The Development of Indonesian Manufacturing Sector: Challenges during External Shock and Effectiveness of Policy Response

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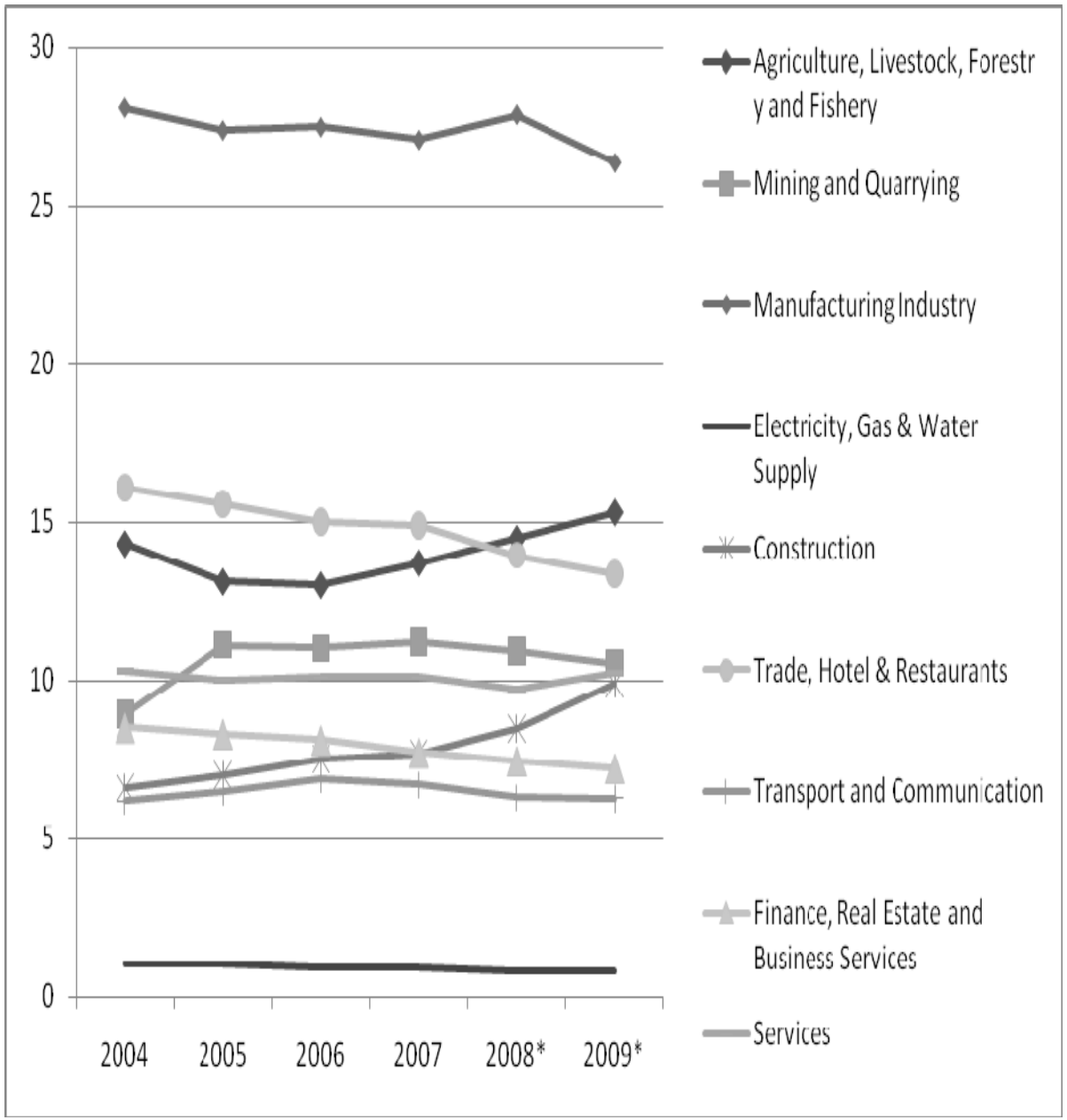
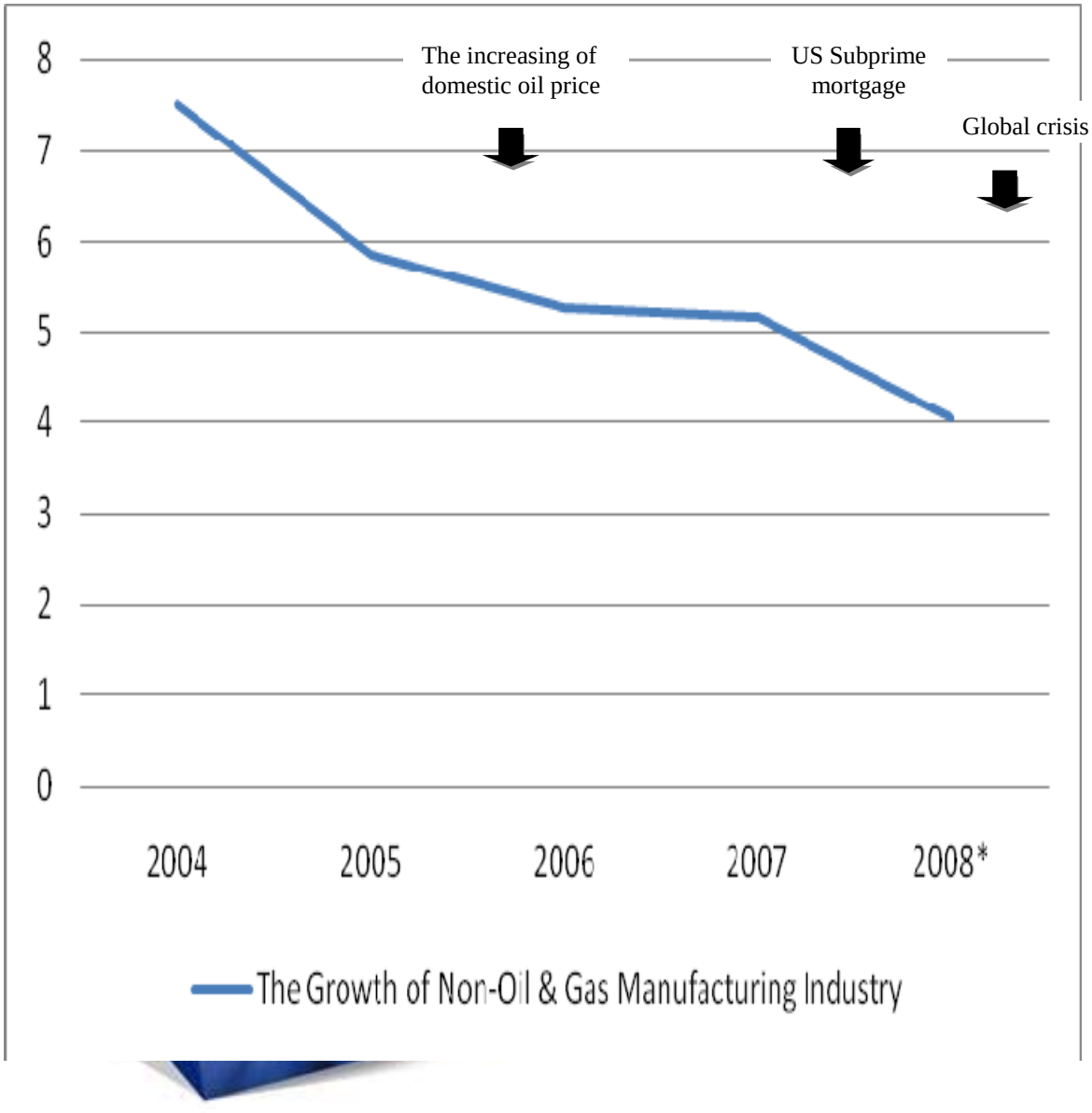
Introduction:

