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Wing Thye Woo^{ab}; Chang Hong^c

^a University of California, Davis, CA ^b Central University of Finance and Economics, Beijing ^c Clark University, Worcester, MA

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INDONESIA'S ECONOMIC PERFORMANCE IN COMPARATIVE PERSPECTIVE AND A NEW POLICY FRAMEWORK FOR 2049

Wing Thye Woo*

University of California, Davis CA

Central University of Finance and Economics, Beijing

Chang Hong*

Clark University, Worcester MA

This is the first paper of a planned 'Indonesia 2049' project, which asks how far Indonesia's economy will have developed 100 years after actual political independence in 1949. We compare dimensions of Indonesia's economy with those of two oil exporters (Mexico and Nigeria), three large populous developing economies (China, India and Brazil) and three Southeast Asian neighbours (Malaysia, Thailand and the Philippines). Under Soeharto, Indonesia's economic performance was better than it had been under Soekarno, and above the average of the eight comparator countries, but below that of the East Asian economies. Our view is that Susilo Bambang Yudhoyono's second administration must adopt a new economic policy framework to ensure successful transition to knowledge-based growth. This proposed new framework goes beyond the Washington Consensus of 'getting prices right' and 'getting institutions right' to include 'getting the role of science right' and 'getting the conception of the reform process right'.

INTRODUCTION: LOOKING AT INDONESIA THROUGH A SLIGHTLY DIFFERENT LENS

The primary difficulty in assessing Indonesia's economic performance is whether to emphasise the 'half-empty' or the 'half-full' part of the glass. National progress demands that Indonesia focus on what remains to be done while drawing courage from past achievements. It is important to know what ingredients should fill the rest of the glass to create a national cocktail that can deliver a just and prosperous society, but just as important to know how to fill the glass without breaking it.

The recipe for and the making of the national cocktail are inevitably country-specific. But there are universal aspirations on some dimensions in the various national cocktails, for example, the desire for a higher level of productivity, cleaner air and water, an accountable government and harmonious international relations. As Indonesia continues to seek better economic management strategies to attain the United Nations Millennium Development Goals and environmentally

* wtwoo@ucdavis.edu; chong@clarku.edu. We are thankful to Iwan Azis, Muhammad Chatib Basri, Christopher Manning, Anwar Nasution, Mari Pangestu, Arianto Patunru and Hadi Soesastro for lessons on Indonesian society, polity and economy, and to Karl Kai Yao Cai for inspiration.

sustainable development, it can benefit from knowing how other countries have tackled similar problems.

Comparative economic analysis will be useful in guiding Indonesia's choice of a development path in the second administration of President Susilo Bambang Yudhoyono (SBY),¹ but also in assessing the development records of his predecessors, notably Soeharto. Meiji Japan's adoption in 1868 of the practice of 'stealing-with-one's-eyes' accelerated national development, by enabling the nation to compare its existing situation not only with its own past but with the performance of other countries, mobilising the national will to run with the best in the world.²

This paper uses comparative analysis to assess Indonesia's long-term economic development performance and to identify policy approaches that could enhance that performance in the future. As part of the longer-term 'Indonesia 2049' project,³ it represents the 'dipping of our big toe' into the pool of collective wisdom to receive guidance from other researchers, especially those in Indonesia, that can improve our understanding of the fundamental economic issues and help us develop an appropriate framework to analyse them. It is not an agenda for action, but rather a call for action to develop a long-term inter-disciplinary comparative perspective about what Indonesia's economic goals should be for the remainder of the first century of independence, and how to reach these targets.

Selecting the comparator countries

After reviewing the economic histories of a number of countries, and the main development indicators over the 1960–2007 period, we see five characteristics that define Indonesia.⁴

First, exports of oil, defined here as petroleum and liquid natural gas (LNG), exerted a strong influence on Indonesian economic performance for most of the period 1960–2007. Oil exports accounted for over 50% of total merchandise exports

1 McLeod (2005) argues rightly that the primary problem of the first three presidents after Soeharto was the failure 'to regain effective government'. Our assessment is that the first SBY administration succeeded in restoring governance to the levels of the Soeharto era, and that the task of its second term is to use government machinery to pursue economic development under a new policy framework.

2 Comparative economic analysis is not a one-way street: Indonesia's development experience offers important economic lessons (both positive and negative) for other countries.

3 This is the introductory paper in a planned series under the rubric of 'Indonesia 2049'. This project takes its name from two considerations. First, Indonesia began its battle for economic development in 1949, after winning the war for political independence that began in 1945. Second, we deem it necessary in shaping the country's future to think well beyond the usual five-year horizon that characterised Soeharto's economic plans (Repelita) and that frames the present Mid-Term Development Plan (Rencana Pembangunan Jangka Menengah). A long-term developmental perspective is necessary to answer questions such as: 'Will the battle for economic development be won, or come close to being won, in 2049 (100 years after it began) under the present development policy framework?' and 'What development policy framework should be adopted by the second SBY administration to ensure that by 2049 Indonesia can come close to achieving the dreams of the founding "1945 Generation"?'.

4 We use the 1960–2007 time-span because this is the period covered in the *World Development Indicators* database.

in the years 1972–86, and revenue from the oil industry has accounted for a significant proportion of state revenue – 28% in 1970, 58% in 1975, 69% in 1980, 58% in 1985 and 34% in 1990 (Woo, Glassburner and Nasution 1994: table A13). Petroleum production fell steadily from 1997 and, as domestic petroleum consumption rose, Indonesia became a net petroleum importer from 2004 onward.

Second, Indonesia has a large population. With 230 million people in 2009, it ranked fourth in population size among 221 countries.

Third, Indonesia is geographically vast. Its land area amounts to 1.9 million km², placing it 16th in the world in terms of land mass.

Fourth, Indonesia is one of the world's poorer countries. Its 2007 GDP per capita of \$3,987 (in PPP [purchasing power parity] international dollars) placed it in the fourth quintile of the global distribution of income, with a rank of 121 among 180 territories (table 1).

Fifth, Indonesia is located in an atypical portion of the tropics. The overwhelming proportion of countries within the tropical belt are poor, in sharp contrast with those in the temperate zone. Jeffrey Sachs (2000) attributes the heavy concentration of poor countries in the tropics to high environmental barriers to economic growth there. The tropical region in which Indonesia is located includes Malaysia and Singapore, countries that have grown rapidly in the last 30 years and achieved middle-income and high-income status, respectively.

Taking these five characteristics into account, we used the following three criteria to choose countries for comparison:

- high population, large geographical size and heavy dependence on the oil sector for export earnings and state revenue for most of the 1960–2007 period (Mexico and Nigeria belong to this group, as did Indonesia until 2004); dependence of state revenue on the oil industry is proxied by the ratio of oil exports to state revenue, because the oil sector in most developing countries is controlled by state oil companies;
- high population and large geographical size (China, India and Brazil);
- location in Indonesia's immediate neighbourhood, high population, large geographical size (by Southeast Asian standards), and a long history of capitalist economic activity (Malaysia, Thailand and the Philippines).

Table 1 lays out the characteristics of Indonesia and the eight comparator countries. In 1980, Nigeria was more dependent than Indonesia on the oil industry for export earnings and for state revenue, with a ratio of oil exports to total exports of 91% as against Indonesia's 81%, and of oil exports to state revenue of 112%, as against Indonesia's 107%. In 1980, China's oil exports accounted for a significant share of total export earnings (21%) but not of state revenue (5%). Malaysia was significantly dependent on the oil industry in 1980: its oil exports represented 28% of total exports and 50% of state revenue. However, Malaysia is much smaller in population and land mass than Indonesia, Mexico and Nigeria, and hence faced a lower administrative burden (and, arguably, less social complexity) in economic management than these three other oil exporters.

The Philippines is similar to Indonesia in income level but, like Malaysia, is much smaller in population and land area. India is larger than Indonesia in population and land area but similar in income level; it does not have a history of oil-shaped development.

