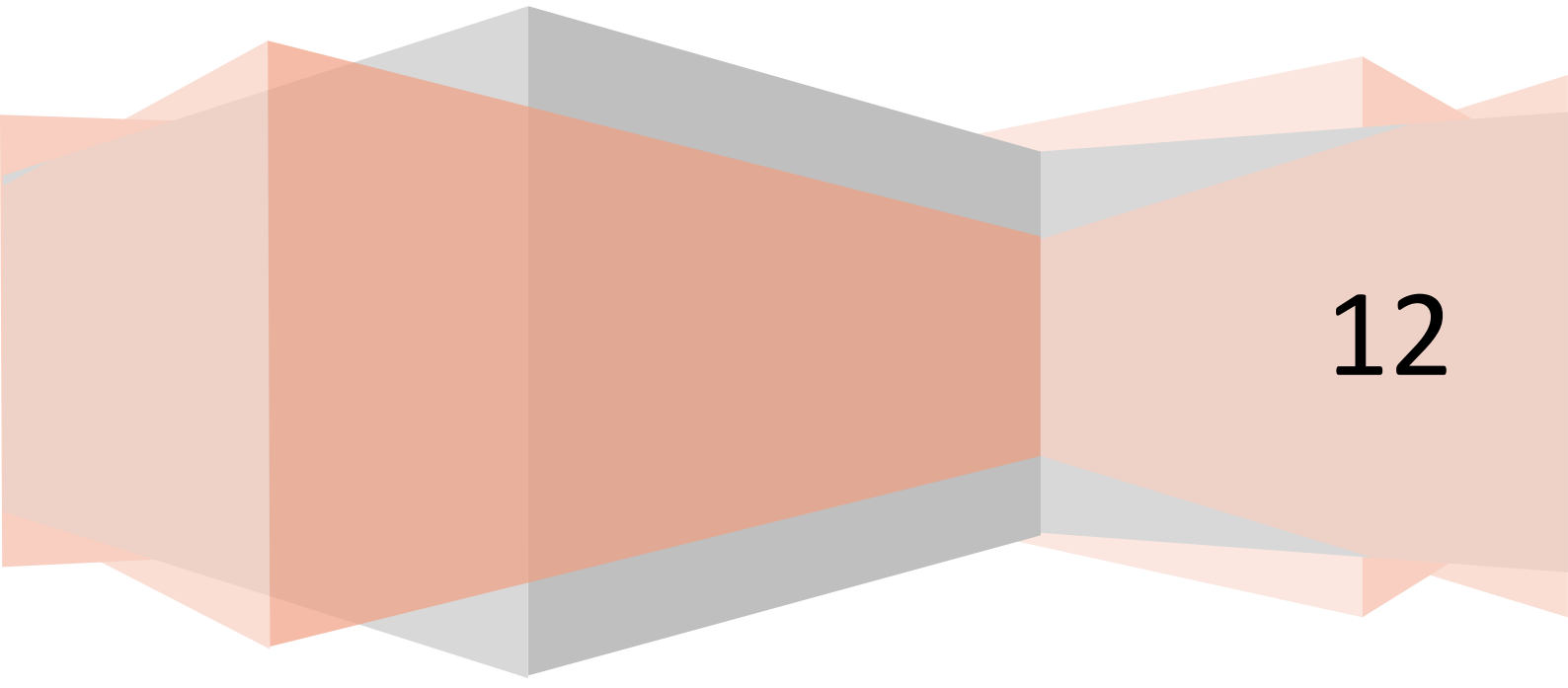
Center for Economics and Development Studies Padjadjaran University

Growth, Poverty, and Labor Market Rigidity in Indonesia

A General Equilibrium Investigation

Arief A. Yusuf, Ahmad Komarulzaman, M. Purnagunawan



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GROWTH, POVERTY, AND LABOR MARKET RIGIDITY IN INDONESIA

A General Equilibrium Investigation

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ABSTRACT

For the period of 1999-2008, Indonesian manufacturing sector experienced a jobless growth. Its employment-output elasticity for that period was close to zero (0.014) compared to 0.53 in the pre-crisis period (1990-1996). We also observed a rapid increase in the capital utilization, indicating the intensification of capital use as a result of the recovery from the Asian financial crisis. The growth of the real wage of formal employment also accelerated, which was attributed to the rapid increase in the minimum wage associated with the political reform and stronger unions. We used these observations together with a Computable General Equilibrium (CGE) model of an Indonesian economy to offer an explanation for this jobless growth phenomenon and its likely implication on the rate of poverty reduction in Indonesia. From the CGE 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 in scale. This indicates that both are equally important in explaining the jobless-growth phenomenon. More flexible labor market would help by allowing the manufacturing sector to absorb more labor than it would have done otherwise with real wage rigidity. Increased capital utilization in the recovery period is inevitable and indeed helps the economy grow 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 nonpoor for three reasons. First, the poor are mainly dependent on nonformal employment, and hence do not benefit from the accelerated growth in the formal labor real wage. Second, the slower expansion of the manufacturing sector affects the rest of the economy, which impacts the real wage of the labor employed in other sectors such as unskilled nonformal labor and agricultural labor upon which the poor are heavily dependent. Third, the income rise from increased capital utilization also mainly benefits the urban nonpoor. This general equilibrium analysis can offer another insight and explanation not only on the jobless-growth phenomenon in Indonesian manufacturing sector but also on the slowing down of the rate of poverty alleviation during the same period.

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

JEL Code: O53, J21, I38

1. BACKGROUND AND MOTIVATION

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

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

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

One of the important hypotheses on what caused the manufacturing sector to grow without creating much employment is higher labor market rigidity that ensued after the Asian financial crisis. Before the crisis (which coincided with the Soeharto era), the labor market was more flexible. Labor unions were "managed" by the state while minimum wage was present but not strongly enforced (Aswicahyono et al. 2010). After the financial crisis, as a consequence of the political reform in Indonesia, the labor market regulation started to be tightened. Minimum wage increased by 90 percent in only three years from 1999-2002 (Aswicahyono et al. 2010).

Based on the results of the Doing Business survey conducted by the 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 (one source of which is the cost of hiring, alongside minimum wage) is well above that of China, Malaysia, Thailand, the Philippines, and even socialist Vietnam.

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

There is arguably some indication that the rate of poverty reduction during the financial crisis in the region was slower than before it struck. Therefore, although some of this stagnation in the poverty reduction aspiration may have been attributed to the crisis, after more than a decade, people wonder if there must have been something else behind the economic stagnation. 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) suggests that the concern is quite well founded. The 'jobless growth' phenomenon in the manufacturing sector may have also played a role, especially in the poverty

[1] Data source: Asian Development Bank

reduction efforts in urban areas. The link between poverty, manufacturing growth, and labor market needs to be investigated more closely.

Table 1. Trend in poverty incidence and number of poor

Number of poor (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

For almost a decade after the Asian financial crisis (2000-2008), manufacturing sector output grew by about 5.2 percent. If that growth had happened before the crisis, with employment elasticity of 0.53, it would have generated 2.76 percent of employment growth. However, in reality, it only generated 0.9 percent 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 the same period does not seem to be progressing well. Poverty is closely linked to sectoral employment opportunities. To a large extent this has to do with the labor market condition and regulations. A perspective which looks at the connection between labor market conditions, sectoral production, household employment, and 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 ask in this research is: To what extent does 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 the manufacturing sector in creating employment? It is also relevant to ask: What is its likely implication 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 the subsectoral level, knowing that labor absorption is very low?
2. What is the economy-wide impact of the growth in the manufacturing sector, at the subsectoral level, on other variables in the economy such as the output of other sectors (non-manufacturing) and GDP? What is its impact on poverty amid labor market rigidity (represented by constant or increasing real wage)?
3. What is the impact of manufacturing growth (on the economy and on poverty reduction) at the subsectoral level in a more flexible labor market (i.e., no real wage rigidity)?

4. What is the implication of those different labor markets setting on the rate of poverty reduction?

3. METHODOLOGY

3.1. A GENERAL EQUILIBRIUM MODEL OF THE INDONESIAN ECONOMY

The main methodology to be used to answer the foregoing research questions is a Computable General Equilibrium (CGE) model called INDONESIA-E3[2]. The unique feature of this model, which is very relevant to this study, is the disaggregation of households 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). It usually has disaggregated households, which link each of the households to both sources of income (through the market for factors of production) and expenditure (through the market for commodities). What happens in the labor market (for example, due to certain economic shocks affecting some sectors of the economy) has direct links to the income of each household in the model. This should be distinguished from another class of model, called top-down, where the CGE model is separate from the poverty module. Between them is only one directional relationship. In the integrated model, there is no distinction between the CGE model and the poverty module, because both belong to one model.

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

More specifically, the INDONESIA-E3 structure has the following components. A 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 200 households (100 urban and 100 rural, grouped according to the 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, namely, 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 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). Detailed construction of the SAM can be found in Yusuf (2006) and its structure in Table 2.

Table 2. 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			_Domestic 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						Enterprise capital Income					Transfers between enterprises		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), the manufacturing sector experienced the following adjustment.