Manufacturing sector is more dominant than other sectors.

Contributed more than a quarter of Indonesian GDP in 2004- 2009.



Introduction:



- Manufacturing sector is highly sensitive to internal and external shock
- 2005: increased domestic oil price up to 126 percent
- 2007: US subprime mortgage
- 2008: Global financial crisis

Other economic shocks: High external debt, stagnant non-oil export, volatile agricultural price

External Shocks and Policy Response

- Government of Indonesia is concerned with the fragility of the manufacturing sector
- Fiscal and Monetary stimulus to support domestic industry facing the threat of global crisis
  - reduction of corporate tax from 30 percent to 28 percent,
  - reduction of individual income tax from 35 percent to 30 percent
  - reducing electricity price for industry.
  - Lowering interest rate

Objectives

Measure the role of manufacturing industry and how far the Indonesian manufacturing industry had developed.

Analyze the effectiveness of several policy responses to strengthen the performance of Indonesian manufacturing sector

Methodology:
(1) Input Output Analysis

- **Multipliers analysis: output multiplier (OM), income index (IM), forward linkage (FL), and backward linkage (BL)**

$$OM_i = \sum_{j=1}^{n} \alpha_{ij}$$

$$IM_i = \sum_{j=1}^{n} \alpha_{ij}^{*}$$

$$FL_i = \frac{n \sum_{j=1}^{n} \alpha_{ij}}{\sum_{i=1}^{n} \sum_{j=1}^{n} \alpha_{ij}}$$

$$BL_j = \frac{n \sum_{i=1}^{n} \alpha_{ij}}{\sum_{i=1}^{n} \sum_{j=1}^{n} \alpha_{ij}}$$

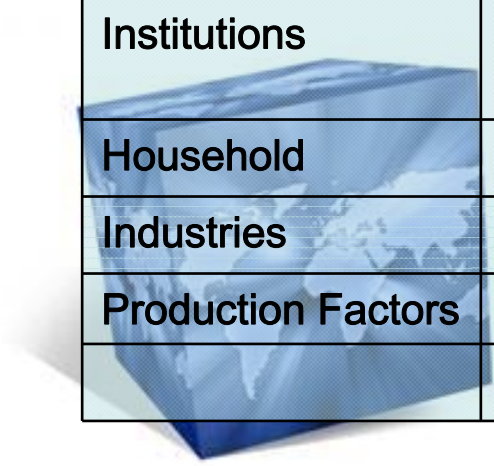
- **Biplot Analysis generated for IO 1995, 2000, 2003, and 2005**