TABLE 1 *Characteristics of the Nine Developing Countries Selected for Comparative Economic Analysis*

	Population in 2006–09 (UN estimates, million)	Population Rank (of 221 units)	Land Area ('000 km ²)	Geographical Size Rank (of 231 units)	GDP per Capita in 2008 (Intl. \$ (IMF PPP estimate))	Income per Capita Rank (of 180)	Income Class ^a	Degree of Dependence on Oil Export Earnings in 1980	
								% of total goods exports	% of state revenue ^b
Indonesia	230.0	4	1,904.6	16	3,987	121	LMI	81.1	107.1
Populous, geographically large, developing, and heavily dependent on oil exports in 1970–2000 period									
Mexico	109.6	11	1,964.4	15	14,560	54	UMI	50.3	30.4
Nigeria	154.7	8	923.8	32	2,134	140	LI	91.4	111.5
Highly populous, and geographically very large									
China	1,337.7	1	9,598.1	4	5,963	100	LMI	21.4	5.3
India	1,162.7	2	3,287.3	7	2,762	129	LMI	0.6	0.2
Brazil	191.2	5	8,514.9	5	10,326	77	UMI	1.7	0.7
Neighbourhood context: same ecological and climate zones and same economic system (historically a capitalist economy)									
Malaysia	28.2	43	329.8	66	14,072	60	UMI	27.5	50.4
Thailand	63.4	21	513.1	50	8,225	86	LMI	1.0	1.3
Philippines	92.2	12	300.0	72	3,546	123	LMI	0.1	0.1

a LMI = lower-middle-income; UMI = upper-middle-income; LI = low-income.

^b As the oil export earnings usually go to state-owned oil companies, state revenue takes only a portion of the earnings. For example, for Indonesia in 1980, petroleum revenue accounted for 69% of total revenue, suggesting a tax rate of about 65%.

Sources: Population, land area and income data are from <<http://en.wikipedia.org/wiki/>> ('List_of_countries_by_population'; 'List_of_countries_and_outlying_territories_by_area'; and 'List_of_countries_by_GDP_(nominal)_per_capita', respectively), accessed on 1 August 2009. Income classification data are from the country classification section of the *World Development Indicators* database at <<http://www.worldbank.org/data/>>. Oil export earnings are derived by adding the values for SITC (Standard International Trade Classification) 33 and SITC 34 in the UN Trade Database (United Nations 2007). The International Monetary Fund's *International Financial Statistics* (IFS) is the source for data on: (a) total goods exports (from the balance of payments); and (b) state revenue (consolidated state revenue converted into dollars using the 'rf' [period-average] series in the IFS).

Since Indonesia is no longer an oil exporter, perhaps its future economic development is better guided by lessons learned from China, India and Brazil than from Mexico and Nigeria. Lessons from Mexico and Nigeria would be invaluable, however, to understanding more about Indonesia's past economic performance and the challenges of that legacy in switching to new engines of growth.

China has been the world's star performer in growth terms for the last three decades, averaging an annual growth rate of slightly below 10%. The GDP per

capita of China and Indonesia (in PPP constant 2005 international dollars) was \$525 and \$1,351, respectively, in 1980; \$1,103 and \$2,085 in 1990; \$2,674 and \$2,724 in 2000; and \$4,537 and \$3,349 in 2006 (see table 3 below). Given this extraordinary 'catch-up' by China, we will pay particular attention to bilateral comparison of Indonesia and China, to draw out lessons that each offers to the other.

The rest of this paper has three parts:

- an assessment of the broad macroeconomic development experience of Indonesia and the eight comparator countries, especially in the Soeharto era (1965–98), based on the evolution of growth, stability and welfare indicators;
- an examination of the export sector to ascertain the pace of technological progress in the overall economy; and
- a proposal for a new policy framework to help Indonesia transit to knowledge-led growth that is environmentally sustainable⁵ and broadly shared.

THE MACROECONOMIC PICTURE: SUCCESSFUL IN GROWTH BUT LESS SUCCESSFUL IN DEVELOPMENT

Output growth and price stability

Part A of table 2 reports the annual growth rates of GDP per capita (in constant prices in the local currency unit) of the nine countries in the 1961–2007 period. The average annual growth rate for Indonesia in this long time-span is 3.7%, lower than for three of the other four comparator East Asian economies – China (6.5%), Malaysia (4.0%) and Thailand (4.7%) – but higher than for all four comparator countries outside the region – Mexico (2.1%), Nigeria (1.2%), India (2.9%) and Brazil (2.4%). If we look only at the post-Soekarno period (1967–2007), then Indonesia's growth rate of 4.2% is exceeded by the growth rates of China (7.2%) and Thailand (4.8%). Indonesia, in short, exhibited high but not spectacular growth in the international context.

The stability of the growth in these nine countries is measured by the coefficient of variation (COV),⁶ which is reported in the second half of table 2, part A. Indonesia's COV is exceeded by (or equal to) those of six countries in the full (1961–2007) and post-Soekarno (1967–2007) periods, indicating that output growth was more stable in Indonesia than in most countries. The comparative perspective suggests that Indonesia's growth was generally high and stable.

Part A of table 2 offers one strong message about growth-oriented macroeconomic management – evidence that market-friendly policies and openness to foreign trade and investment promote growth. China began tentative market-oriented reforms and cautious opening of its economy in December 1978, and then greatly strengthened these liberal economic policies in February 1992 after the implosion of the Soviet Union. The result is that China's growth rates were generally higher after than before 1992.⁷

5 Garnaut (2009) has summarised Indonesia's vulnerability to climate change, and put its potential climate change policy in an international context.

6 $COV = (\text{standard deviation of series}) / (\text{mean value of series})$.

7 This is reflected in China's average growth rate in the 1992–2007 period (9.5%) being higher than that in the full 1979–2007 reform period (8.6%) (NBSC 2009).

In December 1991, India used a balance of payments crisis as the political opening to begin deregulation across the board (for example, trade and investment liberalisation and relaxation of price controls) and privatisation of state-owned enterprises. The outcome was that Indian growth in the 1992–2007 period (5.0%) was higher than in 1961–2007 (2.9%) and 1979–2007 (3.8%). The Chinese and Indian experience suggests that higher growth in Indonesia after 1966 was generated by the more liberal economic policies implemented by the post-Soekarno governments.

Part B of table 2 compares the inflation experience of the nine countries. It shows that even though Indonesia's inflation has fallen with each successive regime (Soekarno, Soeharto and post-Soeharto), it is high by international comparison. The average annual inflation rate of 18.8% in the Soeharto years was higher than the rate in five comparator countries, and the average post-Soeharto rate of 8.7% was above that of seven comparator countries.

Standard economic theory would predict that Indonesia's higher inflation rate would lead to a higher depreciation rate for the rupiah. This prediction is borne out in part C of table 2. In the Soeharto era, Indonesia's inflation rate was higher than the rates of China, India, Malaysia, Thailand and the Philippines, and the rupiah depreciated more rapidly (at 11.7%) than the currencies of each of these countries (China, 4.8%; India, 5.6%; Malaysia, -0.2%; Thailand, 1.5%; and the Philippines, 7.7%). This suggests that, until Indonesia can lower its inflation rate, a continual weakening of the rupiah is inevitable and necessary. Because this may occasionally occur precipitously, the rupiah is more vulnerable to speculative attacks not justified by the economic fundamentals. Such attacks could sometimes be ended by an extreme temporary squeeze in liquidity (as in June 1987 and February 1991) but this shock therapy could also not work (as in August 1997, and even after liquidity was further tightened, as in October 1997), in addition to sending production into a tailspin (as in 1998).⁸

Human development indicators

The benefits of Indonesia's above-average growth rate are shown in table 3, which reports GDP per capita (in PPP constant 2005 international dollars) for the nine countries from 1960 to 2006.⁹ In 1960 and 1980, China ranked ninth, while Indonesia ranked eighth and seventh, respectively, among these countries. China's spectacular growth raised its rank to fifth in 2006, and Indonesia's high growth raised its rank to sixth. The income levels of Nigeria and the Philippines in 1960 were around twice that of Indonesia, but by 2006 Indonesia's income was almost twice that of Nigeria and 10% higher than that of the Philippines.

A country's economic performance is of course judged by more than its growth and inflation record. As a matter of social justice, an absolute increase in the

8 See Cole and Slade (1996) on the 1987 and 1991 episodes, which have been called 'Sumarlin shocks' after the then Minister of Finance, Johannes Sumarlin; see Djiwandono (2000) on the 1998 case.

9 The *World Development Indicators* database reports this series starting only in 1980. For calculation of 1960 and 1970 values in table 3, see note a below the table. The conclusions presented here still hold broadly if the starting point for comparison is moved from 1960 to 1980.

