

Do Non-Manufacturing Export Negatively Impact Manufacturing Export? Study Case From 1967 to 2023 in Indonesia

By HEIDIR ROYYAN FIRDAUS*

The increase in commodity exports driven by rising commodity price has the potential to result in dutch disease, current account deficit, and decline in manufacturing export performance. This study aims to examine whether non-manufacturing export affect manufacturing export during the period of 1967-2023 using OLS and 2SLS models to overcome the problem of bias. The result is non-manufacturing exports and manufacturing exports are correlated because both experienced growth, but no causal relationship between them. Therefore, instead of downplaying the role of natural resources, Indonesia can use the increase in commodity exports when commodity price are rising by developing productive sectors. The government can do currency depreciation and creating a sovereign wealth fund, as well as taking advantage of rising commodity price by implementing strategies such as improving infrastructure to increase Indonesia's attractiveness in export-oriented FDI and increasing integration global value chain, especially the labor-intensive manufacturing sector.

JEL: F10

Keywords: Manufacturing, Non-Manufacturing, Export

A surge in commodity exports can lead to dutch disease, which appreciates the exchange rate and reduce the competitiveness of the manufacturing sector. Chen, Rogoff and Rossi (2010) supports this by finding that the real exchange rate of commodity-exporting countries tend to increase during periods of rising commodity prices. This happens because rising in commodity prices increase a country's trade balance and economic activity, leading the currency to appreciate.

On the contrary, the increase in commodity exports is solely due to higher commodity prices, a current account deficit could arise if commodity prices fall while Indonesia's imports remain high. During COVID-19, Indonesia's current account deficit widen due to sluggish tourism exports and commodity markets (World Bank, 2020). The increase in commodity exports driven by rising in prices is nominal growth and not real growth, causing the economy to become unstable due to price fluctuations. In Figure 1, commodity exports and commodity prices are shown to have the same pattern, so it is assumed that commodity prices have a strong influence to Indonesia's commodity exports.

UNCTAD (2002) classify SITC 5 to SITC 8 as manufacturing export. In figure 2, panel a,

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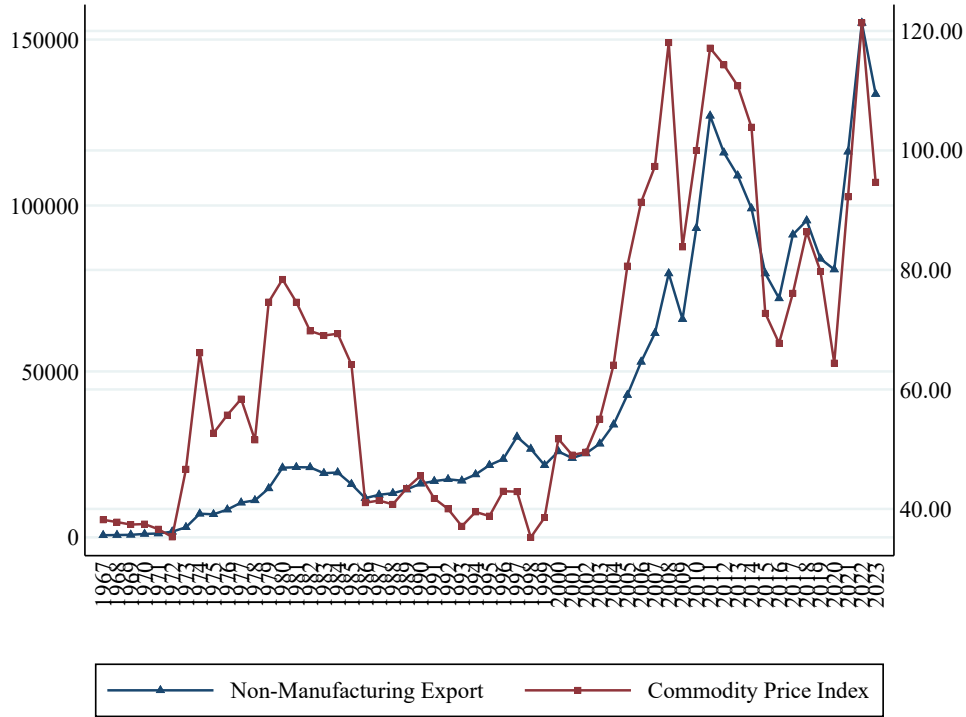


Figure 1. : Non-Manufacturing Export and Commodity Prices Index

Note: The left Y-axis represents the export value (\$ million), while the right Y-axis represents the commodity price index.