Methodology:
(2) Computable General Equilibrium

General equilibrium model of the Indonesian economy (Oktaviani, 2000, Warr and Oktaviani, 2008 Warr *et al.* 1998; Wittwer 1999)

Market-clearing conditions for commodities and primary factors; Producers' demands; Final demands; The relationship of prices to supply costs and taxes; and A few macroeconomic variables and price indices

Sets	*Subsets*	Desegregations
Institutions		Producers, investors, households, aggregate foreign purchaser of exports; government.
Household		One representative household
Industries		52 industries based on 2005 Input-Output Table:
Production Factors	Labour	Mobile among sectors
	Capital	Mobile among sectors for long run simulation



Policy Scenarios

- Reduction of interest rate by 3 percent (SIM 1)
- Reducing income tax for corporate and individual by 6.67 percent and 3.37 percent respectively (SIM 2)
- Electricity price discount for industry sector by 5 percent (SIM 3)

Results

- Role of manufacturing industry
- How far the Indonesian manufacturing industry had developed?
- Conducted by Input Output and Biplot Analysis

Output Multiplier

(-)

Sector	1995	Changes		
		1995-2000	2000-2003	2003-2005
Processed Food	2.06	-1.85	0.31	0.16
Cooking oil made of animal and vegetables oil	2.04	-1.27	-0.10	0.29
Rice Mills	2.35	-1.40	0.09	0.13
All kinds of flour made of other grains and roots	2.08	-1.10	0.01	0.10
Sugar	1.81	-1.20	0.04	0.07
Other foods	2.05	-1.25	0.01	-0.01
Beverages	2.07	-1.62	0.11	-0.01
Tobacco and Cigarettes	1.75	-1.33	0.03	-0.08
Yarn and cloth	2.22	-1.20	-0.03	0.00
Wearing Apparel and Products of leather	2.47	-1.43	-0.02	0.00
Products of wood	2.11	-2.05	0.21	-0.26
Pulp and paper	2.21	-1.75	0.23	-0.23

Output Multiplier

Sector	1995	Changes		
		1995-2000	2000-2003	2003-2005
Fertilizer and Pesticide	2.41	-1.25	0.02	0.00
Basic chemical	2.37	-1.26	0.04	-0.08
Oil Refinery	1.69	-1.35	0.12	0.04
Products of rubber and plastic	2.44	-1.12	-0.17	0.02
Products made of other than iron and steel	1.94	-0.84	-0.29	0.00
Cement	1.96	-0.86	-0.42	0.05
Basic iron and steel	2.04	-0.82	-2.02	0.88
Metal products made of other than iron	2.17	-1.25	-0.43	-0.22
Products made of metal	2.24	-1.33	-0.03	-0.06
Machinery, Equipment and Electrical product	2.57	-1.25	0.00	-0.01
Transportation vehicles and its repair	2.29	-1.24	-0.11	-0.05
Other industry	2.24	-1.23	-0.14	0.09

Output Multiplier

- In general, all sub sectors have high output multiplier up to 2.57 for machinery, equipment and electrical product in 1995.
- By comparing the magnitude of output multiplier across period given, output multiplier for all sub sector decreased substantially in 2000 relative to 1995. These are largely due to 1998 economic crisis

- More than half of sub sectors were recovered quite fast in 2003 but none are fully recovered even in 2005.
- Sub sectors that quickly recovered mostly are agriculture-based industry.

Income Multiplier

Sector	1995	Changes		
		1995-2000	2000-2003	2003-2005
Processed Food	3.19	0.46	-0.10	-0.41
Cooking oil made of animal and vegetables oil	2.45	-0.34	-0.02	0.50
Rice Mills	6.52	-1.91	-0.24	0.16
All kinds of flour made of other grains and roots	2.34	0.10	0.04	0.22
Sugar	2.41	1.97	-0.22	-0.47
Other foods	2.20	0.18	-0.10	0.33
Beverages	2.53	-0.64	-0.19	0.82
Tobacco and Cigarettes	2.86	-0.35	0.04	-0.24
Yarn and cloth	4.04	-0.37	-0.03	-0.20
Wearing Apparel and Products of leather	2.33	-0.13	0.10	0.01
Products of wood	2.71	-0.24	-0.35	0.18
Pulp and paper	2.50	0.03	-0.01	0.07
Fertilizer and Pesticide	3.07	-1.10	-0.37	-0.05

Sector	1995	Changes		
		1995-2000	2000-2003	2003-2005
Basic chemical	2.46	-0.42	0.77	-0.33
Oil Refinery	1.65	0.10	-0.12	-0.36
Products of rubber and plastic	4.14	-1.22	-0.05	0.42
Products made of other than iron and steel	2.07	-0.18	-0.28	0.21
Cement	2.97	-0.50	-1.06	0.75
Basic iron and steel	3.37	0.57	-0.89	1.55
Metal products made of other than iron	3.08	0.06	-1.46	1.42
Products made of metal	2.11	0.05	1.30	-1.39
Machinery, Equipment and Electrical product	2.94	0.01	0.01	-0.03
Transportation vehicles and its repair	2.34	-0.24	-0.01	0.19
Other industry	2.23	0.18	-0.16	0.19

Income Multiplier

- All industrial sub sector have income index higher than 1 in 1995.
- Not all sub sectors experienced negative impact due to extreme economic condition (1998 economic crisis).
- Processed food, sugar, metal products and some other sectors has higher income index in 2000 relative to 1995.