TABLE 2 *Macroeconomic Indicators*

		Populous Oil Exporters			Highly Populous Developing Nations			Southeast Asian Neighbours		
		Indo- nesia	Mexico	Nigeria	China	India	Brazil	Malay- sia	Thai- land	Philip- pines
Part A: GDP per capita, growth rate										
Average growth rate										
Whole sample	1961-2007	3.67	2.07	1.20	6.49	2.93	2.36	3.99	4.74	1.51
Indonesia sub-periods										
Post-Soekarno	1967-2007	4.21	1.82	1.27	7.22	3.25	2.49	4.02	4.76	1.46
Soeharto	1967-1997	5.09	1.74	0.85	6.72	2.52	2.86	4.59	5.47	1.20
Post-Soeharto	2000-2007	3.71	1.86	3.53	9.27	5.65	1.99	3.58	4.22	3.00
China sub-periods										
Reform	1979-2007	3.83	1.37	0.51	8.61	3.77	1.01	3.84	4.63	0.96
Deepen market	1992-2007	3.01	1.63	1.47	9.47	4.99	1.46	3.83	3.60	1.97
Coefficient of variation										
Whole sample	1961-2007	1.04	1.57	6.01	1.12	1.12	1.67	0.83	0.76	1.98
Indonesia sub-periods										
Post-Soekarno	1967-2007	0.88	1.81	5.93	0.71	0.96	1.64	0.88	0.80	2.19
Soeharto	1967-1997	0.44	2.10	9.97	0.85	1.20	1.57	0.65	0.56	2.85
Post-Soeharto	2000-2007	0.17	0.94	0.78	0.12	0.33	0.41	0.50	0.36	0.32
China sub-periods										
Reform	1979-2007	1.06	2.65	9.77	0.33	0.82	3.37	0.98	0.92	3.70
Deepen market	1992-2007	1.65	1.91	2.12	0.21	0.42	1.38	1.10	1.33	1.12
Part B: Price stability^a										
Average inflation rate										
Whole sample	1961-2007	54.77	23.52	17.06	6.42	7.58	432.66	3.22	4.91	9.87
Indonesia sub-periods										
Post-Soekarno	1967-2007	17.83	26.63	18.99	6.42	7.67	432.66	3.61	5.28	10.60
Soeharto	1967-1997	18.79	32.83	21.38	11.28	8.40	683.26	4.01	6.07	12.25
Post-Soeharto	2000-2007	8.74	5.21	12.40	1.63	4.51	7.29	1.98	2.48	4.98
China sub-periods										
Reform	1979-2007	11.31	32.91	21.59	6.42	7.91	432.66	3.20	4.75	10.22
Deepen market	1992-2007	12.38	12.28	24.07	5.25	6.79	319.41	2.84	3.62	6.17
Part C: Exchange rate stability^b										
Average rate of currency depreciation against the dollar										
Indonesia sub-periods										
Post-Soekarno	1968-2007	14.77	23.27	20.37	3.40	4.60	269.11	0.54	1.52	7.11
Soeharto	1968-1997	11.65	29.89	15.35	4.82	5.64	356.15	-0.16	1.50	7.68
Post-Soeharto	2000-2007	2.36	1.78	4.06	-1.04	-0.40	2.01	-1.22	-0.96	2.43
China sub-periods										
Reform	1979-2007	15.56	29.66	28.49	5.94	6.01	363.85	1.65	2.17	7.24
Deepen market	1992-2007	17.77	9.91	28.48	2.84	4.03	306.12	1.87	2.42	3.88

^a Data on CPI inflation are available only from 1987 for China and from 1981 for Brazil.

^b Official exchange rate, units of national currency against the dollar. Data for Indonesia are available only from 1968 onward.

Source: International Monetary Fund, *International Financial Statistics*.

TABLE 3 *GDP per Capita*
(constant 2005 PPP [purchasing power parity] international dollars)

	Populous Oil Exporters			Highly Populous Developing Nations			Southeast Asian Neighbours		
	Indonesia	Mexico	Nigeria	China	India	Brazil	Malaysia	Thailand	Philip- pines
1960 ^a	668.3	4,719.6	1,197.7	297.1	685.5	3,122.3	2,076.1	897.6	1,620.3
1970 ^a	799.0	6,608.3	1,455.0	344.5	811.1	4,292.1	2,918.8	1,460.2	1,939.3
1980	1,350.5	9,449.5	1,749.1	525.2	868.9	7,629.8	4,891.4	2,255.1	2,619.3
1985	1,615.5	9,313.3	1,305.6	816.0	1,003.5	7,194.8	5,508.0	2,708.0	2,174.7
1990	2,085.3	9,176.3	1,463.5	1,103.2	1,206.8	7,235.3	6,645.8	4,139.5	2,431.5
1995	2,815.6	9,038.3	1,433.6	1,853.4	1,409.1	7,748.8	9,185.3	5,908.1	2,416.1
2000	2,724.2	10,966.2	1,456.5	2,673.7	1,716.7	7,936.5	10,270.7	5,728.9	2,637.1
2006	3,348.6	11,805.1	1,795.3	4,537.2	2,412.4	8,673.1	12,204.6	7,378.4	3,057.6

^a The 1960 and 1970 levels are not definitive, but are intended to be indicative of disparity across countries. They were obtained by using the growth rates reported in table 2 (which were based on respective constant national prices) and the 1980 income levels reported in table 3.

Source: Data for 1980 onward are from the *World Development Indicators* database at <<http://www.worldbank.org/data/>>.

welfare level of the middle and low income classes is highly valued. A relative increase in the welfare of the poor in the context of absolute increases in the welfare of every group is desirable, provided that the means used to reduce disparity in welfare do not weaken work and investment incentives so much that aggregate income growth falls significantly.

Tables 4 and 5 report several indicators of welfare. The two obvious performance criteria are the absolute increase in each index over time, and whether Indonesia's final ranking on that index is better than sixth, its rank in GDP per capita in 2006.¹⁰ We have chosen to show multiple proxies for welfare that might show a similar time trend, rather display just one 'best proxy', because we believe the variables in these nine countries were sometimes measured wrongly or inconsistently. Reliable assessment of welfare change requires examination of various welfare proxies for broadly similar movements.

Part A of table 4 reports the proportion of the population that is under-nourished. Of the six countries for which 1971 data are available, Indonesia has the highest proportion of malnourished people (47%) – just slightly above the 46% in China, the poorest country in the group in 1970, with a per capita income less than half that of Indonesia (table 3). Indonesia achieved spectacular improvement in reducing malnutrition over the 1971–2004 period. Its under-nourishment rate (UNR) was 6% in 2004. This is lower than the rates in China (12%), Brazil (7%) and Thailand (17%), which were richer than Indonesia in 2006 by 35%, 160% and 120%

10 For the rest of this section of the paper, 'GDP' refers to GDP measured in PPP 2005 international dollars, as in table 3. We also use the terms 'income' and 'GDP' interchangeably.