Source: UN Comtrade (2024); World Bank (2024), processed.

Exports are dominated by mineral fuels and lubricants, especially oil and gas. In figure 2, panel b, the percentage of non-manufactured goods reached above 90% of total goods exports in the period 1960s to 1970s. However, the decline in oil prices in the 1980s, lowered Indonesia dependence on oil and gas exports (Ng and Jeshurun, 1990). Therefore, manufacturing export began to increase from the 1980s to the 2000s, until a commodity boom triggered another surge in non-manufacturing exports. Although oil and gas exports fell, mineral fuel commodity remained the largest commodity due to the increase in coal commodity. Meanwhile, fats and animal and vegetable oils commodities (SITC 4) have increased significantly since 2000s due to an increase in palm oil export.

In figure 3, petroleum commodity was the dominant commodity from 1967 to 1987, while gas emerged as the second-leading commodity starting in the 1980s. In figure 3, panel a, raw rubber commodity (SITC 23) have declined significantly since 1967 in line with the

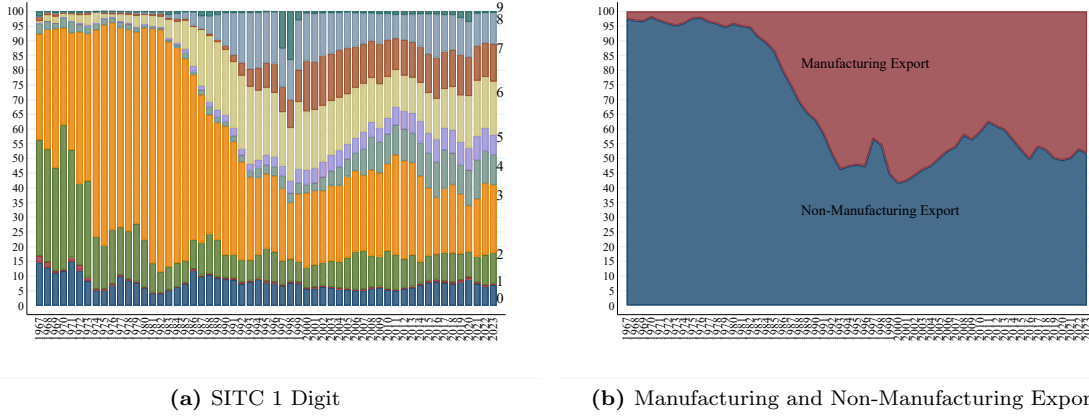


Figure 2. : Indonesia's Export, 1967–2024 %

Note: 0 = foodstuffs and live animals; 1 = beverages and tobacco; 2 = raw material, not for consumption; 3 = mineral fuels and lubricants; 4 = fats and oils of animals and vegetables; 5 = chemicals; 6 = manufactured goods broken down by material; 7 = machinery and means of transport; 8 = various types of manufactured goods; 9 = Transaction items not detailed.
Source: UN Comtrade (2024), processed.

decline in raw material commodities (SITC 2).