Forward Linkage

Sector	1995	Changes		
		1995-2000	2000-2003	2003-2005
Processed Food	0.62	0.13	0.08	-0.14
Cooking oil made of animal and vegetables oil	0.78	0.21	-0.33	0.26
Rice Mills	0.71	-0.05	0.02	0.02
All kinds of flour made of other grains and roots	0.75	0.00	0.46	-0.41
Sugar	0.83	-0.07	-0.17	0.12
Other foods	1.00	0.42	-0.19	-0.01
Beverages	0.60	-0.02	0.00	0.00
Tobacco and Cigarettes	0.64	-0.02	-0.04	0.01
Yarn and cloth	1.00	-0.14	0.16	-0.21
Wearing Apparel and Products of leather	0.89	-0.06	0.27	-0.29
Products of wood	0.83	-0.10	0.00	0.04
Pulp and paper	1.46	-0.20	-0.18	0.19
Fertilizer and Pesticide	1.38	-0.21	0.38	-0.08
Basic chemical	3.95	-1.44	0.73	-0.84
Oil Refinery	1.72	0.26	-0.25	0.81

Sector	1995	Changes		
		1995-2000	2000-2003	2003-2005
Products of rubber and plastic	1.34	-0.30	0.42	-0.34
Products made of other than iron and steel	0.72	-0.07	0.01	-0.01
Cement	0.62	-0.02	0.00	0.01
Basic iron and steel	1.23	-0.09	-0.20	0.17
Metal products made of other than iron	1.14	-0.31	-0.04	0.05
Products made of metal	0.86	-0.05	0.29	-0.23
Machinery, Equipment and Electrical product	2.01	-0.89	-0.21	0.72
Transportation vehicles and its repair	1.33	0.40	-0.03	-0.15
Other industry	0.72	-0.12	0.00	0.04

Forward Linkage

- Most sub sectors have forward linkage less than one
- These industrial sub sectors have less capability to induce higher growth on other sectors. It is very rational since the output of industry mostly consume directly as final demand.
- Nearly two thirds of industrial sub sectors experienced lower forward linkage index in 2000 relative to 1995.
- Some sub sectors recovered quite fast and some others experienced another internal/external shock that cause lower index in 2005 relative to 2003.

Backward Linkage

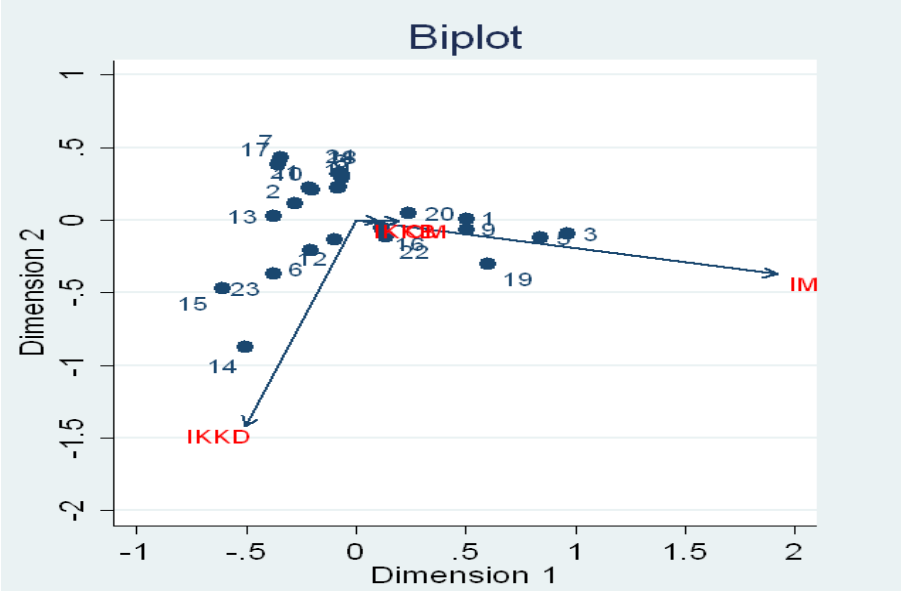
Sector	1995	Changes		
		1995-2000	2000-2003	2003-2005
Processed Food	1.17	0.06	-0.03	-0.03
Cooking oil made of animal and vegetables oil	1.16	0.01	-0.05	0.11
Rice Mills	1.34	-0.19	-0.02	0.05
All kinds of flour made of other grains and roots	1.19	0.01	0.05	0.00
Sugar	1.03	0.12	0.02	0.01
Other foods	1.17	0.00	-0.02	0.05
Beverages	1.18	-0.09	-0.04	0.15
Tobacco and Cigarettes	1.00	-0.06	0.00	0.00
Yarn and cloth	1.27	0.02	0.03	-0.02
Wearing Apparel and Products of leather	1.41	-0.12	0.05	-0.06
Products of wood	1.20	-0.03	-0.08	0.03
Pulp and paper	1.26	0.04	-0.07	0.05
Fertilizer and Pesticide	1.38	-0.30	0.25	-0.28
Basic chemical	1.35	-0.21	0.27	-0.21
Oil Refinery	0.96	-0.10	-0.01	-0.04