TABLE 4 *Quality of Life: Nutrition, Life Expectancy and Infant Mortality*

	1971	1981	1992	1997	2003	2004				
Part A: Under-nourishment rate (UNR) (% of population under-nourished)										
Indonesia	47	24	9	6	6	6				
Mexico	12	5	5	5	5	5				
Nigeria	27	37	13	9	9	9				
China	46	30	16	12	12	12				
India	39	38	25	21	20	20				
Brazil	23	15	12	10	8	7				
Malaysia			5	5		5 (2005)				
Thailand			29	21		17 (2005)				
Philippines			21	18		16 (2005)				
	1960	1967	1970	1977	1980	1985	1990	1995	2000	2006
Part B: Life expectancy at birth (LEB) (number of years)										
Indonesia	41.5	46.0	47.9	52.7	54.8	58.6	61.7	64.0	65.8	68.2
Mexico	57.3	60.3	61.7	65.3	66.8	69.0	70.9	72.4	74.0	74.5
Nigeria	38.7	41.0	42.1	44.5	45.3	46.5	47.2	47.5	46.9	46.8
China	36.3	59.6	61.7	65.4	66.8	68.3	68.9	69.4	70.3	72.0
India	44.3	48.0	49.4	52.9	54.2	56.6	59.1	61.4	62.9	64.5
Brazil	54.8	57.7	58.9	61.6	62.8	64.7	66.6	68.6	70.4	72.1
Malaysia	54.3	59.4	61.6	65.3	66.9	68.9	70.3	71.5	72.6	74.0
Thailand	55.1	58.4	59.7	62.6	63.9	65.7	67.0	67.6	68.3	70.2
Philippines	53.4	56.4	57.4	60.1	61.3	63.4	65.6	67.7	69.6	71.4
	1960	1965	1970	1975	1980	1985	1990	1995	2000	2006
Part C: Infant mortality rate (IMR) (infant deaths per 1,000 live births)										
Indonesia	128.0	121.0	104.0	94.0	79.0	70.0	60.0	48.0	36.0	26.4
Mexico	93.2	86.3	79.0	69.2	57.8	44.1	41.5	36.1	31.6	29.1
Nigeria	165.0	157.0	140.0	120.0	117.0	120.0	120.0	120.0	107.0	98.6
China			84.0	64.2	46.5	36.6	36.3	35.1	29.9	20.1
India	157.7	143.1	130.0	118.0	113.0	97.0	80.0	74.0	68.0	57.4
Brazil	115.3	105.8	95.2	82.7	70.1	59.5	48.1	36.1	26.9	18.6
Malaysia	72.0	56.0	46.0	38.0	31.0	23.0	16.0	13.0	11.0	9.8
Thailand	103.1	84.1	73.9	61.3	46.1	34.2	26.0	17.1	11.4	7.0
Philippines	63.1	60.7	58.4	56.1	53.8	51.0	42.7	32.9	28.5	23.6

Source: World Bank, *World Development Indicators*, <[http:// www.worldbank.org/data/](http://www.worldbank.org/data/)>.

respectively (table 3). Indonesia's UNR was only marginally lower than that of the best economic performers, Mexico (5%) and Malaysia (5%), whose incomes were three-and-a-half times higher. Having lowered its UNR by the largest amount (41 percentage points) in the group, Indonesia ranked third on this welfare indicator in 2004, higher than its 2006 income ranking of sixth.

However, a judgment of superior achievement on welfare as measured by the UNR can be made only cautiously. The UNR is the only welfare indicator for which Indonesia achieved a ranking above its income rank. For 'life expectancy at birth' (LEB, part B of table 4), we chose 1967 as the base year, because 1960 was an atypical year for China.¹¹ Life expectancy in Indonesia increased by 22 years between 1967 and 2006, to raise its cross-country rank on this indicator from eighth to seventh. This improvement still leaves Indonesia below its income rank of sixth.

Indonesia's infant mortality rate (IMR) dropped 102 points between 1960 and 2006, an improvement almost matched by India, which produced a drop of 100 points (part C of table 4). Although the decline in Indonesia's infant mortality rate represented the biggest absolute decrease among the nine countries, its rank of sixth on the IMR indicator in 2006 is the same as its 2006 rank on the income index.

It is noteworthy that the Philippines, whose income in 2006 was 10% lower than Indonesia's, had a higher life expectancy (71.4 years) and a lower infant mortality rate (23.6 per thousand live births) than Indonesia (68.2 years, and 26.4 per thousand, respectively) in that year. These national differences in LEB and IMR are not large compared to the gaping difference in the malnutrition rates of the Philippines and Indonesia (16% versus 6%). This discrepancy in the degree of national difference across welfare indicators, resulting in a large difference between Indonesia's LEB and IMR rankings and its ranking on the UNR indicator, suggests there may be errors in the malnutrition data for Indonesia.

We derive two general observations from our review of the welfare indicators in table 4. The first is that, while Indonesia's development strategy has raised the overall welfare of the poor in absolute terms, the international comparison suggests that it could have achieved more; in some cases, very much more. This point is highlighted by comparing the proportion of the population with access to 'improved sanitation facilities' in Indonesia and the Philippines. Between 1990 and 2006 it increased from 51% to 52% in Indonesia, but from 58% to 78% in the Philippines.¹²

Our second observation is that the relatively small improvement in the lives of the poorest is due to government development expenditure having been seriously inadequate in some years (especially in 1998–2000 during the Asian financial crisis), and to its generally not having been targeted at the poorest people. For example, given that the relatively large fall in Indonesia's IMR is just in line with Indonesia's impressive income growth, the IMR in 2006 was not significantly better than might be expected. The only aspect of welfare that was possibly a spectacular success was the reduction in malnutrition – and the deviation of Indonesia's

11 In 1960, China was in the middle of a man-made starvation episode that killed 30 million people; hence China's life expectancy rose dramatically, from 36.3 years in 1960 to 59.6 years in 1967.

12 The proportion of the population with access to an 'improved water source' rose from 72% in 1990 to 80% in 2006 for Indonesia, and from 83% to 93% for Philippines (data on sanitation and water access are available from authors).

UNR from its ranking on the other welfare proxies raises the possibility of mis-measurement of the UNR.¹³

One indicator that is sometimes omitted when measuring welfare is educational attainment. This is a welfare indicator because it proxies the degree to which individuals have been empowered to improve their productive capacity. This view has been endorsed in the Human Development Index (HDI) computed by the United Nations Development Programme. The HDI is an average of three measures: life expectancy, GDP per capita and educational attainment.

Table 5 shows the level of educational attainment for the nine countries in the 1991–2005 period. The missing data in a number of countries make it difficult to rank Indonesia's performance on the adult literacy rate and the completion rate for primary education;¹⁴ for example, the Philippines in 2003 had a higher adult literacy rate than Indonesia in 2004 but a lower rate of primary school completion in 2004. What is dismaying is that Indonesia ranked seventh in enrolment rates in secondary and tertiary education in 2005. The lower-than-expected rank in secondary enrolment suggests that Indonesia's education system is lagging behind its rate of economic development; and the lower-than-expected tertiary enrolment reveals a slow pace of technology acquisition that would make it harder for Indonesia to climb the value added chain. In summary, Indonesia's investment in human capital has been inadequate.

Assigning 'grades' to the management of the macroeconomy and the meeting of the basic needs of the population

To sum up, Indonesia has not 'punched above its weight' in raising the welfare of the poor, especially the poorest. Soeharto was in charge for 30 years of the 1960–2007 period, so this outcome in welfare improvement is attributable to his policy priorities and the level of his government's administrative ability. The Soeharto government was clearly concerned about the poor, but its policies were not pro-poor, in the sense that they did not raise Indonesia's ranking on indicators of the welfare of the poor to exceed its income ranking.

From most accounts, the Soeharto government focused heavily on poverty alleviation when it first took power in 1966. After major achievements in its first two decades in power, its mediocre overall performance in poverty alleviation during 30 years of rule suggests that the Soeharto administration's anti-poverty focus declined substantially over time. It is probable that this policy shift was facilitated by the greatly reduced likelihood of revived communist activities in the countryside after 1965, when General Soeharto assumed de facto political power. At that time, Indonesia had the largest communist party outside the USSR–China bloc, with much of its strength in the form of peasant organisations.

13 The small rises in the proportion of the population with access to improved sanitation facilities and improved water sources in 1990–2006 reveal that public investment in basic infrastructure has not kept pace with population and income growth. The large amount of public investment made possible by huge oil revenues appears not to have been geared towards meeting the basic needs of the population.

14 Both measures are related, because the literacy rate is based on meeting the minimum standard for literacy and numeracy, a condition that is satisfied with the completion of primary education.