1. Output or value added of the manufacturing sector slightly increased (for about 5 percent 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)

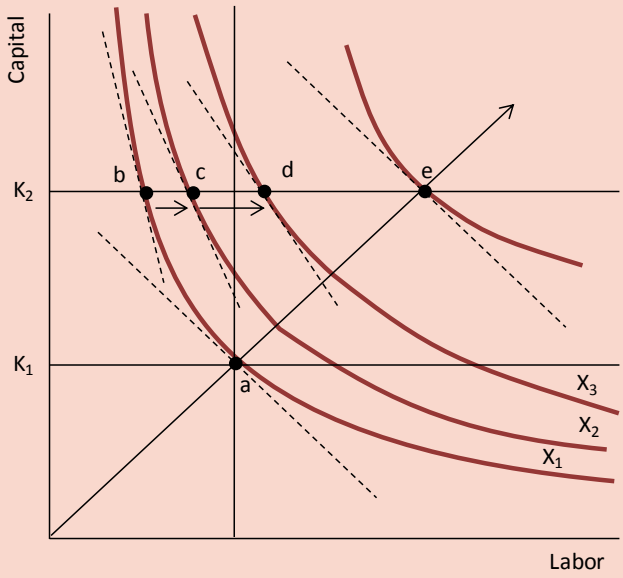


Figure 1 illustrates a manufacturing production isoquant map with typical constant returns to scale technology and specific capital (short run specificity of capital). Initially production level is at point a, with capital fixed at K_1. Capital then increase to K_2 (a situation in the period of economic 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:

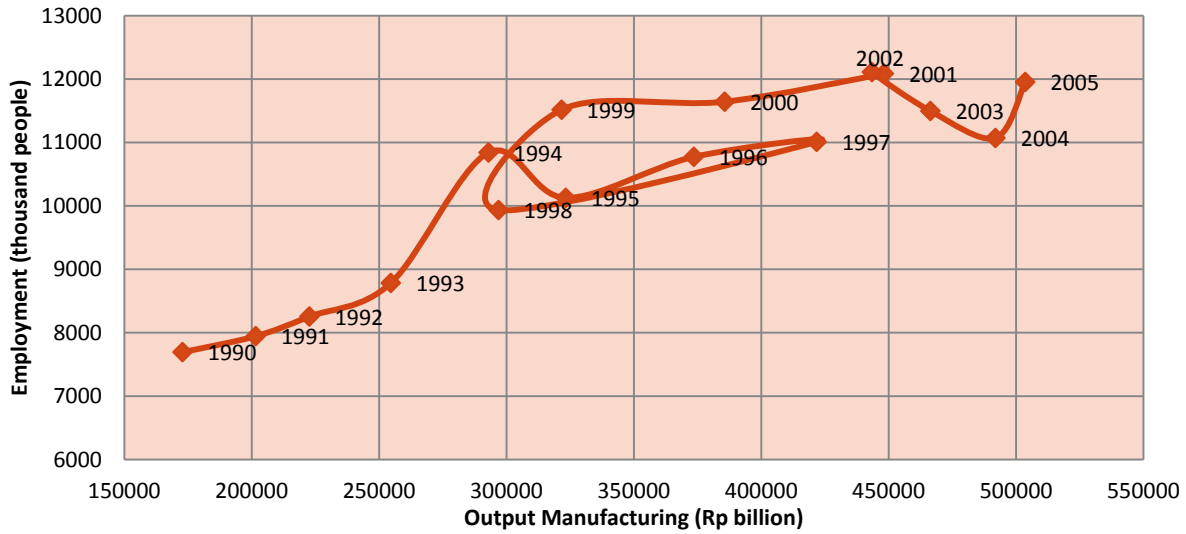
- First, using the statistics of survey of manufacturing establishment for the period under consideration, we will identify at greater detail sectoral level the growth in output and employment.
- Second, using the same set of data, we will investigate possibility and the extent of lower capital utilization 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. RESULTS

4.1 REVISITING JOBLESS GROWTH

We use both secondary data of sectoral value added and employment, as well as data obtained from plant-level survey of the manufacturing establishment conducted by Indonesian Statistics Office (BPS), for the period 1990-2008 to analyze in greater detail output, employment, and capacity utilization in the manufacturing sector, noting the likely differences in the sector's characteristics between pre- and post-Asian financial crisis periods.

Our observation confirms the jobless growth phenomenon in the 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 illustrates the diagram in its logarithm. We added **year** as the label in the diagram to keep track of the evolution of both variables.



Source: ADB Statistics

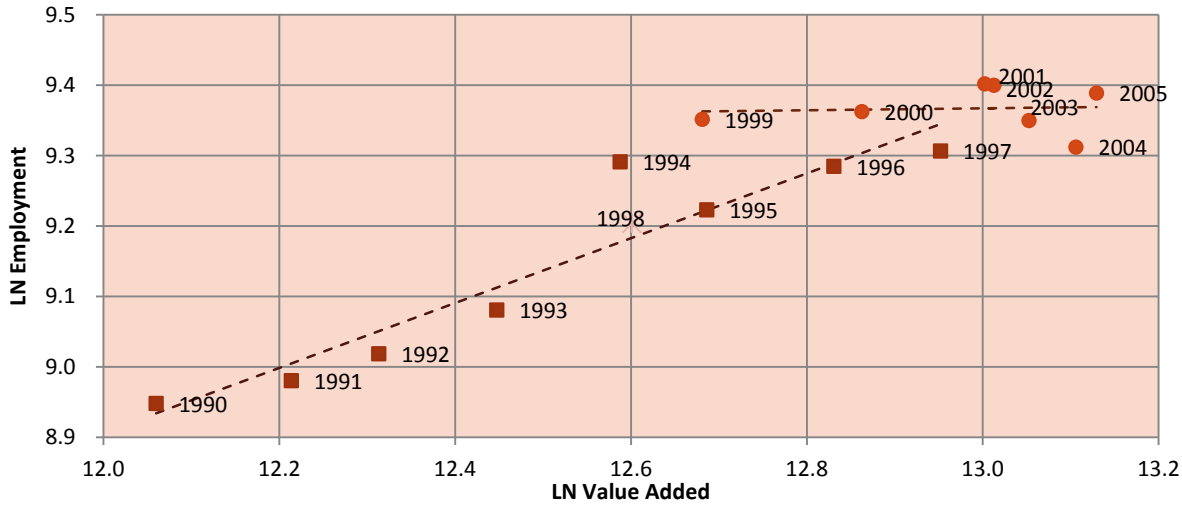
[3] We used the wholesale price index as the deflator.

Figure 2. Manufacturing value added and employment

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 the Asian financial crisis, the output declined from 1997 to 1998 while its employment also fell significantly. Between 1998 and 1999, it started to recover while the employment level reverted to 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 the manufacturing sector despite the growth in its output during the post-crisis period.

Figure 3 illustrates how output elasticity (of employment), as reflected by the slope of the trend line of the pre- and post-crisis periods, differs between those two periods. Elasticity during the period 1990-1997 was 0.46, and close to zero (0.014)[4] during the period 1999-2008.

On the contrary, in the agriculture sector, Figure 4 illustrates that while its employment steadily weakened in the pre-crisis period, employment stopped declining in the post-crisis period. Employment tended to increase in the 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 the manufacturing sector.



Source: Asian Development Bank 2009

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

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

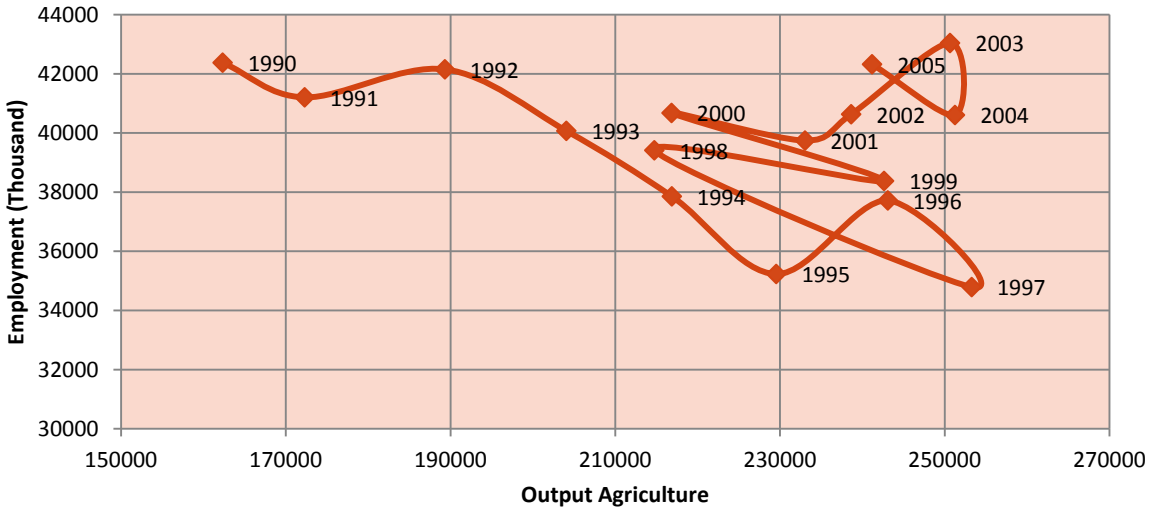


Figure 4. Agriculture value added and employment

We also analyzed the plant-level data of the survey of manufacturing establishment for the period 1990-2008 to get a subsector-level detail. We divided the subsectors of the manufacturing into the following 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 subsectors (under the five 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, the manufacturing sector slowed down in absorbing more labor. In the mean time, as evidence suggests, the resource-based sector is relatively more resilient to economic crisis and it has helped to provide employment for some (Alisjahbana and Yusuf 2004.)

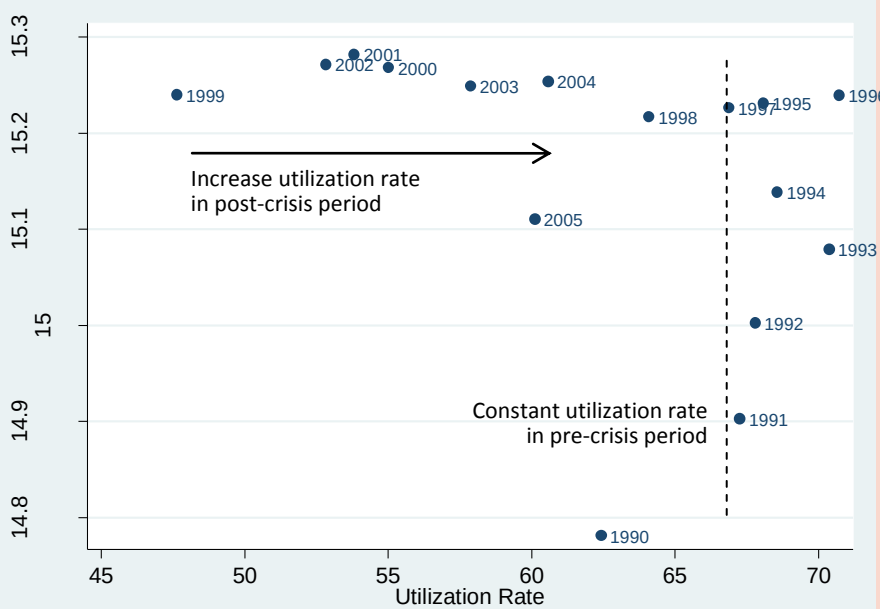
[5] The five categories are based on the following ISIC groups (and corresponding SITC groups for export statistics).