Sector	1995	Changes		
		1995-2000	2000-2003	2003-2005
Products of rubber and plastic	1.39	-0.12	0.11	-0.06
Products made of other than iron and steel	1.11	-0.03	-0.05	0.02
Cement	1.12	-0.02	-0.20	0.17
Basic iron and steel	1.16	0.16	-0.07	0.07
Metal products made of other than iron	1.24	-0.05	-0.12	0.17
Products made of metal	1.28	0.02	0.23	-0.28
Machinery, Equipment and Electrical product	1.47	-0.11	0.00	0.01
Transportation vehicles and its repair	1.30	-0.11	0.02	0.04
Other industry	1.27	-0.01	0.00	0.05

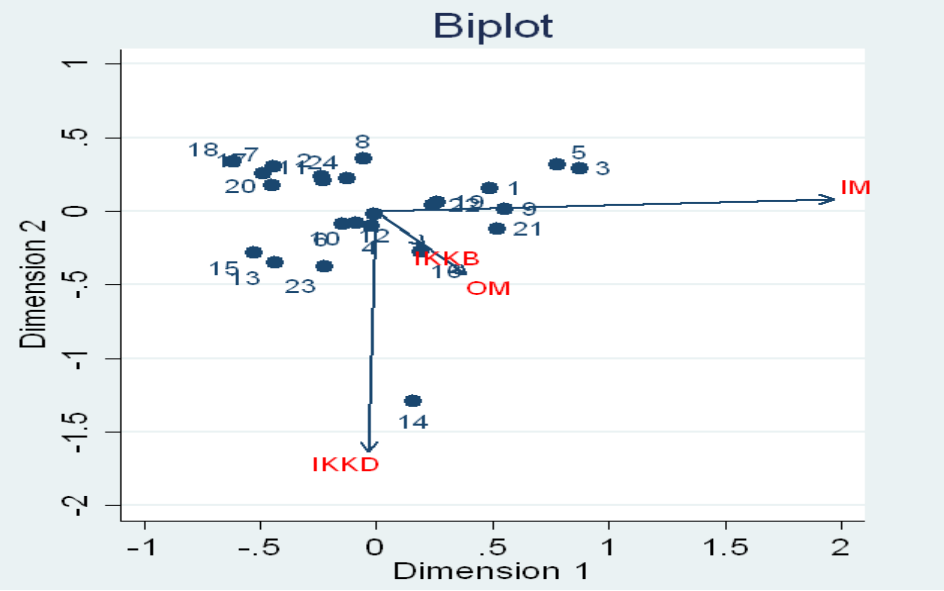
Backward Linkage

- Most sub sectors have backward linkage greater than one → industrial sub sectors have better capability to induce higher growth on other sectors
- The impact of economic crisis was not as severe as other indicators

Biplot based on Input-Output Analysis

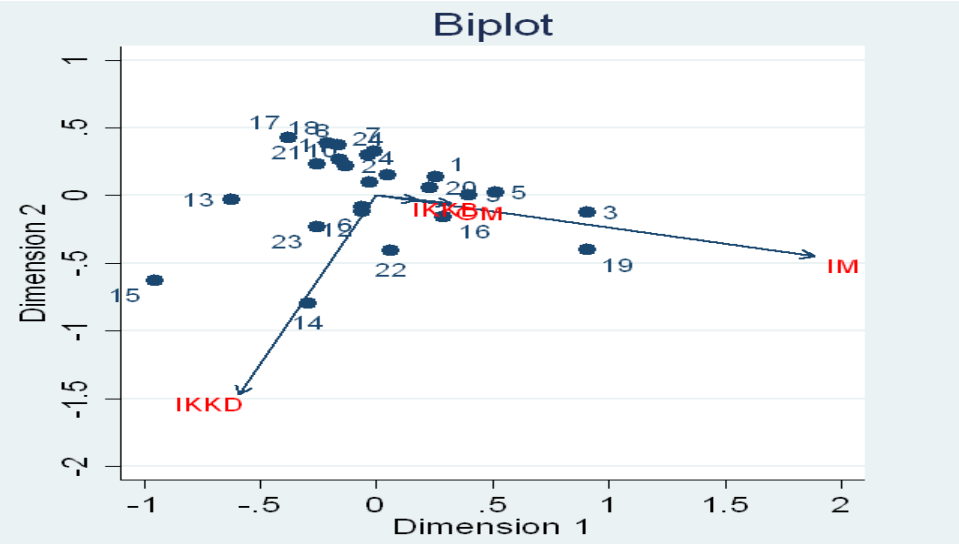


IO-2000



IO-2003

The three biplot looks almost similar.



IO-2005

Biplot Analysis

- Industrial sub sectors divided into three groups:
  - industry that has low output multiplier, income multiplier, forward linkage and backward linkage;
  - industry that has high output multiplier, income multiplier, and backward linkage;
  - industry that has high output multiplier, income multiplier, and forward linkage.
- During the period 2000, 2003 and 2005 there is no differences in terms of groups and its subset.
- The structure of Indonesian industry was almost constant.
- The Leontief coefficients that are generated in the IO analysis is also similar across years which implies that there is no significant technological changes in the given period .