TABLE 5 *Education Attainment of Population*

	1991	2001	2002	2003	2004	2005
Indonesia						
Literacy rate, adults ^a	81.7 ^d				90.4	
Persistence to last grade of primary ^b		86.0	86.4		85.4	79.6
School enrolment, secondary ^c	44.3	56.7	58.0	61.1	63.3	62.2
School enrolment, tertiary ^c		14.4	15.0	16.1	16.6	17.0
Mexico						
Literacy rate, adults ^a	87.7 ^d	90.7 ^e	90.4		91.0	91.7
Persistence to last grade of primary ^b		89.0	91.3	90.4	91.6	92.2
School enrolment, secondary ^c	53.4	74.5	77.2	81.3	83.3	84.7
School enrolment, tertiary ^c	14.7	20.5	21.8	23.0	24.3	25.3
Nigeria						
Literacy rate, adults ^a	55.7				69.1	
Persistence to last grade of primary ^b				62.7		
School enrolment, secondary ^c	23.9	23.1 ^f			32.8	32.4
School enrolment, tertiary ^c		6.3 ^f		9.6	9.7	10.1
China						
Literacy rate, adults ^a	77.6 ^d	90.8 ^e				
Persistence to last grade of primary ^b						
School enrolment, secondary ^c	48.9	65.0		70.1		75.5 ^g
School enrolment, tertiary ^c	2.9			15.4		21.6 ^g
India						
Literacy rate, adults ^a	47.7	60.6				
Persistence to last grade of primary ^b		61.6		78.8	73.0	
School enrolment, secondary ^c	41.6	46.1	47.8	50.1	51.5	53.8
School enrolment, tertiary ^c	6.0	9.8	10.3	10.8	11.2	11.0
Brazil						
Literacy rate, adults ^a		86.4 ^e			88.6	
Persistence to last grade of primary ^b		80.2 ^e				
School enrolment, secondary ^c		106.6	109.5	102.0	105.7	105.5
School enrolment, tertiary ^c	11.2	17.8	20.2	22.3	23.8	25.5
Malaysia						
Literacy rate, adults ^a	82.9	88.7 ^e				
Persistence to last grade of primary ^b	95.7		97.7			
School enrolment, secondary ^c	56.9	65.1	65.8	71.3	72.4	69.1
School enrolment, tertiary ^c		25.5	28.1	31.3	30.7	28.6
Thailand						
Literacy rate, adults ^a		92.7 ^e				
Persistence to last grade of primary ^b						
School enrolment, secondary ^c	32.6	66.6	68.4	68.7	71.6	77.3
School enrolment, tertiary ^c		39.4	41.0	42.4	43.6	46.0
Philippines						
Literacy rate, adults ^a	93.6 ^d	92.6 ^e		92.6		
Persistence to last grade of primary ^b		75.5	73.7	72.4	71.9	70.7
School enrolment, secondary ^c	70.7	77.0	81.7	83.7	85.6	84.9
School enrolment, tertiary ^c			30.5	29.4	28.8	28.1

^a % of persons aged 15 and above. ^b % of cohort.

^c Gross enrolment ratio (ratio of total enrolment, regardless of age, to the population of the age group that officially corresponds to the level of education shown). ^d 1990. ^e 2000. ^f 1999. ^g 2006.

Source: As for table 4.

By comparison with his predecessor, Soeharto had a highly successful growth and inflation record and a good record in increasing the welfare of the poor. We give Soeharto an 'A+' for macroeconomic management and a B+ for poverty alleviation. By international standards, in comparison with the eight comparator countries in this study, Soeharto's grade for economic growth and stabilisation is reduced to A, perhaps even to A-, because Indonesia's high GDP growth was marred by high inflation, the near financial crisis generated by the 1975 bankruptcy of the state oil company (Pertamina) in the middle of an oil boom, and the economic meltdown of 1997-99. International comparison also shows Indonesia's assistance to the poor to be mediocre, leading us to lower the grade on this front to B. By the more stringent standard of East Asian performance, Soeharto receives an A- to B+ grade for macroeconomic management and a C+ grade for meeting the basic needs of the population, although Indonesia's rate of poverty decline was higher than that of other East Asian countries through to the late 1980s (World Bank 1990; Booth 1993). Soeharto's performance would have been enhanced by a greater focus on raising Indonesia's investment-GDP ratio to levels comparable with those of China, Thailand and Malaysia (for example, by being more welcoming to foreign direct investment in the non-oil sector),¹⁵ making more efficient use of the state transfer mechanism to supplement the 'trickle-down' income re-distribution effect of economic growth; investing more of Indonesia's oil wealth in the poor (for example, in basic infrastructure); and investing more heavily in enabling the poor to earn higher incomes through acquisition of skills available only in secondary education.

A KEY MICROECONOMIC DIMENSION: THE EXPORT SECTOR

Indonesia's export sector gets special attention in our cross-country analysis, because economic growth in fast-growing East Asian economies has almost universally been attributed to 'export-led industrialisation'. The large increases in the export-GDP ratios of these countries suggest that comparison of export performance across countries might help to identify growth mechanisms.

In analysing Indonesia's export sector, we bear in mind two observations. The first is the transformational role of exports in the fastest-growing economies in East Asia. Their growth is marked by the steady climb of their exports up the value added chain, out of processed agricultural products and into the export of manufactured goods, and from low-tech into high-tech manufactured products. The second observation is that the performance of non-oil exports (and of the economy more broadly) is generally poor in large, populous oil-exporting countries (Gelb and associates 1988).

One easy way to assess a country's progress in expanding its technological capability is to examine changes in the composition of its exports. We focus on the composition of exports rather than on the composition of GDP for two reasons. First, the cost of subsidising the production of a high-tech product to the point that it becomes a net export is much higher than the cost of subsidising a product that substitutes for just some of a country's imports. The higher cost

15 See Agosin and Machado (2007) and Golub (2009) for measures of openness to inward foreign direct investment.

makes this subsidy-induced net export phenomenon less likely to occur. Second, the appearance of a subsidy-induced export will quickly catch the attention of foreign competitors, who may then lodge anti-dumping charges with the World Trade Organization. This policing by foreign competitors also makes the subsidy-induced net export phenomenon less likely to occur.

In using export composition to assess technological acquisition, we must take into account the 'Dutch disease' phenomenon that is common in oil-exporting economies. The Dutch disease literature emphasises that because oil export earnings can cover a large part of the cost of the country's imports, the resulting exchange rate is 'over-valued' in the sense that the country needs to produce only a small amount of non-oil exports in order to achieve a zero trade account balance. Such an 'over-valued' exchange rate, it is often argued, militates against the appearance of a dynamic manufacturing sector and makes export-led industrialisation difficult.

Perhaps partly in recognition of the twin facts that Indonesia faces the Dutch disease and that it has a higher inflation rate than most of its trading partners, exchange rate management has generally been geared towards maintaining export competitiveness – before mid-1997 through a crawling peg with occasional large, discrete devaluations, and from 1998 onward mostly through floating.

Woo, Glassburner and Nasution (1994) argue that the 50% devaluation of the rupiah in November 1978 in the absence of balance of payments pressures was a key reason why Indonesia, unlike other populous oil exporters and Latin American countries, did not experience an external debt crisis in the 1980s. The 1978 rupiah devaluation prevented the traditional non-oil export sector from being decimated by a worsening of the Dutch disease as a result of the 1979 OPEC oil price increase. This allowed Indonesia to earn enough foreign exchange to service its external debt in the 1982–85 period and avoid an external debt crisis.

Table 6 summarises changes in the composition of total exports. Each export product category is measured both as a share of GDP and as a share of total exports. The export categories used in table 6 are explained in appendix 1.

A very high export–GDP ratio (close to or beyond 100%) does not necessarily indicate that most of the goods made in the country are exported. It could be the result of the country being a regional shipping centre, where goods are loaded from one foreign ship (imports) into storage, and then from storage to another foreign ship (exports). Or it could result from the country being highly integrated into the international production network that links fragmented production spread across many countries, and the same item could enter a country – and be counted – more than once during the production period.

In light of the two preceding examples, and the fact that the export–GDP ratio is naturally exaggerated in any case, because exports are measured as gross value and GDP is measured as value added, we emphasise two particular difficulties in drawing definite conclusions from the export–GDP ratio.

