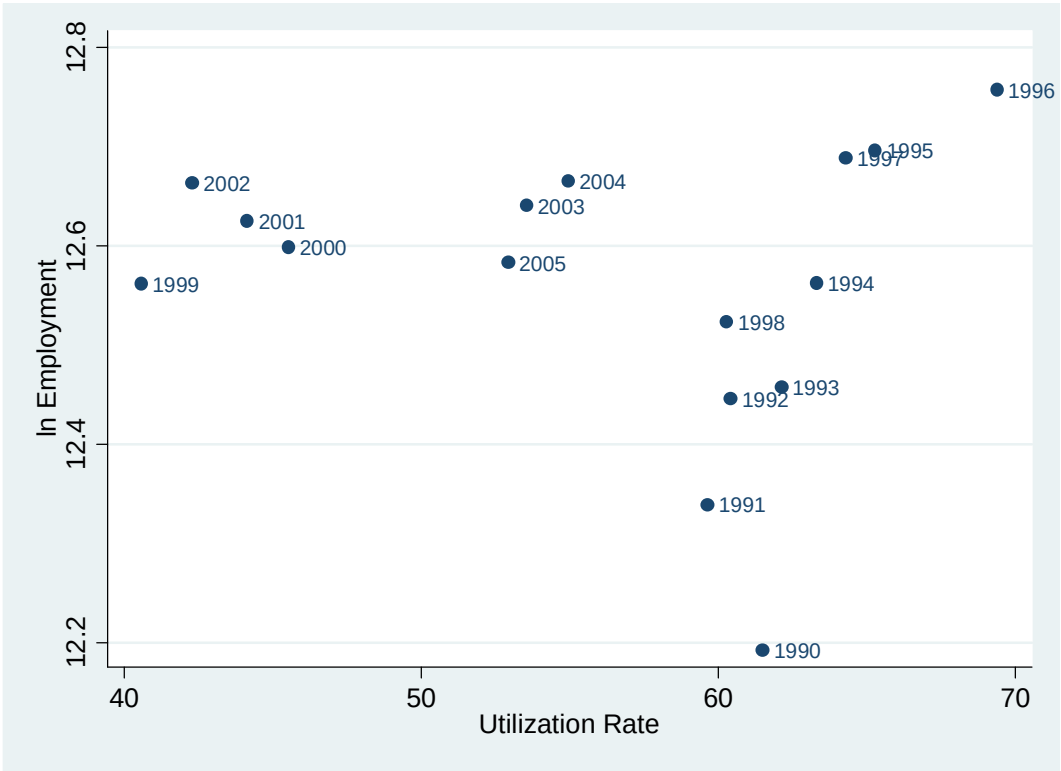


Figure A10: Utilization rate and employment - footloose capital intensive

APPENDIX 2: SENSITIVITY ANALYSIS

Table A1. Simulated impact on macroeconomic variables, and poverty incidences

	0.75 σ			σ			1.25 σ		
	Sim 1	Sim 2	Sim 3	Sim 1	Sim 2	Sim 3	Sim 1	Sim 2	Sim 3
Macro (% change)									
Real GDP	0.66	0.71	0.15	0.66	0.64	0.06	0.66	0.59	-0.02
Employment	0.00	0.10	-1.05	0.00	-0.04	-1.26	0.00	-0.15	-1.41
Real HH Consumption	0.93	1.00	0.20	0.93	0.91	0.06	0.94	0.84	-0.04
Export Volume index	1.23	1.21	0.70	1.18	1.09	0.53	1.15	1.00	0.41
Import Volume index	1.47	1.44	0.85	1.42	1.30	0.65	1.38	1.19	0.50
GDP Price Index	1.02	0.92	1.00	0.93	0.80	0.84	0.87	0.72	0.71
Consumer Price Index	1.28	1.17	1.01	1.21	1.04	0.82	1.16	0.94	0.67
Real Factor Return (% change)									
Labor: Agriculture Labor	1.94	2.12	-0.04	1.96	1.87	-0.35	1.98	1.71	-0.57
Unskilled-Formal	-1.43	0.00	3.00	-2.05	0.00	3.00	-2.45	0.00	3.00
Unskilled-Non Formal	-0.72	-0.37	-2.06	-1.09	-0.97	-2.86	-1.33	-1.40	-3.45
Skilled-Formal	1.46	0.00	3.00	1.33	0.00	3.00	1.25	0.00	3.00
Skilled-Non Formal	2.15	2.44	-0.23	2.11	2.09	-0.71	2.09	1.82	-1.07
Capital	-1.40	-1.36	-1.48	-1.23	-1.17	-1.21	-1.11	-1.04	-1.01
Land	2.36	2.53	0.09	2.37	2.23	-0.28	2.39	2.04	-0.54
Change in Nominal GDP (Billion IDR)									
Consumption	31105	30600	16961	30112	27430	12339	29423	25019	8807
Investment	1365	1824	3407	763	1456	2900	364	1180	2519
Stock of Capital	-143	-195	-13	-154	-186	11	-160	-175	35
Government	3293	2267	4089	2987	1981	3671	2780	1764	3352
Net Export	0	0	0	0	0	0	0	0	0
Total	*35620*	*34496*	*24444*	*33708*	*30681*	*18920*	*32407*	*27789*	*14712*
Poverty incidence (%)									
Urban: Ex-ante	13.60	13.60	13.60	13.60	13.60	13.60	13.60	13.60	13.60
Ex-post	13.31	13.22	13.57	13.35	13.30	13.68	13.38	13.35	13.76
Change	-0.29	-0.38	-0.03	-0.25	-0.30	0.08	-0.22	-0.25	0.16
Rural: Ex-ante	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20
Ex-post	19.38	19.28	20.15	19.37	19.37	20.26	19.35	19.44	20.34