Results

- Effectiveness of several policy responses to strengthen the performance of Indonesian manufacturing sector in order to facing economic shocks
- **Conducted by CGE**

Macro

Description	SIM 1	SIM 2	SIM 3
GDP price index	0.3678	4.2312	-0.0002
Average capital rental	0.3942	8.0317	0.0004
Average real wage of administration labor	0.4913	7.7621	0.2478
Average real wage of farmer labor	-0.1498	5.5410	0.1665
Average real wage of operator labor	-0.0982	7.2679	0.1261
Average real wage of professional labor	0.1907	8.7141	0.2775
Consumer price index	0.2144	3.5412	-0.0227
Aggregate payments to land	0.0589	9.0242	0.1437
Real GDP	0.0323	1.3334	0.1102
Import volume index, duty-paid weights	0.5094	12.508	0.0667
Aggregate real investment expenditure	1.3734	6.9826	0.1162
Real household consumption	0.0810	5.6204	0.1099
Export volume index	-0.6507	-2.8218	0.0676

Macro

- National output, average capital rental, real wage, investment and consumption are expected to increase.
- Electricity price discount is expected to decrease CPI with a very small magnitude.
- In terms of magnitude, reduction of corporate tax rate and individual income tax will have larger positive impact than other simulations

Industrial Output

No	Industry	SIM 1	SIM 2	SIM 3
1	Cooking oil made of animal and vegetables oil	-0.156	0.283	-0.072
2	Rice	0.057	4.122	0.051
3	All kinds of flour made of other grains and roots	-0.079	3.267	0.049
4	Macaroni, spaghetti, noodle and the like	0.041	6.125	0.072
5	Sugar	-0.193	-5.223	-0.027
6	chocolate and sugar confectionery	-0.090	0.550	-0.017
7	Peeling and cleaning of coffee	0.023	3.079	0.034
8	Processed tea	-0.072	0.815	0.062
9	Processed soybean	0.055	4.624	0.061
10	Prepared animal feeds	-0.037	-0.663	0.002
11	Other foods	-0.136	-0.465	-0.006
12	Beverages	-0.005	3.496	0.073
13	Tobacco and Cigarettes	0.033	5.197	0.073
14	Yarn and cloth	-0.309	7.257	0.511
15	Wearing Apparel	-0.219	2.008	0.095
16	Products of leather	-0.339	3.746	0.101
17	Footwear	-0.349	3.284	0.144
18	Products of wood	-0.078	0.656	0.016

19	Pulp and paper	-0.275	7.437	0.236
20	Printed product	-0.052	0.512	0.028
21	Basic chemical	-0.225	8.142	0.093
22	Fertilizer	-0.091	0.021	0.004
23	Pesticide	-0.170	2.403	0.103
24	Oil Refinery	0.033	-3.055	-0.135
25	LNG	-0.153	-5.169	0.029
26	Products of rubber	-0.295	2.789	0.004
27	Products of plastic	-0.057	5.773	0.169
28	Ceramic, Glass and products of glass	0.324	3.957	0.271
29	Cement	0.987	5.339	0.240
30	Products of iron and steel	0.046	-1.015	0.407
31	Products made of other than iron and steel	-0.259	8.913	0.130
32	Other product made of iron and steel	0.352	0.656	0.254
33	Machinery and Equipment	-0.087	14.415	0.068
34	Electrical product, communication and equipment	-0.145	18.554	0.298
35	MachToolOpt	-0.180	-7.959	0.012
36	Ship and Repair of Ship	-0.151	-1.578	0.020
37	Motor cycles	0.025	3.110	0.102
38	Automotive except motor cycles	-0.145	9.867	0.037
39	Other industry	-0.258	-4.752	0.276

Industrial Output

- In general, reduction of interest rate is expected to decrease output of most sectors. Meanwhile, tax reduction and electricity price discount policy is expected to increase output of most industry. These means that Indonesian industry is not responsive to interest rate changes
- The impact of tax cut and electricity price discount is expected to increase output of most sectors

Output Price

No	Industry	SIM 1	SIM 2	SIM 3
1	Cooking oil made of animal and vegetables oil	0.043	6.313	0.025
2	Rice	0.155	9.064	0.107
3	All kinds of flour made of other grains and roots	0.116	4.675	0.023
4	Macaroni, spaghetti, noodle and the like	0.171	5.671	0.034
5	Sugar	0.119	6.762	0.051
6	chocolate and sugar confectionery	0.104	5.736	0.053
7	Peeling and cleaning of coffee	0.182	9.383	0.108
8	Processed tea	0.141	7.823	0.002
9	Processed soybean	0.179	8.253	0.081
10	Prepared animal feeds	0.150	6.185	0.073
11	Other foods	0.131	6.754	0.045
12	Beverages	0.183	6.038	0.015
13	Tobacco and Cigarettes	0.199	6.964	0.032
14	Yarn and cloth	0.091	4.519	-0.135
15	Wearing Apparel	0.066	6.791	-0.010
16	Products of leather	0.128	4.983	0.007
17	Footwear	0.082	6.290	-0.019
18	Products of wood	0.123	6.938	0.009
19	Pulp and paper	0.089	3.097	-0.063