[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 growth, we plot the utilization (i.e., measure of intensity of using capital) rate against employment. At the overall manufacturing level (see Figure 5), it was evident that during the pre-crisis period, both employment and, to a lesser extent, utilization rate rose in supporting the rise in output. Yet, during the post-crisis period (1999-2005), only the utilization rate grew, leaving employment relatively stable. The increase in capital use, which had been idle during the crisis period, was the main driver of manufacturing recovery. What happened was more or less the same across the subsectors 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 an increase in intensity of capital usage, indicating that, in general, manufacturing experienced an increase in capital intensity or capital labor ratio. If the beginning of the recovery period is used as the reference level, then what happened can be perceived as a hefty increase in capital stock, as illustrated conceptually in Figure 3.

Figure 5: Utilization rate & employment: overall manufacturing



Source: Survey of medium and large manufacturing establishments

Real-wage was also higher during the period 1999-2005 compared to the pre-crisis period 1990-1996. The acceleration in real wages between the two periods is shown in Figure 6 below. Real wage growth was steeper during the period 1999-2005 compared to 1990-1996. Based on the 2010 World Bank report, the increasing trend in real wage was attributed to the rapid growth in the minimum wage (especially between 1999 and 2003), thanks to the restoration of democracy and the subsequent proliferation of labor unions.

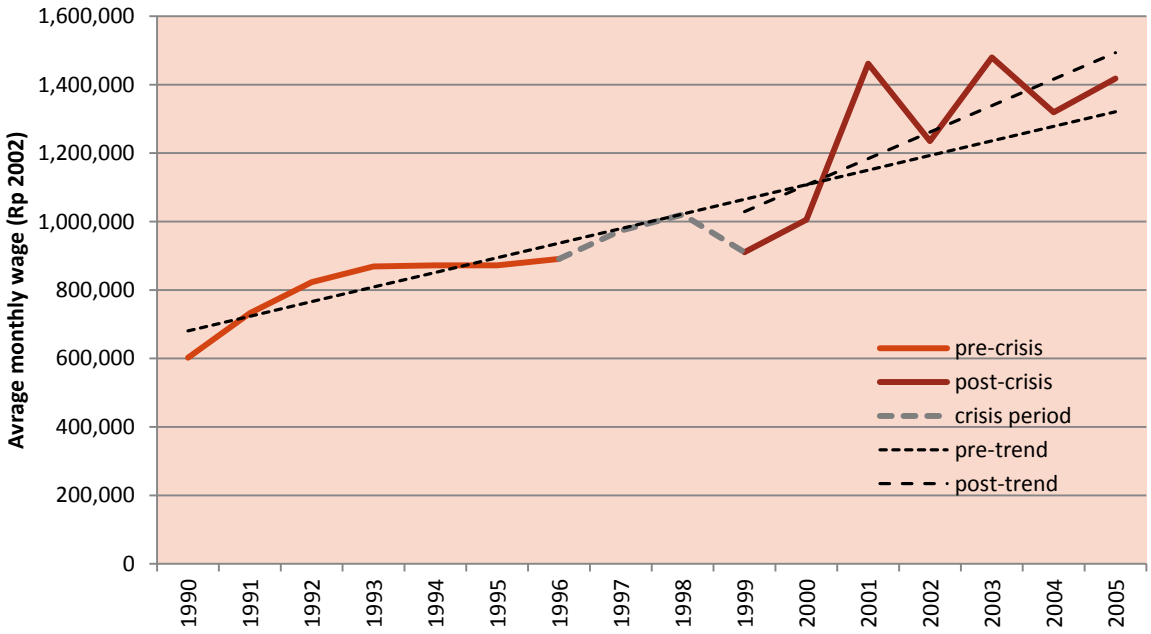


Figure 6. Trend of real wage (1990-2005)

4.2 GENERAL EQUILIBRIUM SIMULATIONS

4.2.1 SIMULATION STRATEGY

Three simulations using INDONESIA-E3 model will be attempted, described as follows:

1. Simulation 1 – An increase in the capital stock of five subsectors of manufacturing under a flexible labor market. The magnitude of increase in the capital stock is approximated by observed change in the utilization rate of the manufacturing sector over the post-crisis period 1999-2005. 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 in Table 3. The assumption of a flexible labor market condition is one of full employment of labor (in each labor category) and real wage change is the equilibrating variable.
2. Simulation 2 – This is has the same setting as 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 – This has the same setting as Simulation 1 except that the real wage for formal labor is increased by roughly 3 percent. This increase is an average deviation from the baseline over 1999-2005. The baseline and non-baseline real wage is calculated using different annualized growth rates between the pre- and post-crisis periods.

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 trickle down to foreigners,

through a current account surplus, or that increases in domestic consumption are not achieved from foreign borrowing (as 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, the full effect of simulations will be channeled to the household expenditure, the proxy of welfare in our model (Warr and Yusuf 2011).

Table 3. The shocks to the capital utilization in five submanufacturing sectors

	Subsector 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: Authors' calculation from the Survey of medium and large manufacturing establishments (1999-2005)

4.2.2 SIMULATION RESULTS

Tables 4 to 7 show the result of three simulations described 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. In simulation 1 (where labor markets are allowed to clear, without wage rigidity), GDP is 0.66% higher relative to baseline as a result of increasing the use of capital stock in the manufacturing sector. Real household consumption increases by 0.93 percent relative to the 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. Given this rigidity, GDP only increases by 0.645 percent, which mostly attributed to the decline in economy-wide employment by -0.043 percent relative to the baseline.

Incorporating the observation that real wage growth accelerated in post-crisis period by as much as 3 percent 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 percent above the baseline. The result suggests quite a contrasting story. Overall, employment falls by -1.26 percent below the baseline, contributing to an increase in GDP that is significantly lower (0.06 percent) than the previous two 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-Nonformal	-1.09	-0.97	-2.86
Skilled-Formal	1.33	0.00	3.00
Skilled-Nonformal	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 calculations

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
Resource-based, Labor-intensive	0.49	0.41	-0.04
Resource-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 calculations

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
Resource-based, Labor-intensive	-1.87	-2.07	-3.07
Resource-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

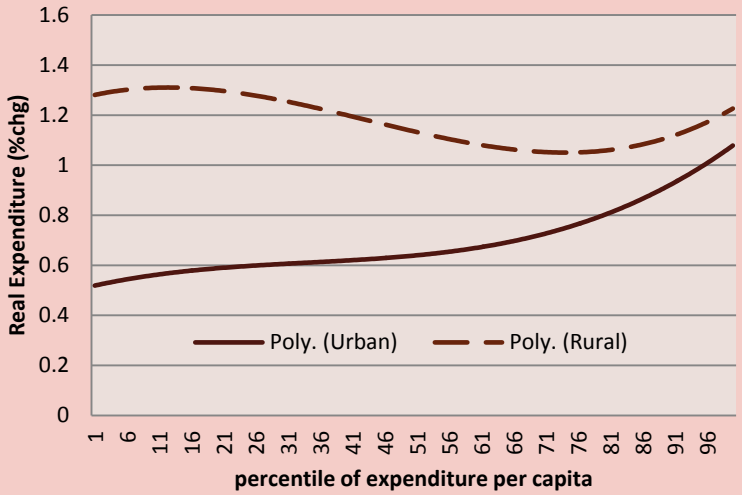
Source: Author's calculations

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

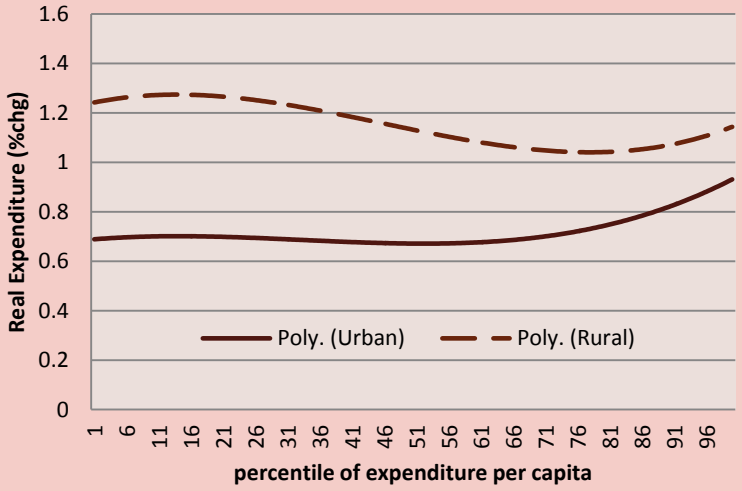
	Simulation 1	Simulation 2	Simulation 3
	Increased capital with no real wage rigidity	Increased capital with real wage rigidity	Increased capital with increased real wage
Urban poor (H13)			
Wage Income			
Agriculture Labor	22.15	20.18	2.93
Unskilled, Formal	-8.72	2.55	10.02
Unskiled, Nonformal	0.50	0.30	-9.63
Skilled, Formal	19.32	10.90	15.96
Skilled, Nonformal	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
Unskilled,, Formal	-4.60	1.31	5.04
Unskilled, Nonformal	0.29	0.18	-5.69
Skilled, formal	4.87	2.83	4.07
Skilled, Nonformal	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 calculations