Change	-0.82	-0.92	-0.05	-0.83	-0.83	0.06	-0.85	-0.76	0.14
Total: Ex-ante	16.91	16.91	16.91	16.91	16.91	16.91	16.91	16.91	16.91
Ex-post	16.36	16.26	16.88	16.37	16.35	16.99	16.38	16.41	17.07
Change	-0.55	-0.65	-0.04	-0.54	-0.57	0.07	-0.54	-0.50	0.15

Source: Author's calculation

Table A2. Simulated impact on sectoral output

	0.75 σ			σ			1.25 σ		
	Sim 1	Sim 2	Sim 3	Sim 1	Sim 2	Sim 3	Sim 1	Sim 2	Sim 3
Output (% change)									
AGRICULTURE	***0.02***	***0.03***	***-0.04***	***0.03***	***0.03***	***-0.04***	***0.03***	***0.03***	***-0.04***
Food Crops	-0.05	-0.04	-0.07	-0.05	-0.04	-0.07	-0.04	-0.03	-0.06
Estate Crops	0.07	0.04	0.08	0.07	0.04	0.08	0.07	0.04	0.07
Livestock	0.15	0.20	-0.08	0.16	0.18	-0.11	0.17	0.16	-0.12
EXTRACTIVE	***0.04***	***0.03***	***-0.05***	***0.05***	***0.03***	***-0.05***	***0.06***	***0.03***	***-0.05***
Forest	0.73	0.68	0.35	0.71	0.60	0.24	0.70	0.54	0.16
Fish	-0.01	0.00	-0.04	-0.01	0.00	-0.04	-0.01	0.00	-0.03
Mining	-0.02	-0.03	-0.10	-0.01	-0.02	-0.09	0.00	-0.02	-0.08
MANUFACTURE	***1.88***	***1.80***	***1.08***	***1.81***	***1.61***	***0.80***	***1.76***	***1.47***	***0.59***
Unskilled-Labor Intensive	2.48	2.25	1.37	2.37	1.94	0.98	2.29	1.72	0.72
Resources based, Labor-intensive	0.49	0.47	0.04	0.49	0.41	-0.04	0.49	0.37	-0.09
Resources based, Capital-intensive	2.10	2.04	1.34	2.05	1.86	1.03	2.01	1.71	0.79
Electronics	5.49	5.60	4.57	5.14	5.14	3.94	4.85	4.75	3.44
Footloose, Capital-intensive	2.02	1.94	0.87	1.96	1.71	0.53	1.93	1.54	0.27
OTHER INDUSTRY	***0.28***	***0.42***	***-0.23***	***0.32***	***0.39***	***-0.27***	***0.34***	***0.37***	***-0.30***
Utilities	0.90	0.93	0.29	0.89	0.83	0.15	0.89	0.76	0.05
Construction	0.03	0.05	-0.01	0.04	0.04	-0.02	0.04	0.04	-0.02
Trade	0.29	0.40	-0.11	0.30	0.37	-0.15	0.31	0.35	-0.18
Hotel & restaurant	-0.14	0.07	-0.49	-0.09	0.09	-0.47	-0.06	0.10	-0.46
Transportation	0.86	0.88	-0.02	0.92	0.82	-0.10	0.95	0.78	-0.17
Services	0.24	0.47	-0.45	0.30	0.44	-0.49	0.33	0.42	-0.52