Output Price

20	Printed product	0.087	7.173	0.042
21	Basic chemical	0.051	3.834	0.000
22	Fertilizer	0.060	4.819	0.014
23	Pesticide	0.082	2.902	-0.045
24	Oil Refinery	0.160	4.837	-0.126
25	LNG	0.027	0.912	-0.005
26	Products of rubber	0.084	6.036	0.011
27	Products of plastic	0.109	4.383	-0.050
28	Ceramic, Glass and products of glass	0.265	5.537	-0.102
29	Cement	0.496	7.442	-0.349
30	Products of iron and steel	0.173	4.400	-0.087
31	Products made of other than iron and steel	0.068	4.872	-0.013
32	Other product made of iron and steel	0.226	2.361	-0.082
33	Machinery and Equipment	0.111	1.951	-0.006
34	Electrical product, communication and equipment	0.134	-0.073	-0.085
35	MachToolOpt	0.067	2.340	0.012
36	Ship and Repair of Ship	0.040	6.045	0.002
37	Motor cycles	0.195	3.837	-0.014
38	Automotive except motor cycles	0.119	1.519	0.014
39	Other industry	0.080	2.676	-0.044

Output Price

- It is expected that nearly all output prices will increase as a response of interest rate reduction and tax cut policy.
- Consequently, simulation 1 and simulation 2 will result higher CPI.
- Reduction of electricity price for all sectors will result negative impact on output price most sectors.

Employment

No	Industry	SIM 1	SIM 2	SIM 3
1	Cooking oil made of animal and vegetables oil	-0.292	0.347	-0.151
2	Rice	0.092	5.989	0.030
3	All kinds of flour made of other grains and roots	-0.123	4.369	0.020
4	Macaroni, spaghetti, noodle and the like	0.061	7.641	0.066
5	Sugar	-0.252	-7.613	-0.077
6	chocolate and sugar confectionery	-0.160	0.782	-0.046
7	Peeling and cleaning of coffee	0.045	5.376	0.047
8	Processed tea	-0.127	1.265	0.098
9	Processed soybean	0.099	7.872	0.093
10	Prepared animal feeds	-0.080	-1.748	-0.018
11	Other foods	-0.197	-1.272	-0.052
12	Beverages	0.002	4.079	0.062
13	Tobacco and Cigarettes	0.051	6.563	0.056
14	Yarn and cloth	-0.423	9.494	0.667
15	Wearing Apparel	-0.281	2.031	0.081
16	Products of leather	-0.389	4.058	0.097
17	Footwear	-0.420	3.609	0.150
18	Products of wood	-0.131	0.942	0.011

Employment

19	Pulp and paper	-0.437	11.704	0.365
20	Printed product	-0.117	0.852	0.041
21	Basic chemical	-0.277	9.759	0.078
22	Fertilizer	-0.122	-0.506	-0.030
23	Pesticide	-0.238	2.515	0.078
24	Oil Refinery	0.058	-5.453	-0.263
25	LNG	-0.299	-10.070	-0.054
26	Products of rubber	-0.388	3.141	-0.037
27	Products of plastic	-0.069	7.346	0.189
28	Ceramic, Glass and products of glass	0.460	4.765	0.326
29	Cement	1.432	6.965	0.295
30	Products of iron and steel	0.067	-1.979	0.509
31	Products made of other than iron and steel	-0.332	11.123	0.133
32	Other product made of iron and steel	0.526	0.198	0.316
33	Machinery and Equipment	-0.103	17.736	0.054
34	Electrical product, communication and equipment	-0.187	24.237	0.356
35	MachToolOpt	-0.258	-12.227	-0.042
36	Ship and Repair of Ship	-0.232	-3.368	-0.027
37	Motor cycles	0.048	4.083	0.103
38	Automotive except motor cycles	-0.158	10.671	0.031
39	Other industry	-0.337	-7.022	0.324

Employment

- Expansionary monetary policy is expected to decrease labor absorption on the sectors that are negatively affected in terms of output, for instance rice, peeling and cleaning of coffee, processed soybean and tobacco and cigarette
- In the simulation 2, tax cut is expected to increase labor absorption in almost all sectors with significant magnitude.

Export

No	Industry	SIM 1	SIM 2	SIM 3
1	Cooking oil made of animal and vegetables oil	-0.248	2.058	-0.141
2	Rice	-0.800	-12.354	-0.553
3	All kinds of flour made of other grains and roots	-1.031	17.738	-0.207
4	Macaroni, spaghetti, noodle and the like	-1.522	8.879	-0.300
5	Sugar	-0.641	-0.494	-0.275
6	chocolate and sugar confectionery	-0.234	2.091	-0.118
7	Peeling and cleaning of coffee	-0.407	-6.076	-0.243
8	Processed tea	-0.316	-2.583	-0.004
9	Processed soybean	-0.690	-6.109	-0.313
10	Prepared animal feeds	-0.578	1.873	-0.281
11	Other foods	-0.506	-0.326	-0.175
12	Beverages	-0.409	1.415	-0.034
13	Tobacco and Cigarettes	-0.767	-1.136	-0.125
14	Yarn and cloth	-0.659	15.617	0.979
15	Wearing Apparel	-0.481	-0.875	0.074
16	Products of leather	-0.989	12.987	-0.055
17	Footwear	-0.634	2.929	0.149
18	Products of wood	-0.738	-1.609	-0.055
19	Pulp and paper	-0.492	19.651	0.349
20	Printed product	-0.477	-2.765	-0.229