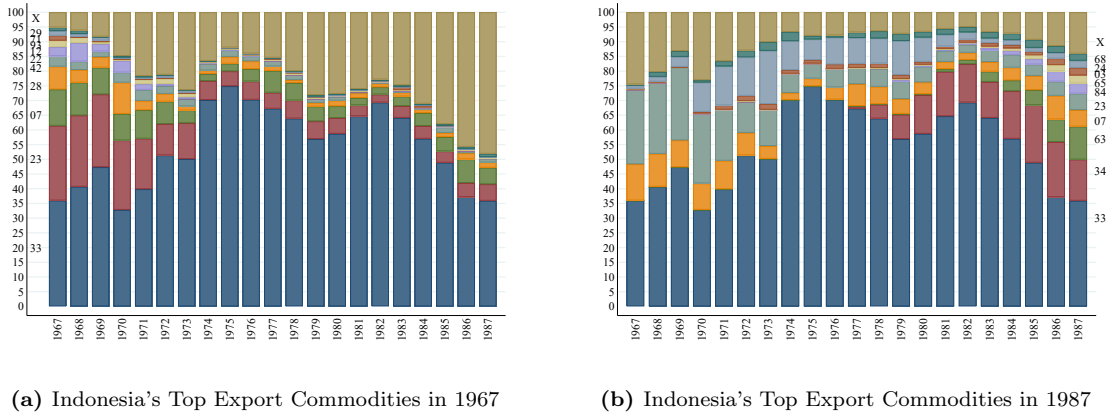


Figure 3. : Indonesia's Top Export Commodities, 1967–1987 (%)

Note: The selected commodities are the top 10 commodities of 2-digit SITC exports. Commodity code labels can be seen in table 1.
Source: UN Comtrade (2024), processed. All commodity code labels can be seen in table A1.

In 4, panel a, manufacturing commodities by materials (SITC 6) increased in the mid-1980s in line with the revival of Indonesia's manufacturing exports. Among manufacturing exports, wood manufacturing commodity (SITC 63) have experienced the most significant growth since the mid-1980s. The revival of Indonesia's manufacturing exports has made Indonesian commodities more diversified. In 4, panel b, clothing commodity (SITC 84) have increased significantly since the 1990s, while exports of palm oil commodity (SITC 42) have increased since the 2000s.

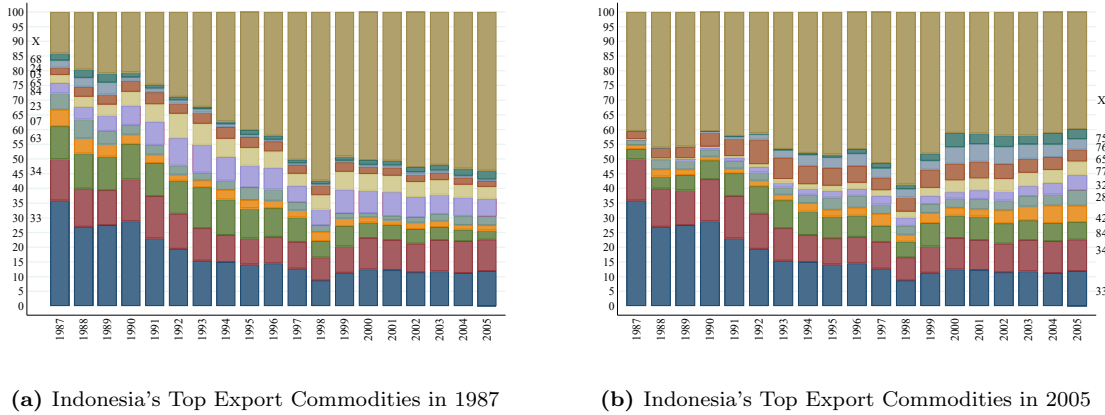


Figure 4. : Indonesia's Top Export Commodities, 1987–2005 (%)

Note: The selected commodities are the top 10 commodities of 2-digit SITC exports. Commodity code labels can be seen in Table3.

Source: UN Comtrade (2024), processed. All commodity code labels can be seen in table A1.

In 4, panel b, petroleum and natural gas commodity continue to decline until they are not Indonesia's top commodities export anymore in the 2020s. Meanwhile, iron and steel commodities experienced a significant increase in the early 2020s in line with the ban on nickel ore exports due to the government's downstream policy prohibiting the export of raw goods and supporting the export of finished goods. In addition, the base metal and metal goods industry is an industry with the highest FDI inflow since the 2020s in figure 6.

The increase in investment in the base metal and metal products industry was shown by the entry of greenfield investment¹ in the iron industry from Shandong Xinhai (\$1260 million) and the copper industry from Hailiang (\$860 million), as well as in the automotive industry by nickel ore investment from Zhejiang Huayou Cobalt (\$2040 million) in 2023 (AIR, 2024). FDI is assumed to positively affect manufacturing exports in Indonesia. It is

¹Greenfield Investments Companies build business operations that start from scratch by building new facilities such as factories and offices, rather than acquiring or merging with existing local businesses.