Source: Author's calculation

Table A3. Simulated impact on sectoral employment

	0.75 σ			σ			1.25 σ		
	Sim 1	Sim 2	Sim 3	Sim 1	Sim 2	Sim 3	Sim 1	Sim 2	Sim 3
Sectoral Employment (% change)									
AGRICULTURE	***-0.01***	***0.00***	***-0.07***	***0.00***	***0.00***	***-0.06***	***0.00***	***0.00***	***-0.06***
Food Crops	-0.10	-0.08	-0.12	-0.09	-0.07	-0.11	-0.08	-0.06	-0.10
Estate Crops	0.04	0.01	0.09	0.04	0.01	0.09	0.05	0.01	0.09
Livestock	0.19	0.24	-0.11	0.20	0.22	-0.14	0.21	0.21	-0.16
EXTRACTIVE	***0.15***	***0.12***	***-0.20***	***0.20***	***0.12***	***-0.20***	***0.23***	***0.12***	***-0.20***
Forest	1.63	1.52	0.77	1.58	1.33	0.52	1.55	1.19	0.35
Fish	-0.05	-0.02	-0.08	-0.04	-0.01	-0.07	-0.03	-0.01	-0.07
Mining	-0.17	-0.22	-0.64	-0.05	-0.16	-0.56	0.03	-0.11	-0.50
MANUFACTURE	***-1.20***	***-1.42***	***-3.40***	***-1.41***	***-1.99***	***-4.21***	***-1.55***	***-2.42***	***-4.83***
Unskilled-Labor Intensive	-0.91	-1.45	-3.42	-1.21	-2.19	-4.35	-1.40	-2.72	-5.00
Resources based, Labor-intensive	-1.84	-1.90	-2.87	-1.87	-2.07	-3.07	-1.88	-2.17	-3.19
Resources based, Capital-intensive	-0.72	-0.96	-3.57	-0.97	-1.70	-4.77	-1.13	-2.28	-5.74
Electronics	-1.52	-1.19	-4.69	-2.97	-3.01	-7.11	-4.14	-4.51	-9.10
Footloose, Capital-intensive	-1.10	-1.31	-3.94	-1.29	-1.94	-4.87	-1.41	-2.40	-5.55
OTHER INDUSTRY	***0.46***	***0.74***	***-0.55***	***0.53***	***0.69***	***-0.61***	***0.58***	***0.66***	***-0.66***
Utilities	5.96	6.17	1.31	6.00	5.55	0.45	6.02	5.09	-0.20
Construction	0.00	-0.01	-0.18	0.04	0.00	-0.16	0.06	0.01	-0.15
Trade	0.45	0.66	-0.24	0.48	0.62	-0.30	0.50	0.58	-0.35
Hotel & restaurant	-0.18	0.10	-0.64	-0.12	0.12	-0.62	-0.08	0.13	-0.60
Transportation	1.80	1.84	-0.19	1.96	1.73	-0.34	2.06	1.65	-0.46
Services	0.43	0.88	-0.90	0.54	0.83	-0.98	0.60	0.79	-1.04

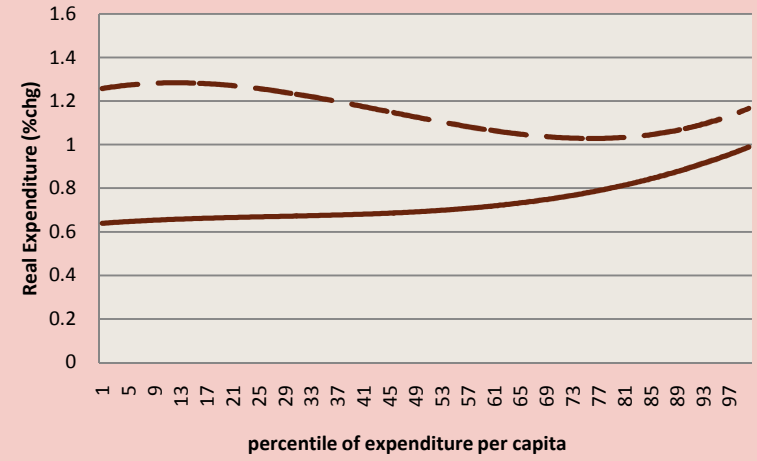
Source: Author's calculation

Table A4. Decomposition of change in real expenditure of the marginally poor (IDR Billion)