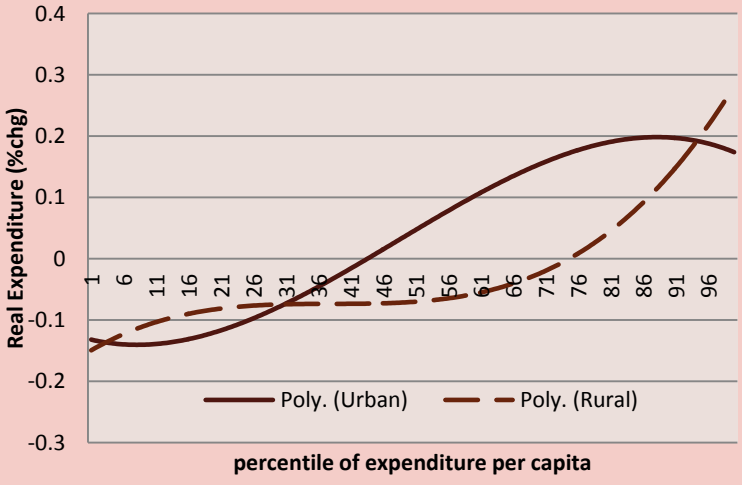
Figure 7. Simulated impact on household's real expenditure (Incidence curve)



Simulation 1



Simulation 2



Simulation 3

Source: Author's calculation

The jobless-growth phenomenon is clearly seen in what happens at the sectoral level (Tables 5 and 6), particularly in manufacturing. In Simulation 2, manufacturing output increases by 1.6 percent relative to the baseline. Yet its employment falls by 2 percent below its baseline. A comparison of Simulation 2 and Simulation 1 suggests that the capital-driven recovery in the manufacturing sector still tends to slow down employment absorption within the said sector, whether or not real wage is fixed exogenously. However, the economy performs better when the labor market is flexible, because more labor can be absorbed in the non-manufacturing sector, particularly in utilities, transportation, trade, services, and to a lesser extent, agriculture. Agriculture seems to absorb relatively less labor than the service sector because it does not depend much on formal sector workers that are laid off from the manufacturing sector.

It should be stressed that, first, the formal-informal distinction is about labor, not sector, type. Second, we assume the length of the simulation run corresponds to the period where the informal labor market always clears (where wage is the clearing instrument) while in the formal labor market, demand is the clearing instrument (real wage is fixed). This is a dualistic situation of the 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 percent real wage increase in formal labor employment has a huge impact on the manufacturing sector's output and employment as well as on the rest of the economy. A capital-driven recovery combined with a 3 percent increase in real wage reduces manufacturing employment at a rate roughly twice that of the simulation without real wage increase. The increase in the manufacturing sector is also reduced by only half the increase without the real wage shock.

The phenomenon of jobless growth in Indonesian manufacturing sector can be a result of two factors that work at the same time. First is the increase in capital utilization as the economy, especially the manufacturing sector, was recovering from the Asian financial crisis, resulting in widely available and affordable capital stock. This is clearly observed from the data taken from a survey of medium and large manufacturing establishments, as explained earlier. This tends to increase the manufacturing sector's capital intensity, thus improving employment absorption.

Second is the acceleration of real wage growth, which some estimates peg at about 3 percent a year. If such an increase (relative to baseline or normal increase) in real wage occurred during the post-crisis period (1999-2005), then the jobless growth in the 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 factors is approximately in the same magnitude, contributing about 50 percent each to falling rate of employment growth in manufacturing.

Figure 7 shows how each of the three simulations affect household welfare (represented by their real consumption expenditure). Each figure represents the incidence curve, where percentage change in real expenditure is plotted against percentile of expenditure per capita (100 percentile),

from the poorest 1 percent to the richest 1 percent in urban and rural areas. From these incidence curves, we can easily determine whether the simulation being analyzed is 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.

As shown in Figure 7, Simulations 1 and 2 are relatively neutral, especially for rural areas. In urban areas, however, Simulation 1 is noticeably regressive, where richer households tend to experience higher increase in their real expenditure than the poor. However, as a result of Simulations 1 and 2, the percentage change in the real expenditure of rural households is always higher than that of urban households, despite both being positive. This can be explained by what happens to the return of the different types of factors of production (as shown in Table 4). As a result of the capital-driven expansion of the manufacturing sectors, non-manufacturing sectors, particularly agriculture sector (including livestock, estate crops, and forestry) expand. The expansion of these sectors cannot be driven by capital or land utilization (by model's assumption), but only by adding more labor to those sectors. As a result, real wages in those sectors, such as agricultural labor, rise. Agricultural labor incomes constitute a dominant source of income among the rural households, especially the poor.

In urban areas, where most households rely on the incomes of formal labor employed in manufacturing, capital intensification to some extent reduces their incomes. An increase in capital utilization translates into an increase in income of pre-dominantly richer households, as can be seen in the upward sloping incidence curve of urban households in both Simulations 1 and 2.

As a result of the positive increase in the real expenditure of all households in urban and rural areas, poverty incidence falls in both simulations (Table 3). Total poverty incidence declined by -0.54 percent and -0.57 percent in Simulation 1 and Simulation 2, respectively. However, the reduction in poverty incidence is much higher in rural than in urban areas. As previously discussed, this is because in general, rural household spending increases to a larger extent compared to urban households, including lower-income ones.

To understand better what drives the change in poverty incidence, it is useful to do a decomposition analysis. The idea behind this type of analysis is to explain the driving forces behind change in poverty incidence by looking at what happens to the real expenditure of marginally poor households. The change in the real expenditure of any household (including poor ones) is a result of various factors, most importantly the change in their incomes (including each income component coming from various returns to factor of production, as well as transfers) and also their living costs. If, say, the income of a specific households increases but 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 this scenario 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 a more detailed derivation.

where $\Delta\widetilde{E}_h^{\ i}$ is the nominal (absolute) change in real expenditure of a household h, decomposable into ΔY_h^f, the nominal change in household h's factor income (which is also decomposable into its components such as labor income, capital income, among others), 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) households.

As can be seen in Table 7, for both urban and rural poor households, almost half of the increase in income is offset by the increase in the cost of living. Simulation 1 and Simulation 2 are 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, resulting in a rise in both households' real expenditure, thus contributing to the decline in poverty incidence. For the rural poor, agricultural labor income is the dominant factor in their total income (roughly 60 percent). 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 percent).

Simulation 3, which simulates 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. The majority of rural households, except the richest 40 percent, suffer a falling real expenditure while the real expenditure of the poorest 40 percent in urban areas also declines.

A closer look at the simulation results suggests that such 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 things worse, the increase in the income of the poor in urban and rural areas cannot compensate for 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 percent and 0.062 percent 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 seen, pending a more thorough investigation, using other types of analysis. However, a general equilibrium analysis like this can offer an insight into the possible linkage between jobless growth in manufacturing 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, being mainly dependent on nonformal employment. Moreover, the capital-driven jobless-recovery of the manufacturing sector has an adverse effect on the rest of the economy. It slows

down the recovery of other nonmanufacturing sectors, which in turn has an impact on the real wage of the labor employed in those sectors, including unskilled nonformal labor and agricultural labor, on which the poor are heavily dependent.

4.2.3 SENSITIVITY ANALYSIS

The elasticity of substitution differs across sectors and was taken from the GTAP (Global Trade Analysis Project) model[8] 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., subsector 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 percent lower and 25 percent higher than the baseline parameter. This is reported in Table A.1-A.4 in 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 percent reduced the impact on aggregate employment (Simulation 3) from -1.26 percent to -1.05 percent. Increasing the elasticity by 25 percent increases the impact on aggregate employment from -1.26 percent to -1.41 percent. The sign, however, is unchanged. Impact on poverty, however, is rather insensitive. For Simulation 1, for example, reducing elasticity by 25 percent yields slightly the same results, -0.54 percent to -0.55 percent. When we increase the elasticity by 25 percent, the percentage change of poverty does not vary. (See the Appendix for this sensitivity analysis.)

5. CONCLUSION

For almost a decade after the Asian financial crisis (2000-2008), the manufacturing sector output grew by about 5.2 percent. If the employment elasticity had been 0.53 (estimated from the pre-crisis period), it would have generated 2.76 percent employment growth. However, in reality it generated almost no growth in manufacturing employment. During the same period, poverty reduction did not seem to be progressing adequately. As poverty is inextricably linked to sectoral employment opportunities, which to a larger extent are influenced by the labor market condition, understanding the linkages between these factors is always an academically worthwhile pursuit and relevant to policymaking. A perspective that considers the connection between labor market conditions, sectoral production, household employment, and poverty incidence is naturally a general equilibrium problem.

As a CGE model of an Indonesian economy, INDONESIA-E3 explores the extent to which real wage rigidity in certain segments of the labor market, plays a role in the stagnation of the manufacturing

[8] GTAP is a widely-known multi-country computable general equilibrium model used mainly for trade-related analysis (Hertel, 1999).

sector in creating employment and how this impacts poverty in Indonesia. To facilitate better understanding of these issues, it uses a theoretically-coherent as well as data-consistent framework.

INDONESIA-E3 model is unique in its power to facilitate understanding of the distributional elements of an economy-wide analysis because of its disaggregation of households by expenditure classes. This allows for precise estimates of the distributional impact and poverty incidence.

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

We used the above observations to simulate three different scenarios using the CGE model: **(1)** an increase in capital utilization in manufacturing in a flexible labor market; (2) similar to no. 1 observation 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 of an accelerated real wage growth on the slowing down of employment absorption (despite expanding output) is about the same in magnitude. This indicates that both are equally important in explaining the jobless-growth phenomenon. A more flexible labor market would help by allowing the manufacturing sector to absorb more labor than it would have done with real wage rigidity. Increased capital utilization in the recovery period is inevitable and indeed helps the economy grow 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 work in favor of the non-poor for three accounts.