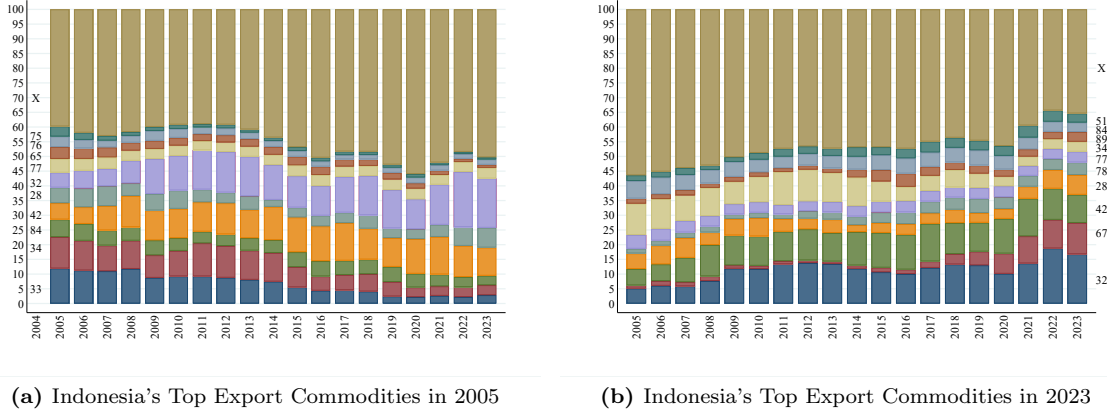


Figure 5. : Indonsia's Top Export Commodities, 2005–2023 (%)

Note: The selected commodities are the top 10 commodities of 2-digit SITC exports. Commodity code labels can be seen in Table3.

Source: UN Comtrade (2024), processed. All commodity code labels can be seen in table A1.

approved by Sahoo and Dash (2022) which states that FDI can increase exports, especially for developing countries, in theory FDI can increase capital, technology and knowledge spillovers, as well as increase competitiveness.

I. Literature Review

The impact of increasing manufacturing exports has different results compared to the increase in commodity exports. The increase in labor force is supported by the expansion of manufacturing exports, not commodities (Laksono, Oktiyo and Vadila, 2024). An economy that is concentrated in the commodity sector does not create dense field jobs. Study Coxhead and Shrestha (2016) revealed that the surge in Indonesia's natural resource exports, especially palm oil commodities, led to an increase in informal employment and aggregate income, but real labor income stagnated due to increased inequality. Conversely, Costa, Garred and Pessoa (2016) found that slower wage growth in the manufacturing sector was due to import competition with China, while wage growth was higher in the commodity sector due to increased demand from China during commodity boom in the 2000–2010 period.

The expansion of exports from Latin American countries to the PRC was also experienced in Indonesia, which was dominated by natural resource-based products, such as nonferrous metal ore products (ISIC 2302), palm oil (ISIC 3115), and coal (ISIC 2100) which accounted for more than half of Indonesia's export expansion to China during commodity boom in the 2000-2007 period (Laksono, Oktiyo and Vadila, 2024). In addition, Indonesia is not very integrated in global value chain, this is reflected in Indonesia's trade tending to be