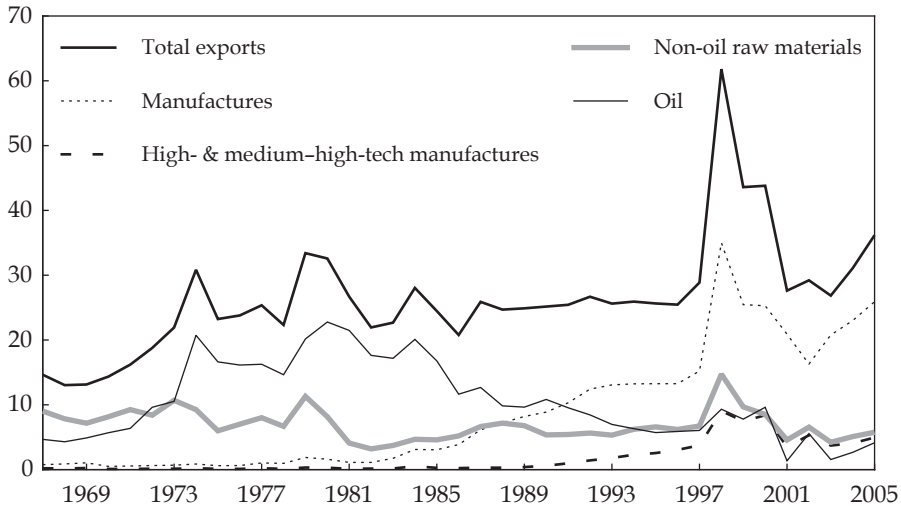
First, country A, in which the final stage of manufacturing is located, will report a higher export value for a good than country B, which had exported to it the almost-finished good, even though country A may have added less value than country B; for example, country B manufactures hard disks and processor chips, while country A merely screws both items onto the motherboard. So a comparison of countries' export–GDP ratios does not necessarily reflect the relative

TABLE 6 *Change in the Composition of Exports*

	Export Type/GDP (%)					Export Type/Total Exports (%)			
	Total Exports	Manu- factured Exports	High-tech & Med- high-tech Manuf.	Non-oil Raw Materials Exports	Oil Exports	Manu- factured Exports	High-tech & Med- high-tech Manuf.	Non-oil Raw Materials Exports	Oil Exports
Indonesia									
1970	14.3	0.5	0.1	8.2	5.7	3.4	0.6	56.8	39.6
1981	26.7	1.1	0.1	4.1	21.5	4.1	0.5	15.3	80.5
1987	25.9	6.1	0.3	6.6	12.7	23.7	1.1	25.7	49.0
1996	25.4	13.3	3.0	6.2	5.9	52.1	11.9	24.3	23.1
2005	36.2	25.9	4.9	5.8	4.1	71.6	13.6	15.9	11.5
Mexico									
1970	5.0	1.8	0.7	2.8	0.2	35.5	13.3	56.8	3.5
1981	9.0	2.4	1.2	1.1	5.3	26.7	13.1	12.7	58.7
1987	20.6	11.0	6.6	2.9	6.2	53.2	32.1	13.9	30.1
1996	28.2	22.0	14.6	2.5	2.9	77.8	51.7	8.7	10.2
2005	16.7	12.6	9.4	1.6	2.2	75.5	56.3	9.6	13.4
Nigeria									
1970	10.2	0.4	0.0	3.4	6.4	3.5	0.2	33.4	62.9
1981	31.1	0.2	0.0	0.7	30.2	0.6	0.1	2.3	97.1
1987	34.2	0.6	0.3	1.4	32.2	1.7	0.8	4.1	94.2
1996	49.5	0.8	0.1	2.2	46.5	1.7	0.2	4.4	93.9
2002	31.5	1.6	0.1	0.3	29.6	5.0	0.3	0.9	94.0
China									
1970	1.8	0.8	0.1	1.0	0.0	45.3	6.0	54.3	0.3
1981	10.3	5.2	0.6	2.8	2.3	50.5	6.0	27.0	22.1
1987	18.2	11.5	2.6	3.9	1.6	63.5	14.1	21.7	8.6
1996	29.9	26.7	10.8	2.5	0.5	89.4	36.2	8.4	1.6
2005	34.1	31.8	17.6	1.7	0.5	93.4	51.6	5.1	1.4
India									
1970	3.7	1.8	0.2	1.8	0.0	49.5	5.1	49.0	0.9
1981	3.6	2.1	0.2	1.4	0.0	59.0	6.8	40.2	0.4
1987	4.8	3.0	0.4	1.5	0.4	61.4	7.9	30.2	7.8
1996	9.8	7.2	1.1	2.5	0.1	72.9	11.1	25.2	1.4
2004	20.6	13.8	3.2	4.4	2.0	67.0	15.6	21.5	9.6
Brazil									
1970	7.1	0.8	0.2	6.2	0.0	11.9	3.4	87.1	0.5
1981	9.3	3.3	1.6	5.3	0.5	35.8	16.7	57.1	4.9
1987	10.0	4.8	1.8	4.7	0.3	48.2	18.4	47.2	3.4
1996	6.1	3.3	1.2	2.7	0.1	53.3	19.0	43.4	0.9
2005	13.4	7.3	3.6	5.0	0.8	54.4	27.0	37.3	6.0
Malaysia									
1970	48.2	10.6	0.9	35.0	2.4	22.0	1.8	72.6	5.0
1981	55.8	15.8	8.0	27.2	12.5	28.3	14.3	48.7	22.3
1987	66.0	25.4	16.1	28.2	11.8	38.4	24.4	42.7	17.8
1996	90.4	70.3	53.4	12.3	6.7	77.8	59.1	13.7	7.5
2005	155.3	121.1	85.2	10.9	22.7	78.0	54.9	7.0	14.6
Thailand									
1970	10.6	1.9	0.0	8.6	0.0	17.7	0.4	81.1	0.2
1981	20.7	6.6	1.2	14.0	0.0	32.0	5.6	67.3	0.2
1987	24.1	12.0	3.3	11.7	0.2	49.7	13.8	48.7	0.8
1996	33.3	24.2	14.5	8.2	0.4	72.6	43.7	24.8	1.2
2005	62.4	48.2	29.5	10.4	2.7	77.3	47.2	16.7	4.3
Philippines									
1970	18.6	1.8	0.1	16.3	0.3	9.8	0.5	87.9	1.6
1981	19.4	7.2	2.9	11.5	0.3	37.2	15.0	59.4	1.5
1987	20.7	12.2	5.0	7.7	0.4	58.9	24.1	37.4	2.0
1996	29.8	24.8	17.7	4.2	0.5	83.2	59.3	14.0	1.6
2004	91.3	83.3	69.6	6.7	1.2	91.2	76.2	7.3	1.3

Source: Feenstra (2005); Feenstra and Lipsey (2005); United Nations (2007).

FIGURE 1 *Indonesia: Export Categories as a Share of GDP (%)*



Source: As for table 6.

contribution of their export growth to GDP growth. The second problem is that the fragmentation of production also undermines the ranking of the technological level of exports as determined by Standard International Trade Classification (SITC) criteria, which would in our example classify country A as a producer of high-tech goods and country B as a producer of medium-tech goods.¹⁶ This reminds us to interpret export composition indicators with caution and with reference to other evidence.

The Indonesian case

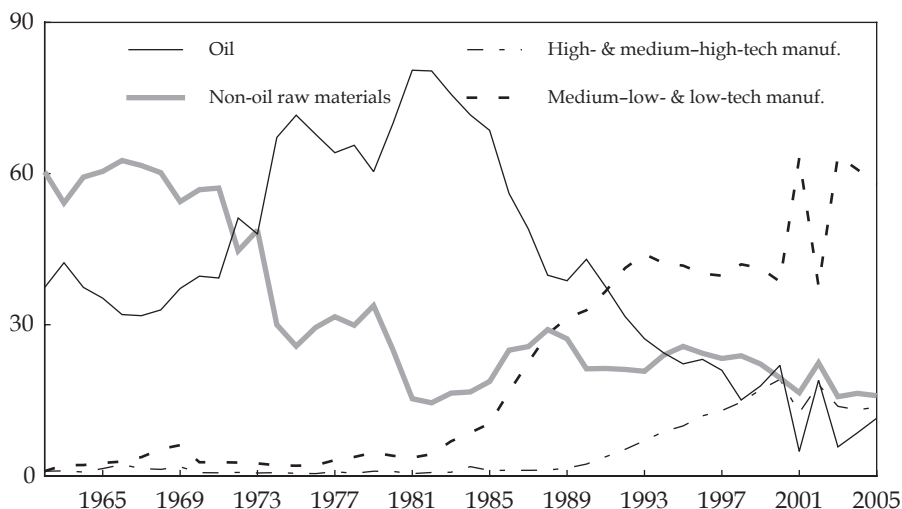
We highlight three features of Indonesia's export performance summarised in figure 1 (export-GDP ratios for categories of exports) and in figure 2 (the sectoral composition of exports). First, there has been an acceleration of exports since 2003. The overall export-GDP ratio rose from 14.6% in 1967 to around 25% in the 1973-97 period (with substantial deviations during periods of sharp oil price changes), and then to an unprecedented 36.2% of GDP in 2005.¹⁷

Second, oil exports (including LNG) were very important in the 1970s and 1980s, accounting for 10-20% of GDP in the 1972-92 period (figure 1) and for 40-80% of total exports in the 1972-87 period (figure 2). The Dutch disease effect was strongest between 1974 and 1985. The November 1978 rupiah devaluation did blunt the Dutch disease impact that followed OPEC's doubling of the oil price

16 Another interesting implication of production fragmentation is that one should not evaluate investments on the basis of sectoral linkages (Athukorala and Santosa 1997).