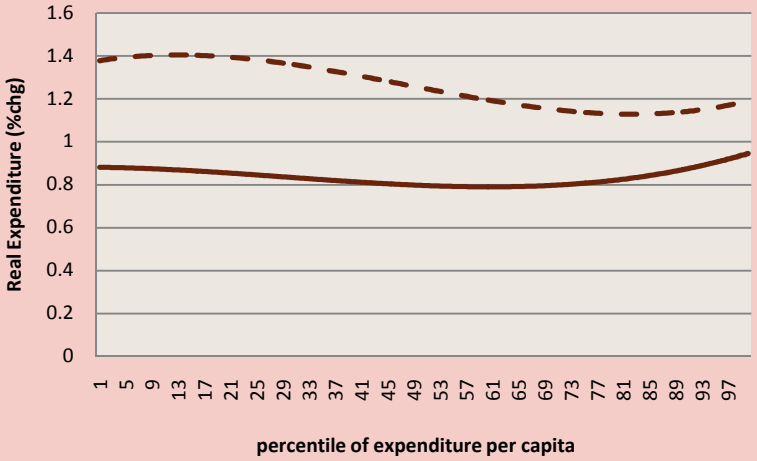
	0.75 σ			σ			1.25 σ		
	Sim 1	Sim 2	Sim 3	Sim 1	Sim 2	Sim 3	Sim 1	Sim 2	Sim 3
Urban poor (H13)									
Wage Income									
Agriculture Labor	22.61	23.07	6.30	22.15	20.18	2.93	21.91	18.19	0.60
Unskill-Formal	-1.72	8.03	18.78	-8.72	2.55	10.02	-13.04	-1.38	3.83
Unskill-Non Formal	2.77	3.97	-5.08	0.50	0.30	-9.63	-0.93	-2.28	-12.81
Skill-Formal	20.99	13.22	19.58	19.32	10.90	15.96	18.19	9.17	13.26
Skill-Non Formal	24.06	25.52	5.00	23.17	21.69	0.62	22.59	18.95	-2.52
Capital	13.34	12.58	9.47	14.61	13.35	10.42	15.38	13.83	11.02
Land	4.71	4.78	1.40	4.63	4.22	0.67	4.58	3.83	0.16
Others (Transfers)	-0.84	-0.86	-0.58	-0.75	-0.71	-0.37	-0.68	-0.60	-0.21
Total Income	118.76	129.72	66.07	96.00	95.68	32.24	82.36	73.75	11.57
Saving	-11.69	-12.08	5.28	-15.39	-14.08	2.11	-17.68	-15.42	-0.02
Nominal consumption	147.70	161.28	57.74	131.64	127.74	29.51	121.52	105.43	11.60
Living cost	79.39	73.32	53.19	73.81	63.10	40.01	70.02	55.61	30.58
Real expenditure	38.08	50.75	2.97	33.28	39.63	-7.50	30.29	32.01	-14.54
Rural poor (H20)									
Wage Income									
Agriculture Labor	78.46	80.34	18.97	76.53	68.57	8.56	75.57	60.78	1.72
Unskill-Formal	-0.89	4.06	9.28	-4.60	1.31	5.04	-6.95	-0.71	1.96
Unskill-Non Formal	1.59	2.28	-2.97	0.29	0.18	-5.69	-0.54	-1.32	-7.62
Skill-Formal	5.27	3.40	4.93	4.87	2.83	4.07	4.60	2.39	3.41
Skill-Non Formal	5.49	5.80	1.22	5.31	4.99	0.15	5.18	4.40	-0.63
Capital	12.56	11.84	8.92	13.75	12.57	9.82	14.48	13.02	10.38
Land	4.45	4.51	1.32	4.37	3.98	0.63	4.32	3.61	0.15
Others (Transfers)	0.82	0.68	0.82	0.78	0.62	0.73	0.75	0.57	0.65
Total Income	136.52	147.09	49.08	123.17	117.51	24.78	115.08	98.30	9.54
Saving	-10.83	-11.24	4.00	-14.02	-12.89	1.50	-16.00	-13.97	-0.16
Nominal consumption	165.25	178.38	43.34	159.55	149.68	22.94	156.04	130.51	9.72
Living cost	67.79	66.22	38.30	64.14	57.52	27.67	61.62	51.07	19.97
Real expenditure	58.09	67.48	3.64	58.13	58.52	-3.71	58.43	52.59	-8.54