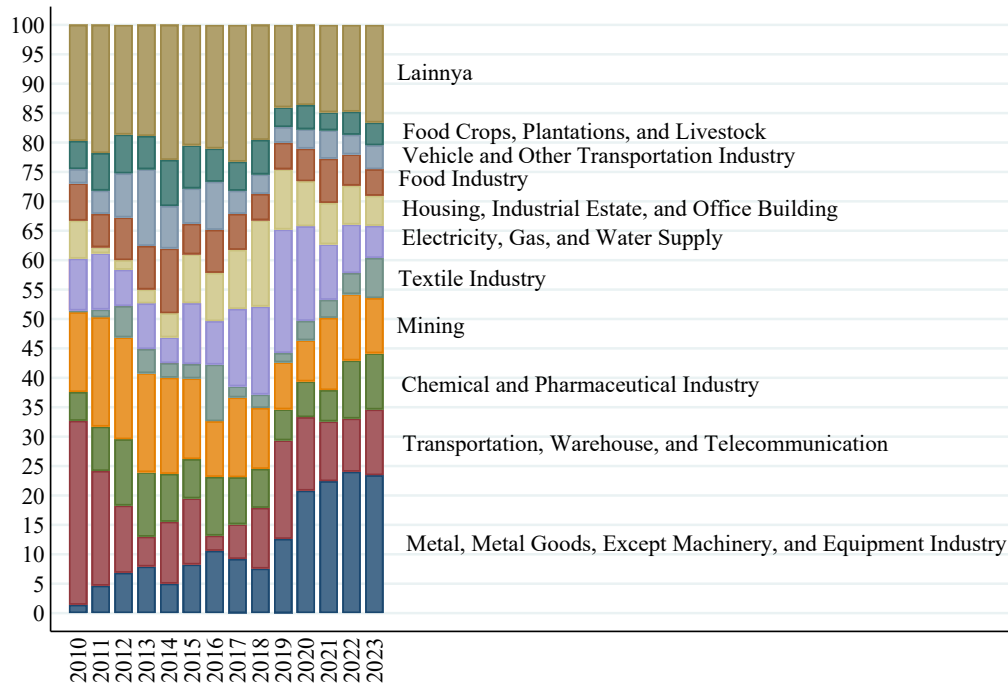


Figure 6. : Indonesia's FDI Inflow by Industry

Note: The selected industries are the Indonesia's top 10 industries in 2023.

Source: BKPM (2024), processed.

more based on the upstream component in the value chain due to Indonesia's abundant natural resources such as coal and palm oil (OECD, 2020). Low integration global value chain identical to countries that have a large domestic market like India or rich in natural resources like Australia. Weak integration into the global value chain has slowed the growth of the non-commodity trade sector (Chang et al., 2019).

The performance of Indonesia's manufacturing exports has deteriorated since 2000 and the percentage of manufacturing to Indonesia's GDP has declined, and Indonesia's attractiveness in export-oriented FDI has declined (World Bank, 2020). Deindustrialization poses a significant risk to developing countries. Rodrik (2015) found that it deindustrialization the primary route to rapid economic convergence in low-income nations, the shift of workers from rural areas to urban factories, which typically offer higher productivity and faster growth. The number of workers in the Agriculture, Forestry, Fisheries sector still dominates in Indonesia, while the manufacturing industry only contributes 13.83% of the

Table 1—: Descriptive Statistics

	N	Mean	Median	Std. Dev	Min	Max
Manufacturing Export	57	32840.36	22179.46	36225.88	16.38709	136948.3
Non-manufacturing Export	57	41072.5	21739.34	40736.65	649.069	155030.8
Index Commodity Price World Bank	57	64.29847	58.4	25.29726	35.24	121.3484
Nominal Exchange Rate	57	5657.68	2248.608	5311.417	149.5833	15236.88
Net FDI Inflow	54	6275.558	1387.03	8976.891	-4550.355	25120.73

Note: Net FDI inflow, manufacturing and non-manufacturing export are measured in million dollars.

national workforce (BPS, 2024). Deindustrialization has the potential to drive Indonesia into a high-income economy or be trapped middle income trap.

II. Research Methods

This study uses annual data from the period 1967–2023 with quantitative methods, 2SLS with the reason to overcome the problem of bias in the research results. The data source used comes from UN Comtrade for manufacturing and non-manufacturing export data, while commodity prices, nominal exchange rates, and FDI inflow data come from the World Bank. The descriptive statistics is shown in table 1.

Stage 1:

$$\lnnonmanu_t = \alpha_1 + \alpha_2 \lnindex_t + \nu$$

Stage 2:

$$\lnmanu_t = \delta_1 + \delta_2 \lnnonmanu_t + \delta_3 X + \epsilon$$

This study uses a dependent variable, \lnmanu_t or manufacturing exports in natural logarithms and independent variables, \lnnonmanu_t or the World Bank commodity price index in natural logarithms, as well as instrument variables, \lnindex_t or the World Bank commodity price index in natural logarithms. Meanwhile, the control variable, X that contains Indonesia's nominal exchange rate in natural logarithms and Indonesia's FDI inflow in natural logarithms.