17 We disregard the unusually high export-GDP ratios in 1998-2000, because these were temporary deviations caused by the interaction between the fast and deep depreciation of the rupiah during this period and the slower rise in the prices of domestically produced goods.

FIGURE 2 *Indonesia: Export Categories as a Share of Total Exports (%)*



Source: As for table 6.

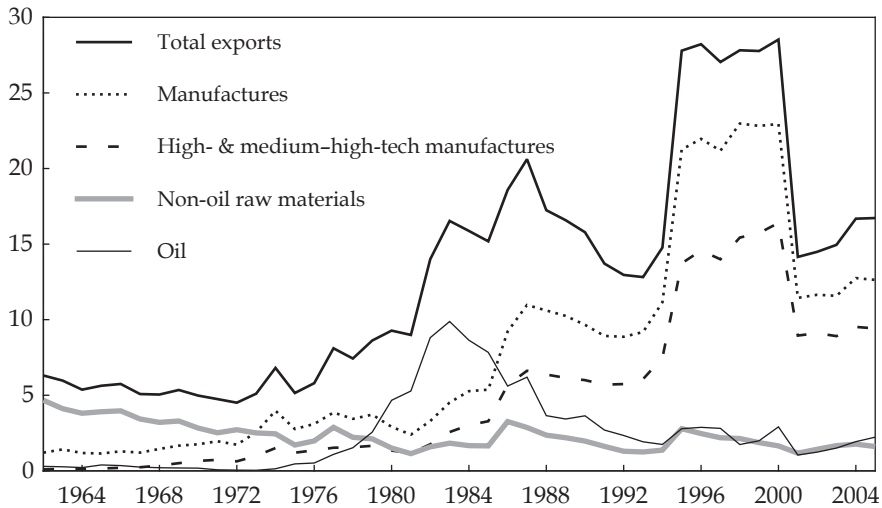
in 1979. Of the 11 percentage point increase in the export-GDP ratio in 1978-79, 5.5 percentage points were due to a rise in non-oil exports, probably induced by the 1978 devaluation.¹⁸

Third, the first sustained high spurt in manufactured exports (SITC 5 to 8 in appendix 1, represented approximately in figures 2, 4 and 6 by the sum of the 'high- & medium-high-tech' and 'medium-low- & low-tech' series) occurred in the second half of the 1980s. They grew rapidly from 3.1% of GDP in 1984 to 13.1% in 1993 before stagnating in 1994-97 (figure 1).¹⁹ This dramatic rise in manufactured exports increased their share of total exports from 11% in 1984 to 51.1% in 1993. Manufactured exports resumed sustained growth in 2002 to reach 25.9% of GDP in 2005 and to account for 71.6% of total exports (figures 1 and 2). Most of the new manufactured exports that appeared after 1985 were in the medium-low-tech and low-tech categories. Of the 26 percentage point increase in the manufactured export-GDP ratio in 1985-2005, 21 percentage points came from the increase in medium-low-tech and low-tech goods.

18 This decomposition is computed from a rise in manufactured exports from 1.0% of GDP in 1978 to 1.9% in 1979, in non-oil raw materials exports from 6.7% to 11.3%, and in oil export earnings from 14.6% to 20.2%.

19 James and Fujita (1997) estimate that the employment induced by manufactured exports was 1.3% of the workforce in 1980, 2.7% in 1985 and 6.7% in 1990. Creation of more jobs by increasing manufactured exports that use low-skill labour is likely to be the most effective way to improve the welfare of the poor. As Alisjahbana and Manning (2006) report, in 2002, while the unemployment rates of the poor, near-poor and non-poor differed little (being 11.2%, 10.2% and 9.8%, respectively), their under-employment rates differed greatly (being 17.3%, 15% and 10.1%, respectively).

FIGURE 3 Mexico: Export Categories as a Share of GDP (%)



Source: As for table 6.

The export experiences of other countries²⁰

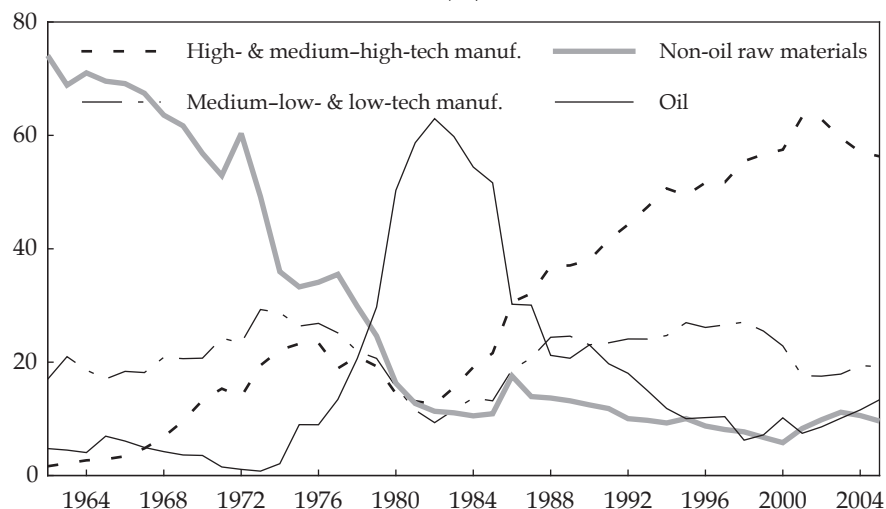
We start with the group of other significant oil exporters (Nigeria, Mexico and Malaysia) to ascertain the impact of the Dutch disease on the performance of non-oil exports. The Nigerian export sector is completely dominated by oil. Since the end of 1973 when OPEC quadrupled the oil price, oil exports have equalled or exceeded 30% of GDP and 90% of total exports (table 6). Manufactured exports were negligible in the 1962–2002 period, and non-oil raw materials exports dwindled from 8% of GDP (which was about 80% of total exports) in 1962–68 (not shown) to less than 1% of GDP in 2002 (below 1% of total exports). Overall, Nigeria has performed just as poorly in structural transformation as in economic growth and stability.

In examining the Mexican export experience (figures 3 and 4), two facts are important. First, crises in the 1980s and 1990s caused large devaluations of the Mexican peso,²¹ enhancing non-oil export performance. Second, the establishment on 1 January 1994 of the North American Free Trade Area (NAFTA) – involving Canada, the United States and Mexico – promoted the out-sourcing of US production of goods to Mexico.

20 For comparator countries other than Mexico and Malaysia, graphs showing export performance are available upon request. Export performance data on all comparator countries are shown in table 6.

21 The first crisis was the extended external debt crisis that began at the end of 1981 and lasted into 1987. Over this period, the Mexican peso depreciated over 9,100%, and the average annual GDP growth rate was only 0.1%. The second crisis (known as the ‘tequila crisis’) saw a 125% depreciation of the exchange rate during 1995–96 and an average annual growth rate of –0.5%.

FIGURE 4 Mexico: Export Categories as a Share of Total Exports (%)



Source: As for table 6.