Source: Author's calculation

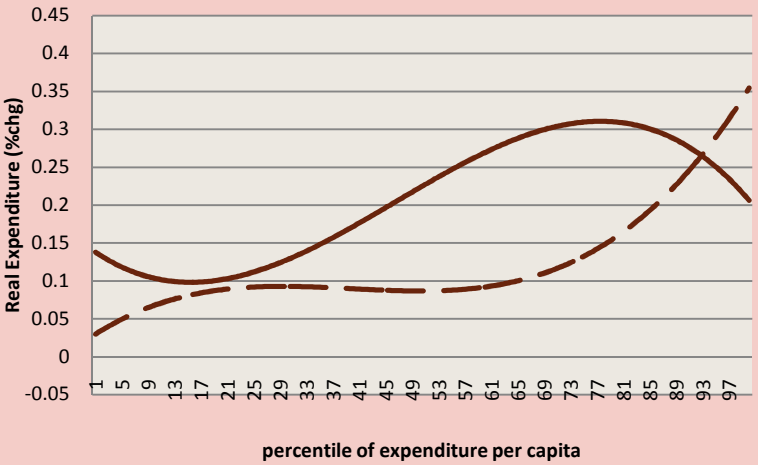
Figure A11. Simulated impact on household's real expenditure (Incidence curve) (0.75 σ)



Simulation 1



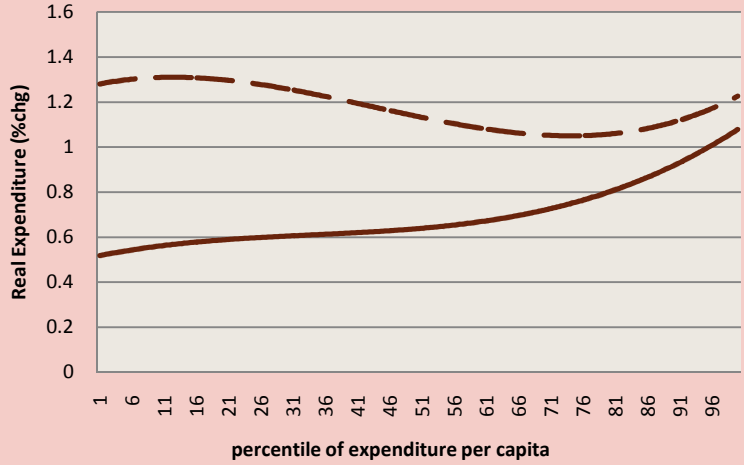
Simulation 2



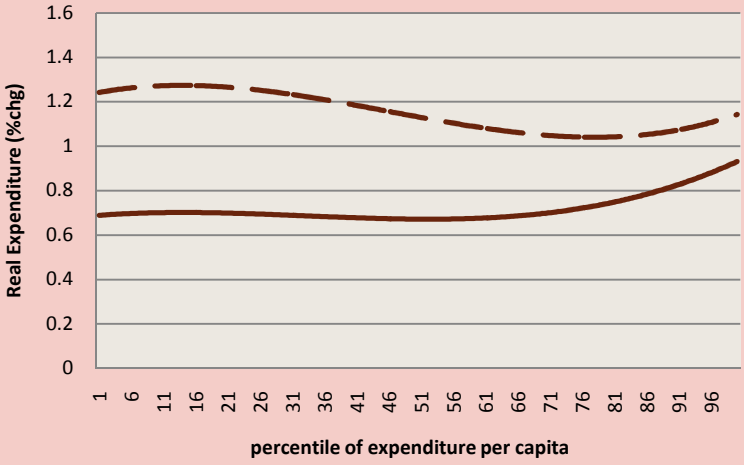
Simulation 3

Source: Author's calculation

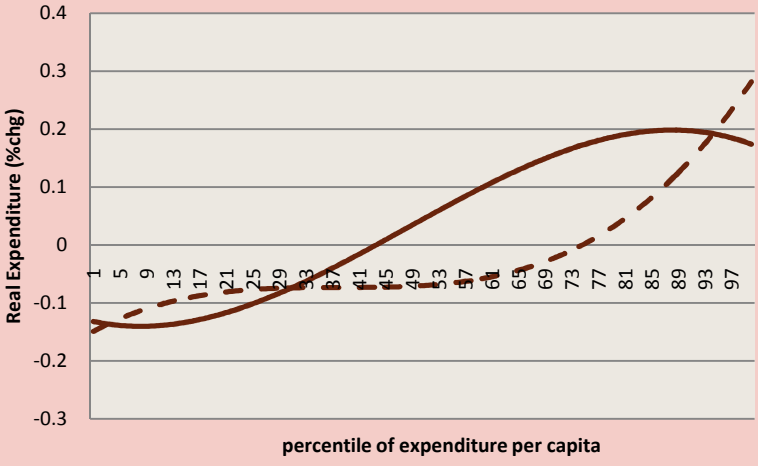
Figure A12. Simulated impact on household's real expenditure (Incidence curve) (σ)