III. Results and Discussion

In table 2, non-manufacturing export has a positive effect on manufacturing export in the OLS model, while non-manufacturing export commodities is not significant to manufacturing export in the 2SLS model. This indicates that non-manufacturing export and manufacturing export are correlated because both experienced growth, but no casual relationship between them. Meanwhile, the exchange rate has a positive effect on the export of manufacturing commodities, meaning that a currency depreciation increases the manufacturing export. Meanwhile, FDI inflow did not have a significant effect on manufacturing

Table 2—: Regression Tables

	(1)	(2)	(3)	(4)
Dependent Variable is Manufactured Export				
	OLS	2SLS	OLS	2SLS
lnnonmanu	0.876*** (0.095)	0.090 (0.240)	0.812*** (0.192)	−0.375 (0.386)
lnnominal	1.027*** (0.079)	1.695*** (0.202)	1.094*** (0.145)	1.878*** (0.230)
lninflow			−0.037 (0.089)	0.104 (0.136)
cons	−6.318*** (1.769)	7.099 (4.354)	−4.507 (3.482)	14.726** (6.387)
N	57	57	49	49
r^2	0.944	0.903	0.926	0.854

Note: *** = significant 1%; ** = significant 5%; * = significant 10%. Standard error in parentheses.

exports. OECD (2020) found that in Indonesia, FDI-intensive sectors are mainly concentrated in capital-intensive industries with relatively higher productivity, such as mining, energy, transportation services, and chemicals. but also in some relatively more productive labor-intensive sectors such as food.

IV. Conclusion and Suggestions

The increase in commodity exports due to the increase in commodity prices has the potential to result in dutch disease which causes the rupiah to appreciate so that manufactured commodities are less competitive. Meanwhile, an increase in commodity exports can also cause current account deficit when commodity prices are falling and a decline in manufacturing export performance, as well as a decrease in the percentage of manufacturing to GDP. Deindustrialization has the potential to hinder Indonesia into a high-income economy or be trapped middle income trap.

The percentage of non-manufactured goods reached above 90% of total goods exports in the period 1960s to 1970s. However, this percentage is decreasing due to the decline in oil prices in the 1980s, manufacturing exports began to increase until the 2000s until 2014 there was a surge in non-manufactured goods due to the commodity boom. The revival of Indonesia's manufacturing exports has made Indonesian commodities more diversified.

Non-manufacturing commodity exports have a positive effect on manufacturing commodity exports in the OLS model because non-manufacturing commodity exports and manufactured commodities are positively correlated in line with the increase in the value of the two commodities. However, non-manufacturing commodity exports are not significant to manufacturing commodity exports in the 2SLS model, meaning that non-manufacturing

commodity exports and manufactured commodities are correlated because the two commodities have increased, but do not provide a cause-and-effect relationship. Therefore, instead of downplaying the role of resources, Indonesia can use the increase in commodity exports when commodity prices are rising by developing productive sectors. These results align with the findings of the World Bank, which state that natural resource exploitation can support development without hindering the growth of manufacturing activities, as seen in case studies of Australia, Canada, Finland, Sweden, and the United States, which have invested in skills and innovation (Enrique, 2010).

Indonesia can develop productive sectors such as improving infrastructure and developing labor-intensive manufacturing sectors, rather than benefiting from increasing commodity prices, are used for subsidized spending. Furthermore, Indonesia can prevent Dutch disease by depreciating the exchange rate so as to increase the competitiveness of manufactured commodities. Indonesia can devise strategies such as improving infrastructure to increase Indonesia's attractiveness in export-oriented FDI and increase integration global value chain, especially the labor-intensive manufacturing sector. Improving the manufacturing sector is needed to realize Indonesia into a high-income economy or a free economy from middle income trap. In addition, Indonesia can create a sovereign wealth fund to prevent deficits current account due to the instability of commodity prices.