From the distribution perspective, both factors (i.e., increase capital utilization of manufacturing sector and increase in the real wage of formal employment) do not benefit the poor. The effect is regressive and slightly dents income. Worse, it tends to increase poverty incidence. The acceleration real wage growth of formal labor does not benefit the poor, who mainly depend on nonformal employment. Meanwhile, the capital-driven, jobless-recovery of the manufacturing sector has an adverse impact on the rest of the economy. That is, it slows down the recovery of other nonmanufacturing sectors, which in turn adversely affects the real wage of the laborers, including unskilled non-formal labor and agricultural ones, on whom the poor are heavily dependent. These inherently general equilibrium linkages may provide an insight into the jobless-growth phenomenon in Indonesia's manufacturing sector in the post-Asian financial crisis as well as into the rate of poverty alleviation that slows down during the same period.

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APPENDIX 1: FIGURE A1-A10

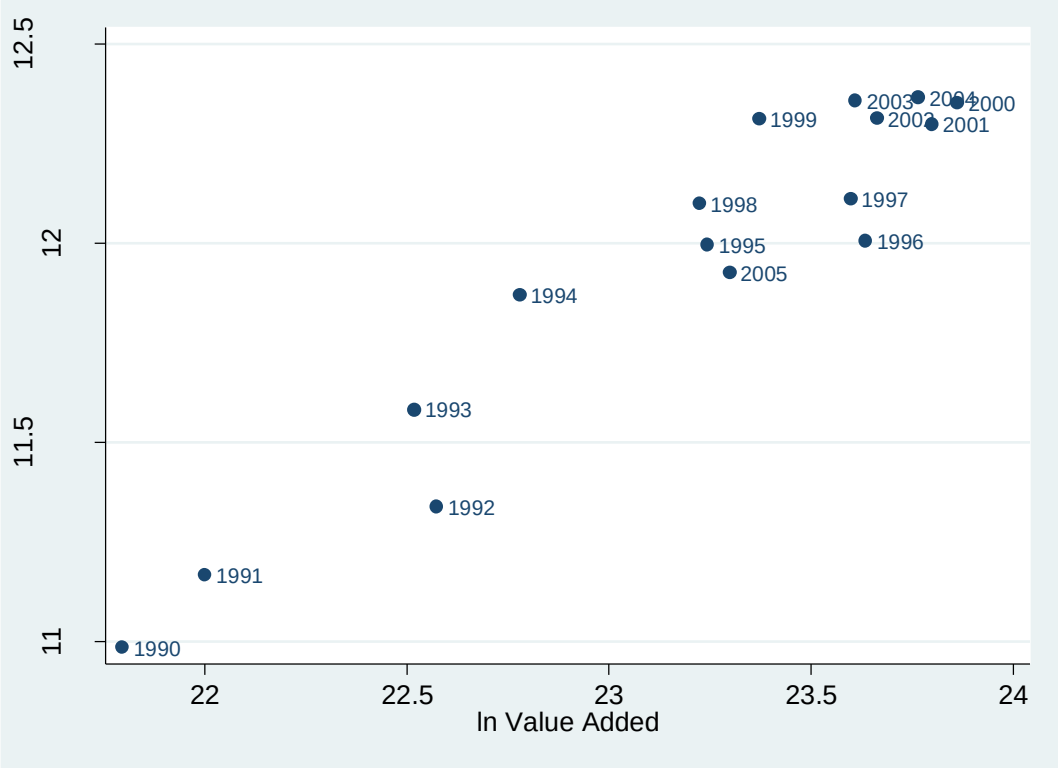

Figure A1: Value added & employment: Unskilled labour-intensive

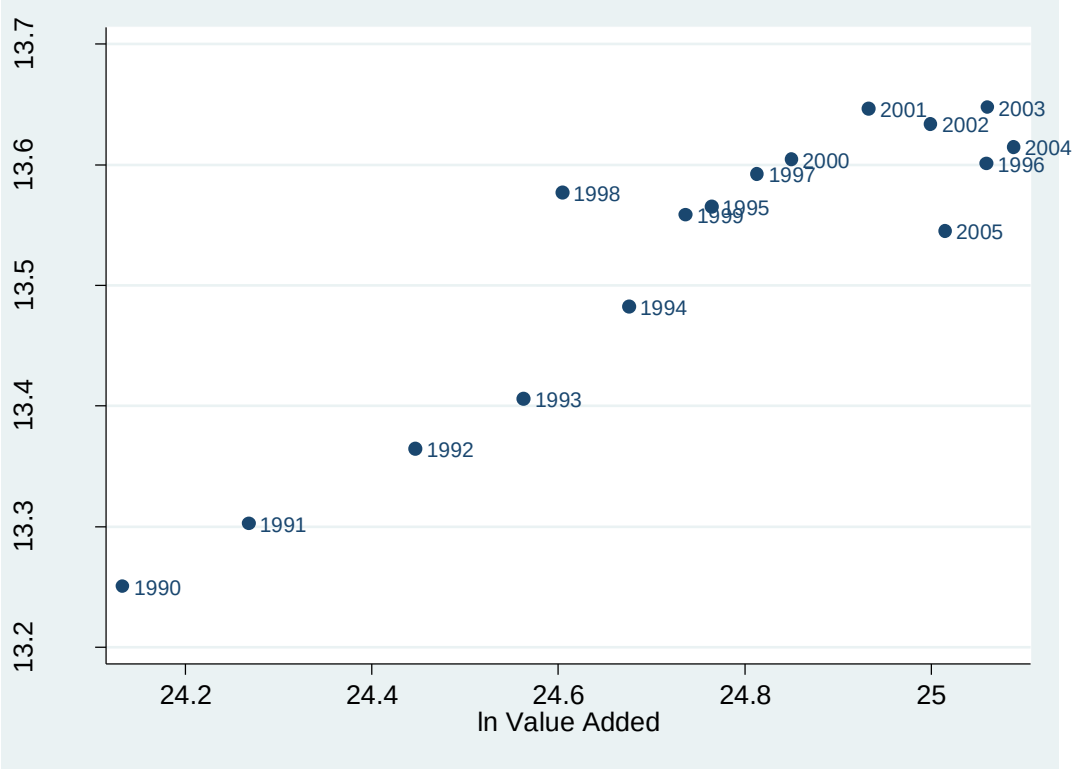

Figure A2: value added & employment - Resource based, labour-intensive

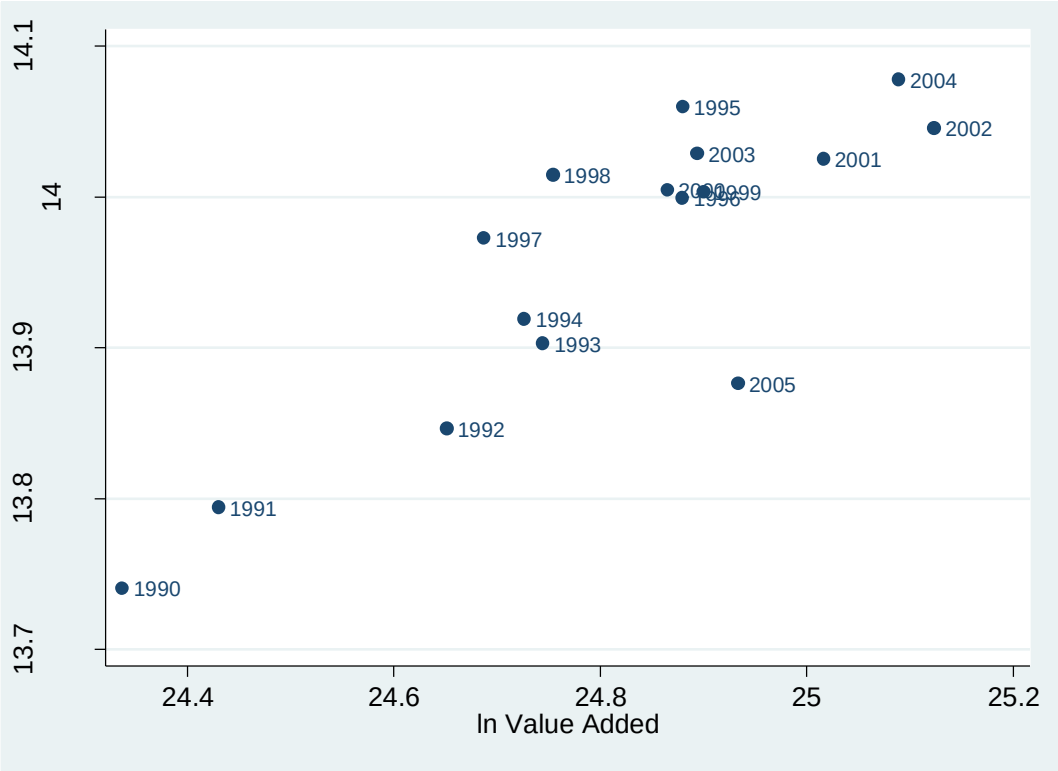

Figure A3: Value added & employment - Resource based, capital-intensive

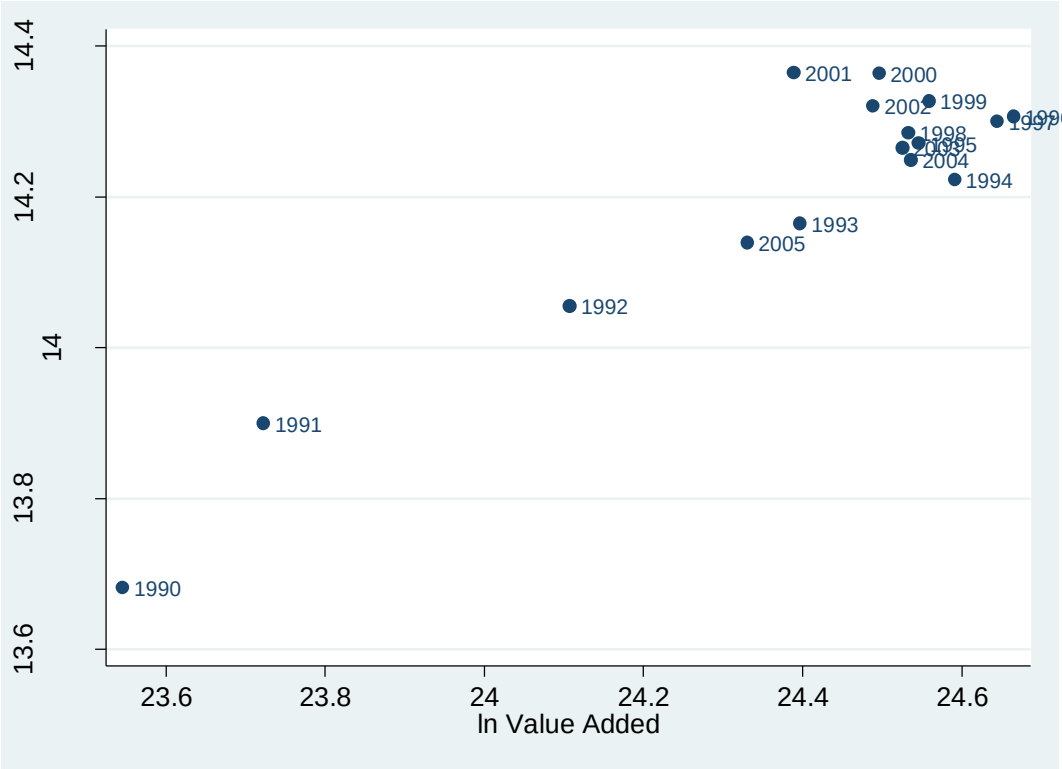

Figure A4: Value added & employment - Electronics

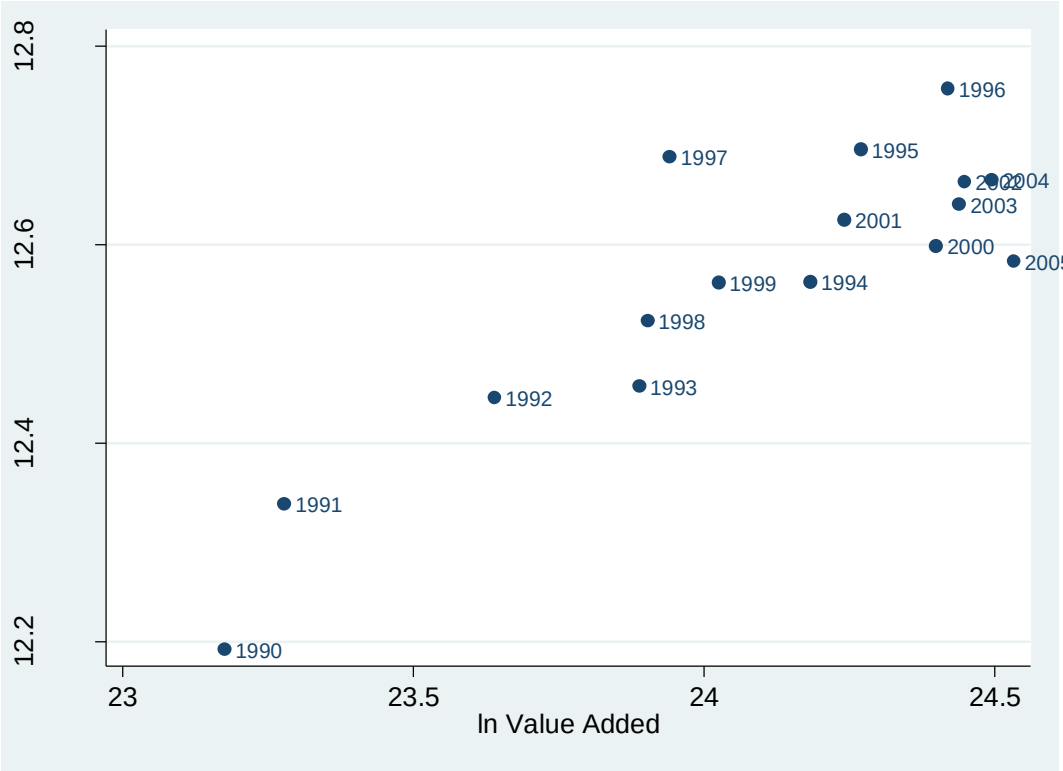

Figure A5: Value added & employment - Footloose capital-intensive

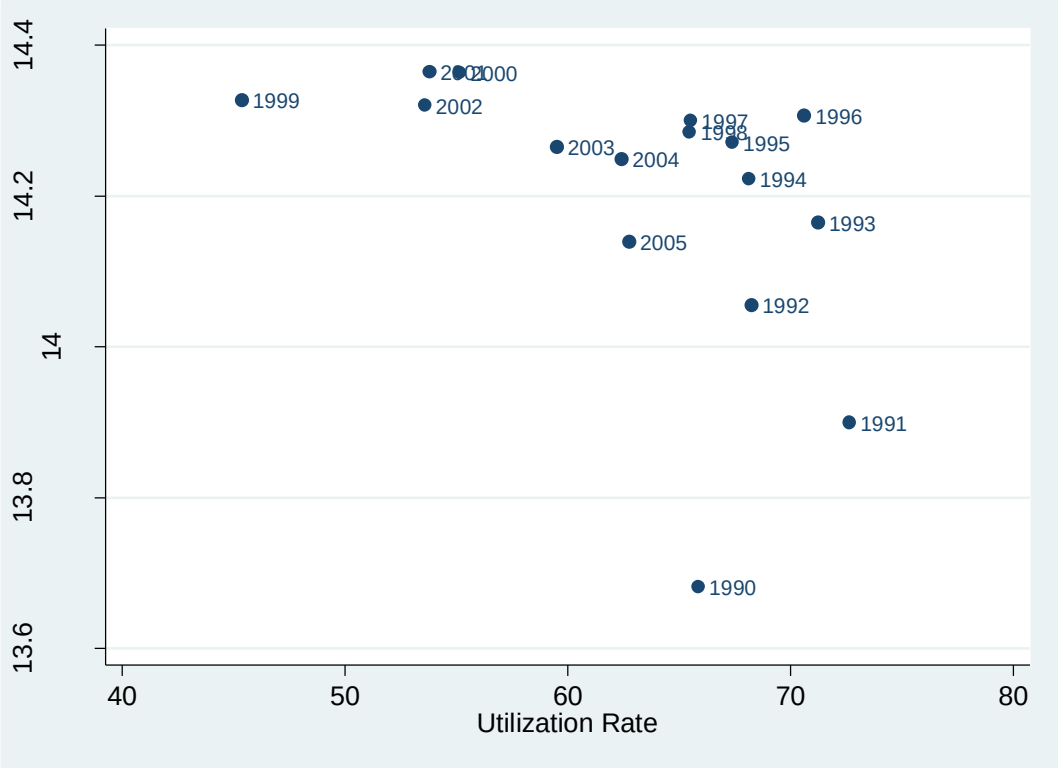

Figure A6: Utilization rate and employment - unskilled labor intensive

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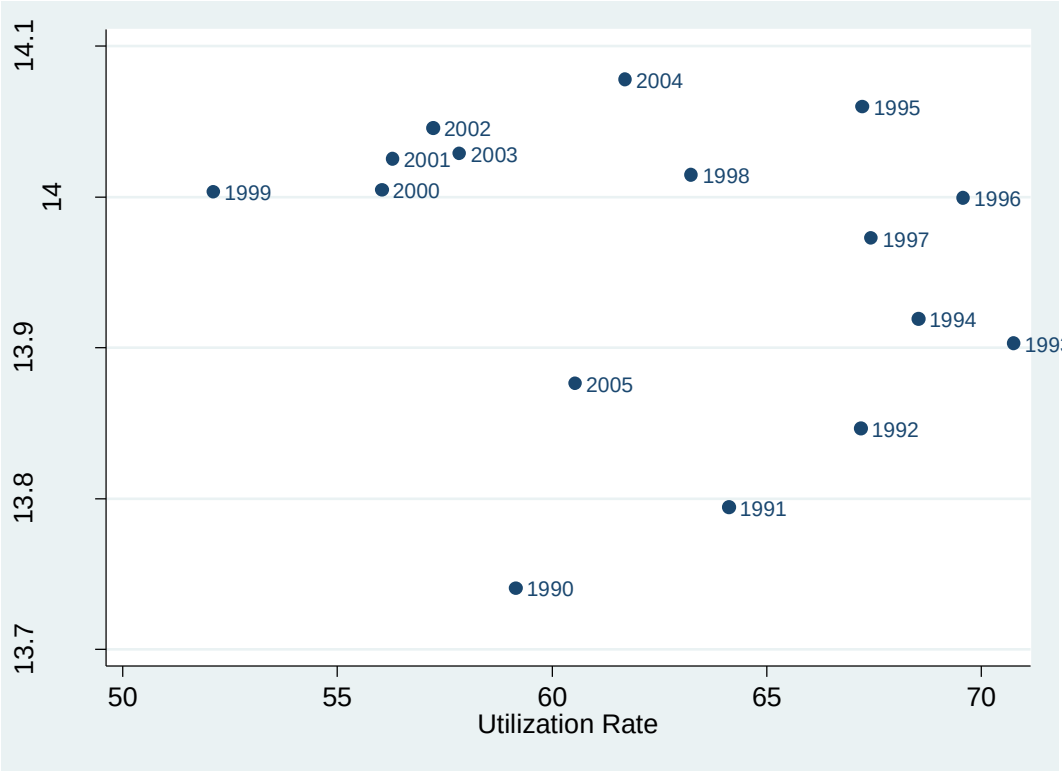