Export

21	Basic chemical	-0.334	18.403	-0.002
22	Fertilizer	-0.390	12.013	-0.091
23	Pesticide	-0.534	24.452	0.294
24	Oil Refinery	-0.656	-19.784	0.513
25	LNG	-0.153	-5.169	0.029
26	Products of rubber	-0.625	4.703	-0.081
27	Products of plastic	-0.805	16.969	0.375
28	Ceramic, Glass and products of glass	-1.963	8.407	0.755
29	Cement	-3.677	-5.730	2.588
30	Products of iron and steel	-1.280	16.841	0.648
31	Products made of other than iron and steel	-0.508	13.339	0.099
32	Other product made of iron and steel	-1.680	-17.520	0.608
33	Machinery and Equipment	-0.887	37.655	0.050
34	Electrical product, communication and equipment	-0.752	37.759	0.478
35	MachToolOpt	-0.532	-18.673	-0.095
36	Ship and Repair of Ship	-0.344	5.335	-0.018
37	Motor cycles	-1.665	24.162	0.120
38	Automotive except motor cycles	-1.019	43.940	-0.122
39	Other industry	-0.595	-19.858	0.324

Export

- Reduction of interest rate is expected to decrease export of all manufacturing commodities.
- The impact of other two simulations on export is expected to vary across sectors.
- There are some sectors that have better export performance and some others that experience negative impact.

Import

No	Industry	SIM 1	SIM 2	SIM 3
1	Cooking oil made of animal and vegetables oil	0.3282	33.6886	0.1945
2	Rice	0.6354	36.6517	0.4327
3	All kinds of flour made of other grains and roots	0.6393	28.1725	0.1944
4	Macaroni, spaghetti, noodle and the like	1.0960	39.5387	0.2834
5	Sugar	0.2458	14.4022	0.1415
6	chocolate and sugar confectionery	0.5926	32.7133	0.3200
7	Peeling and cleaning of coffee	1.1343	58.9046	0.6819
8	Processed tea	0.8314	46.1669	0.1047
9	Processed soybean	1.1445	53.9746	0.5452
10	Prepared animal feeds	0.3008	12.7559	0.1505
11	Other foods	0.6928	36.3147	0.2885
12	Beverages	1.0625	38.4170	0.1713
13	Tobacco and Cigarettes	0.4163	18.3799	0.1369
14	Yarn and cloth	0.5294	28.2213	-0.4903
15	Wearing Apparel	0.5263	46.4698	0.0684
16	Products of leather	0.3029	21.4787	0.1346
17	Footwear	0.5316	39.7775	0.0344
18	Products of wood	1.1189	28.8471	0.1098
19	Pulp and paper	0.0999	12.4891	0.0019
20	Printed product	0.4105	34.4668	0.2475
21	Basic chemical	-0.1205	4.1670	0.2259

Import

22	Fertilizer	0.1650	14.5442	0.0698
23	Pesticide	0.1934	7.7580	-0.0767
24	Oil Refinery	0.2557	6.3367	-0.2139
25	LNG	-0.0781	-2.6460	0.0146
26	Products of rubber	0.3131	16.1818	0.1008
27	Products of plastic	0.5791	24.2653	-0.0743
28	Ceramic, Glass and products of glass	1.6126	24.4689	-0.2089
29	Cement	3.0683	33.9412	-1.1777
30	Products of iron and steel	0.9364	11.2462	0.0592
31	Products made of other than iron and steel	0.1255	15.7614	0.1421
32	Other product made of iron and steel	1.4974	12.6457	-0.1114
33	Machinery and Equipment	0.7518	11.1433	0.0850
34	Electrical product, communication and equipment	0.4662	11.8753	-0.0176
35	MachToolOpt	0.3168	10.5057	0.1582
36	Ship and Repair of Ship	0.5177	4.6759	0.0813
37	Motor cycles	0.6589	15.5777	0.0491
38	Automotive except motor cycles	0.4953	8.8923	0.0975
39	Other industry	0.2325	9.9354	0.0556

Import

- Monetary and fiscal policies will increase import of manufacturing sectors.
- It is expected that an increase in real household consumption will result higher demand of manufacturing commodities
- In term of magnitude, simulation 2 will result higher impact on import which is increase by 4 percent up to 58 percent for specific commodity

Conclusion and Recommendation

- The extreme economic condition on sub sector of Indonesian industry was clearly disadvantageous.
- Agricultural-based industry were recovered quite faster than others after external shocks.
- The nearly constant Leontief Coefficient imply two possible issues. First, the data that are presented in Input-Output might have an error (error in collection of data). Second, the technological change during period given was almost constant. Both fiscal and monetary policies are quite powerful to minimize the impact of external and internal shock.

Conclusion and Recommendation

- Some issues that need to be considered:
  - type of policy tool that are used. Simulation 2 and Simulation 3 show that fiscal policy with different tool will result different impact. It will depend on the transmissions that are occurred.
  - Simulation 1 suggests that Indonesian industry is not so responsive with changes in interest rate → fiscal policy is still preferable to improve real sector relative to monetary policy.
- Government should be aware of Indonesian industry competitiveness. Most industrial sectors respond negatively in terms of export.

THANK YOU