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Table A1—: SITC 2 Digit Commodity List

Code	Label
03	Fish, crustacean, and molluscs
07	Coffee, tea, cocoa, spices
12	Tobacco and tobacco manufactures
22	Oil seeds, oil nuts, and oil kernels
23	Crude rubber
24	Cork and wood
28	Metalliferous ores and metal scrap
29	Crude animal and vegetable materials, nes
32	Coal, coke, and briquettes
33	Petroleum and petroleum products
34	Gas, natural, and manufactured
42	Fixed vegetable oils and fats
51	Organic chemicals
63	Cork and wood, cork manufactured
65	Textile yarn, fabrics, made-up articles, nes
67	Iron and steel
68	Non-ferrous metals
71	Machinery, other than electric
75	Office machines and automatic data-processing machines
76	Telecommunications and sound-recording
77	Electrical machinery, apparatus, and appliances, n.e.s
78	Road vehicles
84	Articles of apparel and clothing accessories
89	Miscellaneous manufactured articles, n.e.s
93	Special transact. Not class. According to kind

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. ivreg2 lnnanu lnnominal ( lnnonnanu = lnnindex), r
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IV (2SLS) estimation

Estimates efficient for homoskedasticity only
Statistics robust to heteroskedasticity

		Number of obs =	57
		F(2, 54) =	252.77
		Prob > F =	0.0000
Total (centered) SS	=	Centered R2	= 0.9033
Total (uncentered) SS	=	Uncentered R2	= 0.9987
Residual SS	=	Root MSE	= .8252

		Robust				
lnnanu	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
lnnonnanu	.0903231	.2397399	0.38	0.706	-.3795585	.5602047
lnnominal	1.694731	.2020329	8.39	0.000	1.298754	2.090709
_cons	7.099476	4.354361	1.63	0.103	-1.434914	15.63387

Underidentification test (Kleibergen-Paap rk LM statistic): 22.361
Chi-sq(1) P-val = 0.0000

Weak identification test (Cragg-Donald Wald F statistic): 41.525
(Kleibergen-Paap rk Wald F statistic): 58.233
Stock-Yogo weak ID test critical values: 10% maximal IV size 16.38
15% maximal IV size 8.96
20% maximal IV size 6.66
25% maximal IV size 5.53

Source: Stock-Yogo (2005). Reproduced by permission.
NB: Critical values are for Cragg-Donald F statistic and i.i.d. errors.

Hansen J statistic (overidentification test of all instruments): 0.000
(equation exactly identified)

Instrumented: lnnonnanu
Included instruments: lnnominal
Excluded instruments: lnnindex

(a) Table 2 Column 2

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. ivreg2 lnnanu lnnominal lnninflow ( lnnonnanu = lnnindex), r
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IV (2SLS) estimation

Estimates efficient for homoskedasticity only
Statistics robust to heteroskedasticity

		Number of obs =	49
		F(3, 45) =	81.01
		Prob > F =	0.0000
Total (centered) SS	=	Centered R2	= 0.8544
Total (uncentered) SS	=	Uncentered R2	= 0.9984
Residual SS	=	Root MSE	= .9269

		Robust				
lnnanu	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
lnnonnanu	-.3748342	.3863153	-0.97	0.332	-1.131998	.3823299
lnnominal	1.877782	.2300246	8.16	0.000	1.426942	2.328622
lnninflow	.1035934	.1355844	0.76	0.445	-.1621471	.369334
_cons	14.7264	6.387069	2.31	0.021	2.207977	27.24483

Underidentification test (Kleibergen-Paap rk LM statistic): 18.930
Chi-sq(1) P-val = 0.0000

Weak identification test (Cragg-Donald Wald F statistic): 31.461
(Kleibergen-Paap rk Wald F statistic): 33.708
Stock-Yogo weak ID test critical values: 10% maximal IV size 16.38
15% maximal IV size 8.96
20% maximal IV size 6.66
25% maximal IV size 5.53

Source: Stock-Yogo (2005). Reproduced by permission.
NB: Critical values are for Cragg-Donald F statistic and i.i.d. errors.

Hansen J statistic (overidentification test of all instruments): 0.000
(equation exactly identified)

Instrumented: lnnonnanu
Included instruments: lnnominal lnninflow
Excluded instruments: lnnindex

(b) Table 2 Column 4

Figure A1. : 2SLS Postestimation