Figure A7: Utilization rate and employment – labor-intensive, resource-based

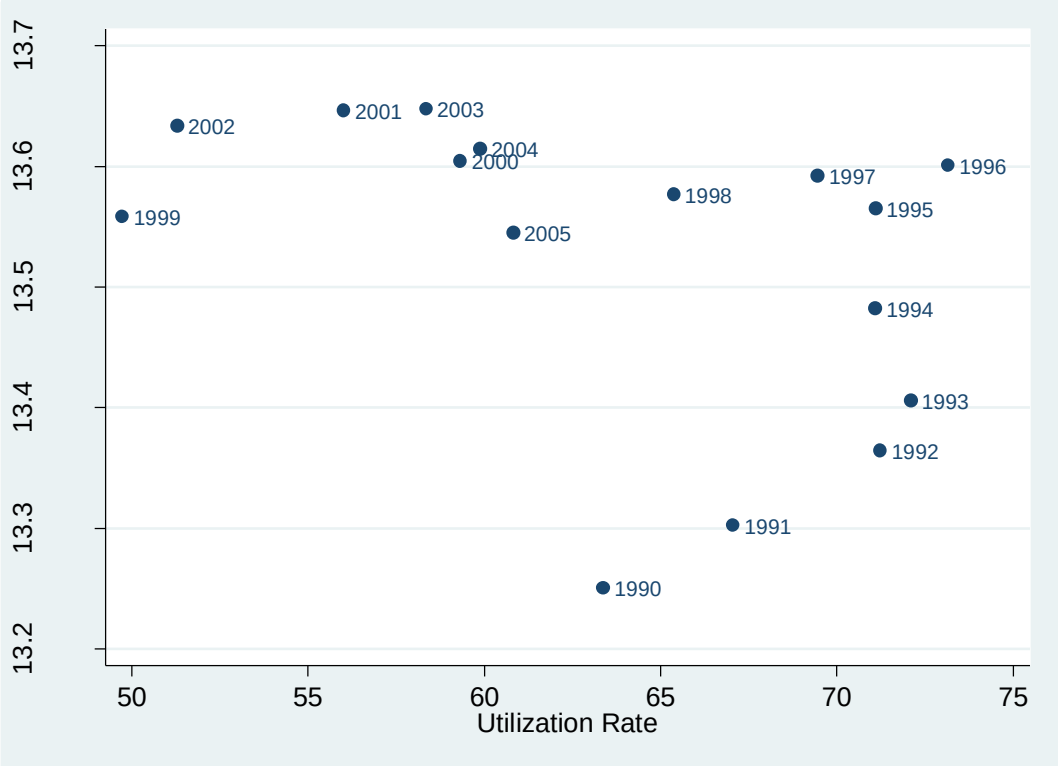


Figure A8: Utilization rate and employment – capital-intensive, resource-based

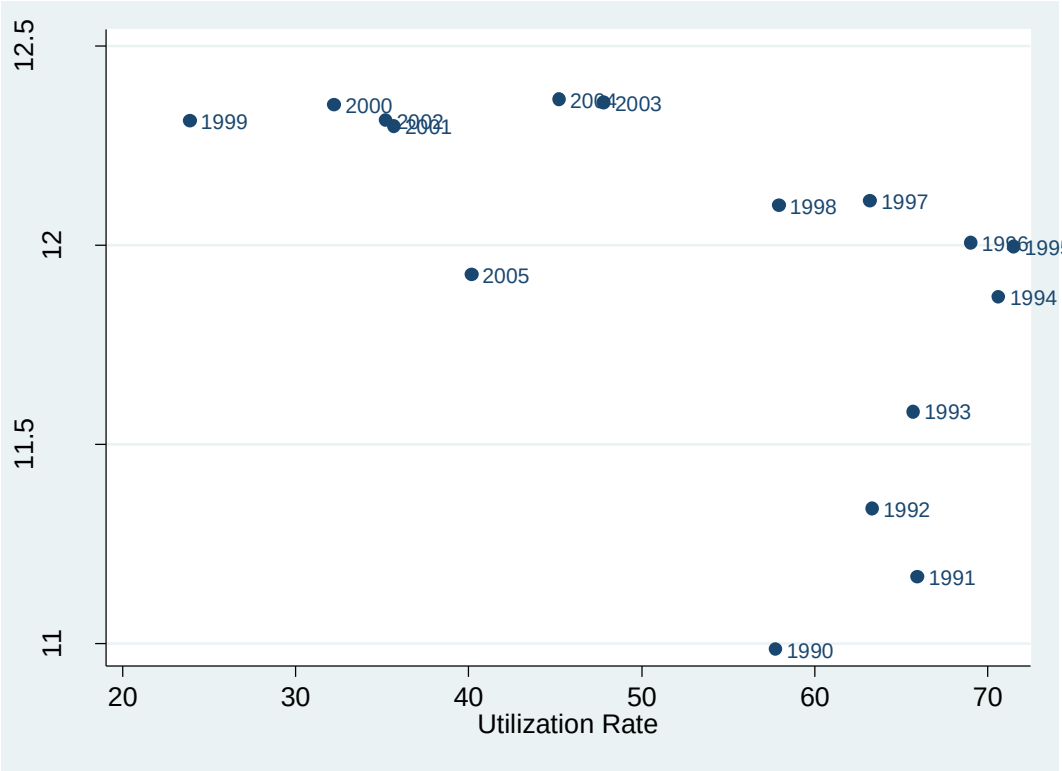


Figure A9: Utilization rate and employment - electronic

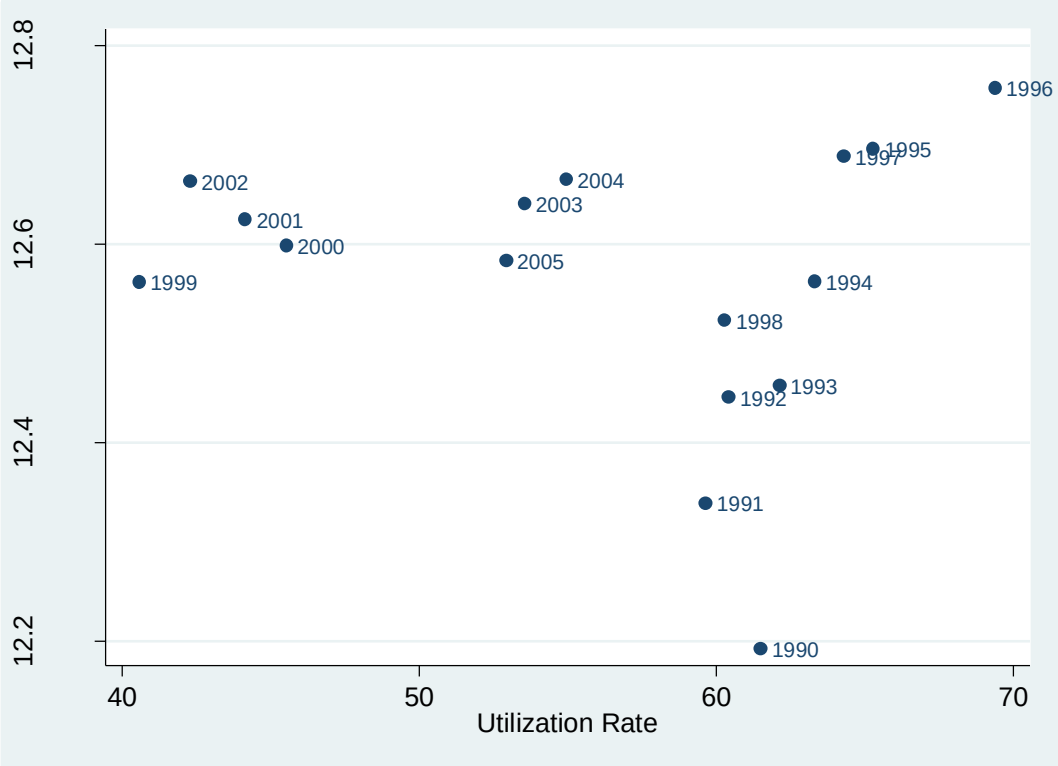


Figure A10: Utilization rate and employment – footloose capital-intensive

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 calculations

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 calculations

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

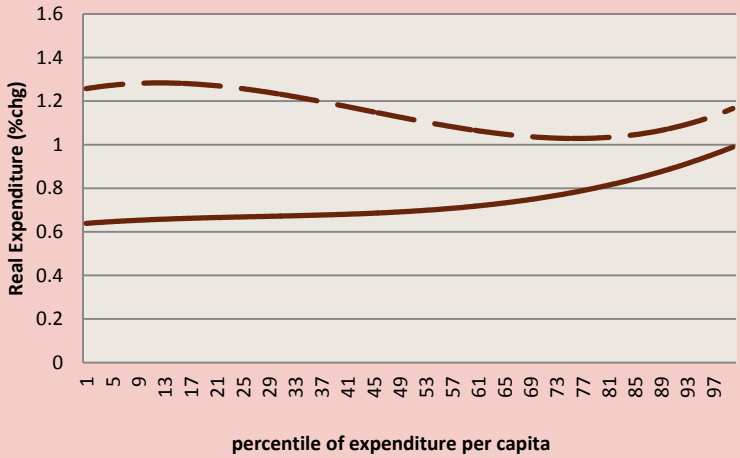
Source: Author's calculations

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

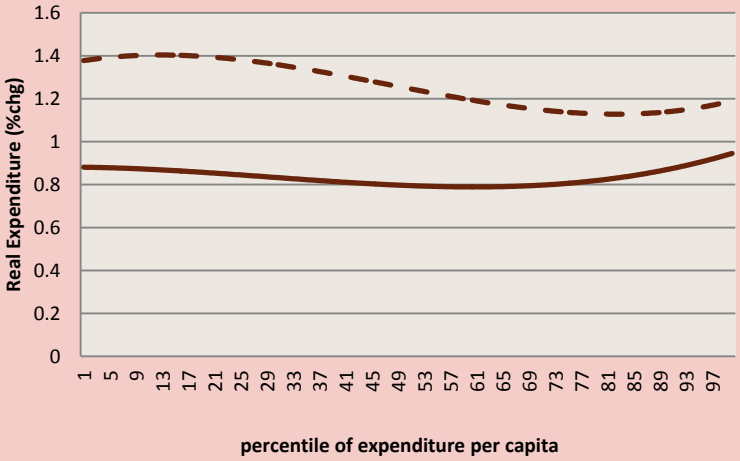
	0.75 σ			σ			1.25 σ		
	Sim 1	Sim 2	Sim 3	Sim 1	Sim 2	Sim 3	Sim 1	Sim 2	Sim 3
Urban poor (H13)									
Wage Income									
Agriculture Labor	22.61	23.07	6.30	22.15	20.18	2.93	21.91	18.19	0.60
Unskill-Formal	-1.72	8.03	18.78	-8.72	2.55	10.02	-13.04	-1.38	3.83
Unskill-Nonformal	2.77	3.97	-5.08	0.50	0.30	-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-Nonformal	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-Nonformal	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-Nonformal	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 calculations