Simulation 1



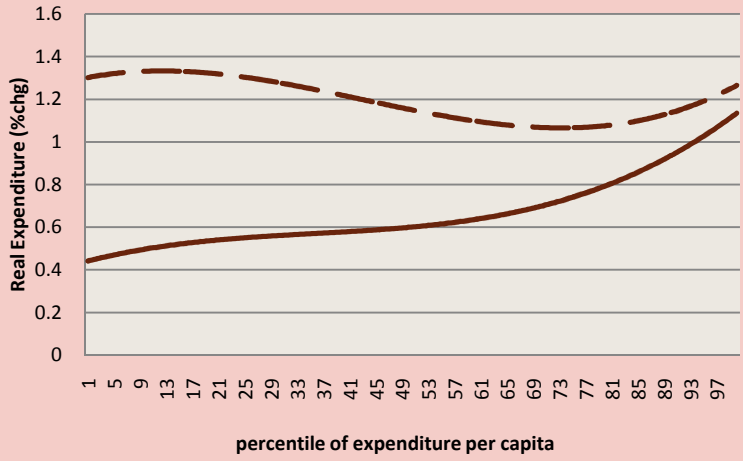
Simulation 2



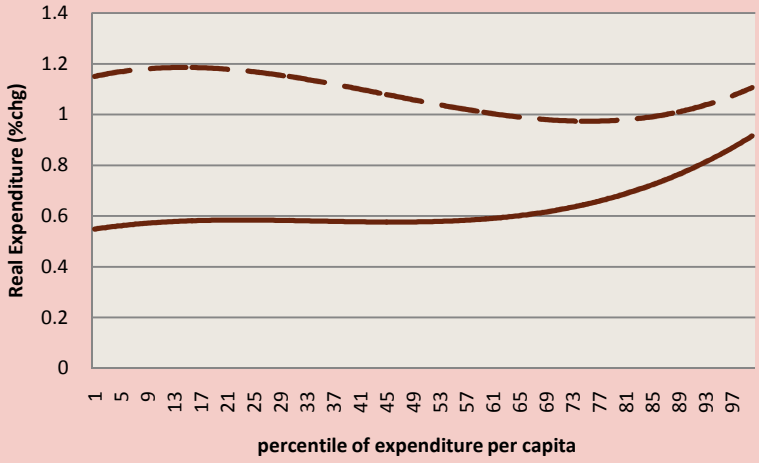
Simulation 3

Source: Author's calculation

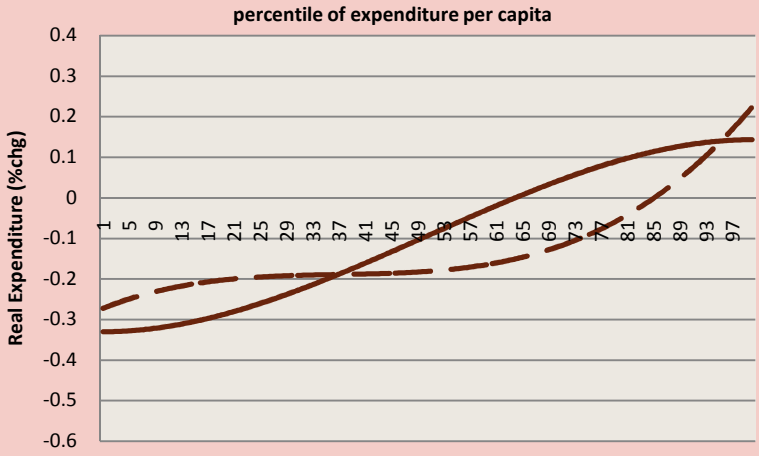
Figure A13. Simulated impact on household's real expenditure (Incidence curve) (1.25)σ



Simulation 1



Simulation 2



Simulation 3

Source: Author's calculation