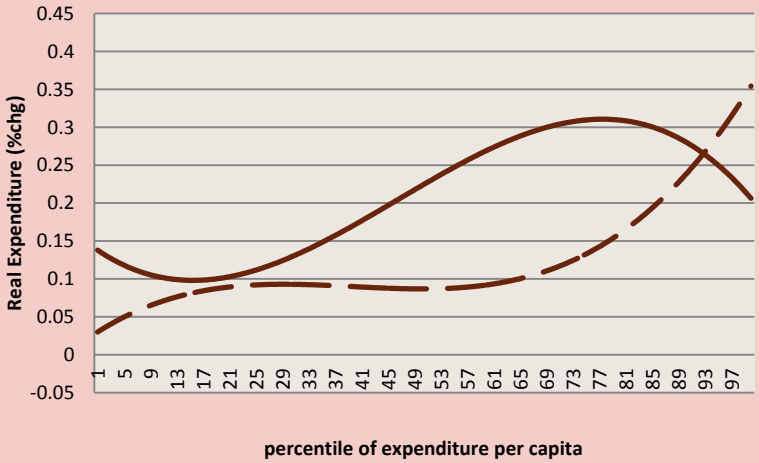
Figure A11. Simulated impact on household's real expenditure (Incidence curve) (0.75 σ)



Simulation 1



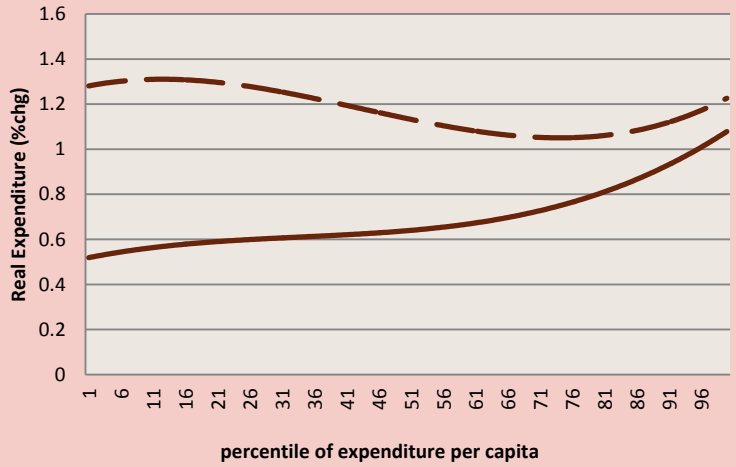
Simulation 2



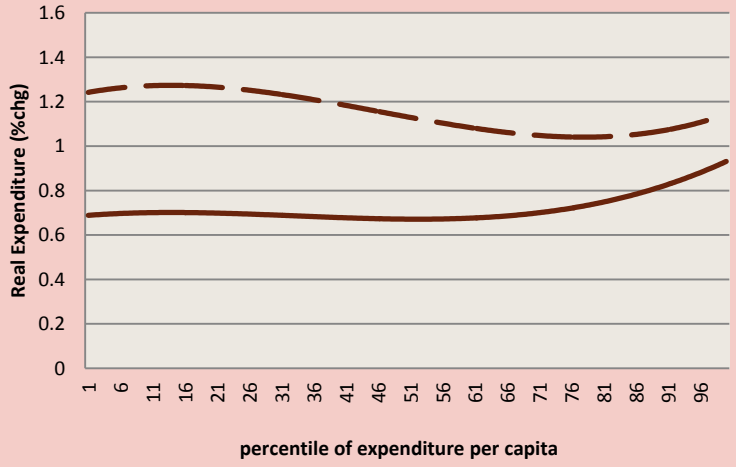
Simulation 3

Source: Author's calculation

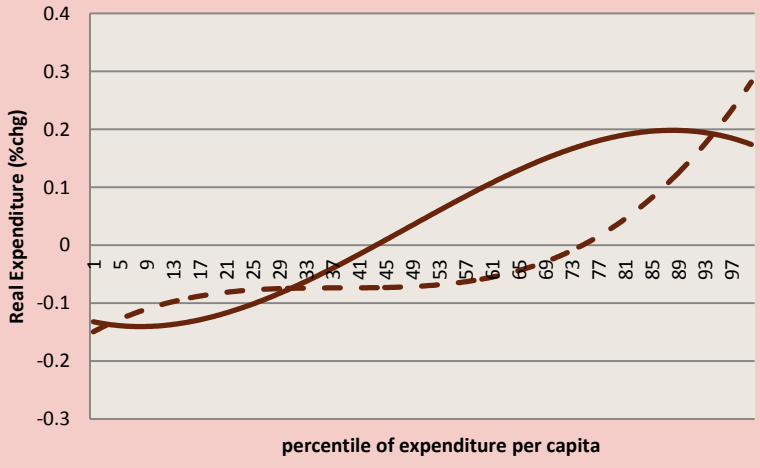
Figure A12. Simulated impact on household's real expenditure (Incidence curve) (σ)



Simulation 1



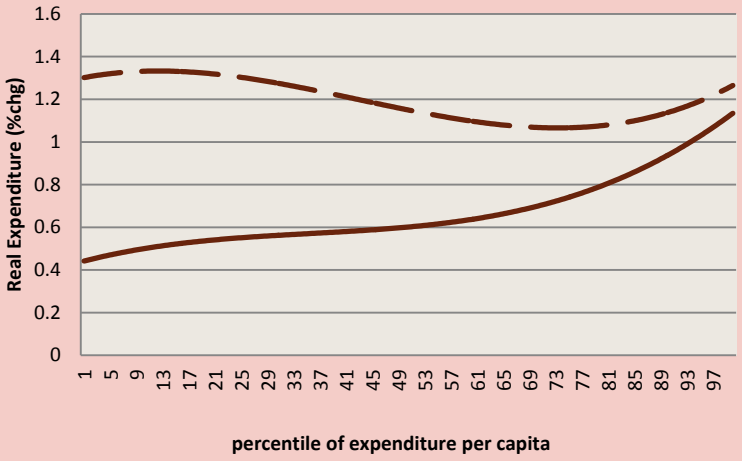
Simulation 2



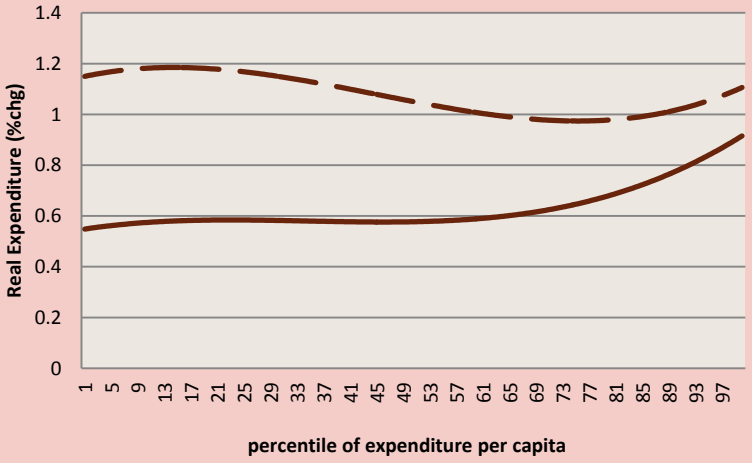
Simulation 3

Source: Author's calculation

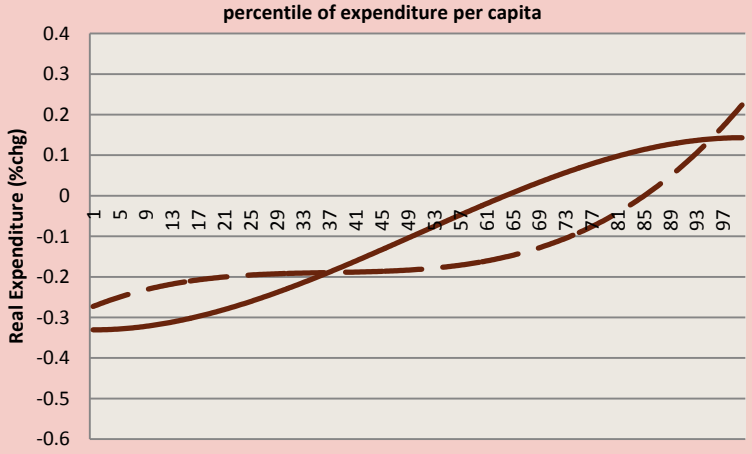
Figure A13. Simulated impact on household's real expenditure (Incidence curve) (1.25)σ



Simulation 1



Simulation 2



Simulation 3

Source: Author's calculation