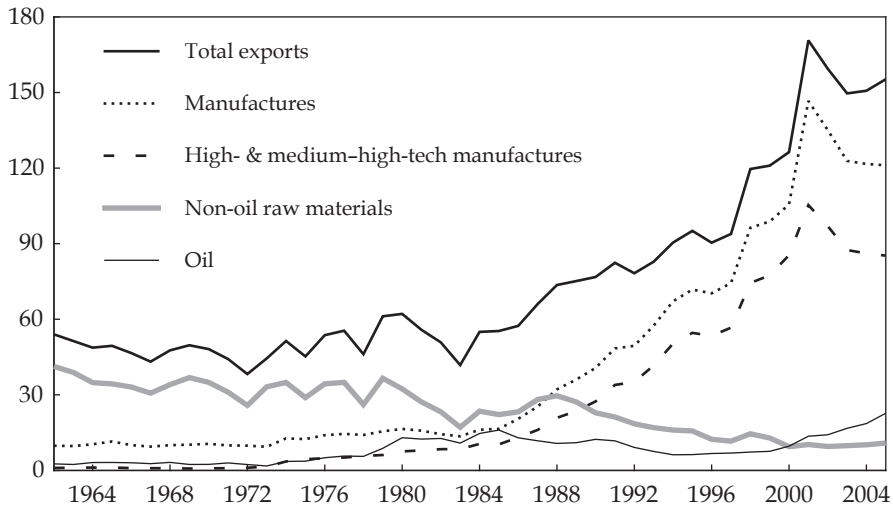
Mexico had only one brief period, 1980–85, when there could have been a significant Dutch disease effect. Oil exports amounted to over 50% of total exports in that period (figure 4) but, since they did not reach 10% of GDP (figure 3), the Dutch disease impact was less severe than in Indonesia and Nigeria. There is an upward trend in the ratio of manufactured exports to GDP between 1982 and 1985, albeit at a lower rate than that for oil exports. Manufactured exports went from 3.3% of GDP in 1982 to 5.4% in 1985, and jumped to 9.2% in 1986, pushing the share of manufactures in total exports from 35% in 1985 to 50% in 1986.

The next discernible jump in Mexican manufactured exports occurred when NAFTA came into being in 1994: manufactured exports were 9% of GDP in 1993, 11% in 1994 and 21% in 1995. Admittedly, the high 1995 ratio had to be temporary, because prices of domestic goods had not fully responded to the large peso depreciation in that year. This could partly explain why manufactured exports averaged only 12.7% of GDP in 2004–05 (the last two years in the dataset), but the 2005 value of the ratio is still higher than its value in any year before 1995.

The most notable feature of Mexican manufactured exports is the strong growth of medium-high-tech and high-tech products throughout the periods of macroeconomic turbulence and Dutch disease, allowing these products to supplant non-oil raw materials exports in importance. The export of medium-high-tech and high-tech products was 0.7% of GDP in 1970, 1.7% in 1982, 3.3% in 1985, 6.1% in 1993, and 9.4% in 2005. The outcome is that the export shares of each product category in 1970 and 2005, respectively, are:

- | | |
|-----------------------------------------------|-----------------|
| • medium-high-tech and high-tech manufactures | 13.3% and 56.3% |
| • low-tech and medium-low-tech manufactures | 20.7% and 19.2% |
| • non-oil raw materials | 56.8% and 9.6% |
| • oil (including LNG) | 3.6% and 13.4% |

FIGURE 5 *Malaysia: Export Categories as a Share of GDP (%)*



Source: As for table 6.

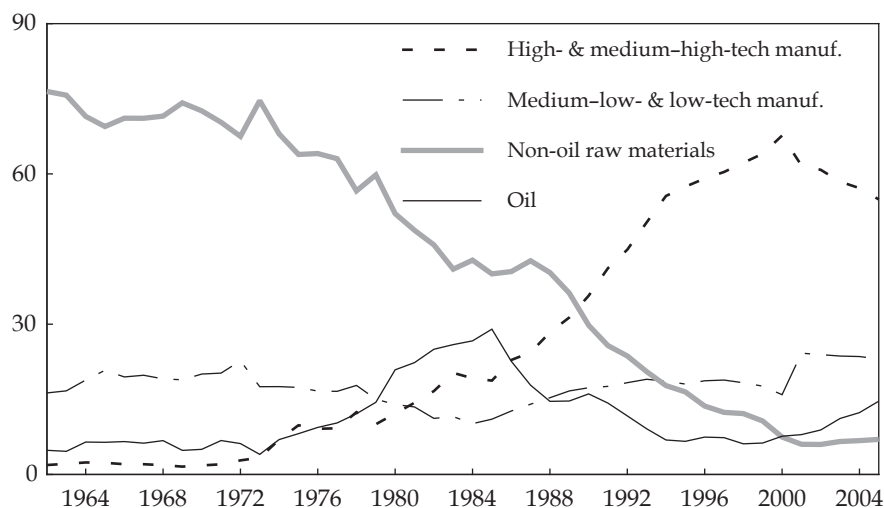
Malaysia is the most export-oriented of the countries studied, as measured by the export-GDP ratio (table 6). Malaysia's export-GDP ratio of 54% in 1962 (figure 5) was much larger than the export-GDP ratios of Indonesia, Mexico, Nigeria, China, India and Brazil in 2005 (table 6). Furthermore, this ratio reached 155% in 2005, with this very high value identifying Malaysia as an important node in the international production chain.

One would expect Malaysia to have experienced a more severe Dutch disease effect than Mexico, because Malaysia had a larger and more durable oil boom as a result of the 1979 OPEC price increase. The Mexican oil export-GDP ratio was less than 10% in the peak 1982–85 period, but Malaysia's ratio averaged 13.6% in the same period. The Mexican boom lasted from 1982 to 1985, while Malaysia had two booms: 1980–92 and 2000–05.

However, despite the bigger and longer oil boom in Malaysia and despite Mexico's preferential NAFTA access to the US market, in 2005 the composition of Malaysian exports was almost the same as that of Mexican exports (figures 4 and 6), and Malaysia appeared to be a much more important node than Mexico in the international production network. Medium-high-tech and high-tech manufactured exports accounted for 54.9% of exports in Malaysia, and 56.3% in Mexico (table 6). Yet they amounted to 85.2% of GDP in Malaysia and only 9.4% in Mexico.

The export experience of the Philippines and Thailand also shows that they started their steady climb to permanently higher levels of manufactured exports in the 1985–88 period, just as Indonesia and Malaysia did. This common export phenomenon across Southeast Asia supports the hypothesis that the drastic appreciation of the yen after 1984 – which induced the Japanese to relocate production abroad and caused the US and Western Europe to look beyond their borders for cheaper manufactured imports – is responsible for the structural changes in the composition of Southeast Asian exports.

FIGURE 6 *Malaysia: Export Categories as a Share of Total Exports (%)*



Source: As for table 6.

Among the large, populous economies of Brazil, China, India and Indonesia, China showed the largest increase in the export-GDP ratio in the 1970-2005 period, from 1.8% to 34.1%, reflecting its emergence from self-imposed isolation under the central planning regime (table 6). China's rapid integration into the international economy was matched by its rapid movement up the value added ladder. By 2005, China's exports of high- and medium-high-tech exports represented 17.6% of GDP compared with 3.6% for Brazil, 3.2% for India and 4.9% for Indonesia. These 2005 GDP shares translated into high- and medium-high-tech exports accounting for 51.6% of China's total exports, 27% of Brazil's, 15.6% of India's and 13.6% of Indonesia's. In export performance, China resembled the Southeast Asian economies of Malaysia, Thailand and the Philippines more than Indonesia resembled them.

Explaining the technological transition in the export sector

The most pertinent observations about the rise of manufactured exports in the oil economies of Indonesia, Malaysia and Mexico are that it coincided with changes in the external economic environment and that the Dutch disease was not a barrier to export-led industrialisation.²² The transition to manufactured exports in the four Southeast Asian countries was greatly helped by the massive inflow of Japanese investment after the 1985 Plaza Accord forced the yen to appreciate from ¥238/\$ in 1984 to ¥128/\$ in 1988.

The spectacular rise in Mexico's export-GDP ratio, even during the oil boom, reflected the steady migration of production from the US since the early 1970s.

²² Our second conclusion is supported by the contribution of Coxhead and Li (2008) to the same 'Indonesia in Comparative Perspective' series of BIES to which our paper belongs.

The accelerated rise in the export-GDP ratio after the inception of NAFTA in January 1994 confirms the primacy of external economic developments in inducing structural transformation.

The different transformation rates of the Southeast Asian export sectors in response to a common external shock (the Plaza Accord) are largely the result of national differences in receptivity towards foreign direct investment (FDI), in maintenance of law and order, and in the stock of human capital. Indonesia was less welcoming to FDI than were China, Malaysia, the Philippines and Thailand. It also had a less educated labour force (table 5). Enrolment in secondary education in 1991 was lower in Indonesia (44%) than in China (49%), Malaysia (57%) and the Philippines (71%), but higher than in Thailand (33%). By 2001, Thailand's secondary education enrolment rate too (67%) was higher than Indonesia's (57%).

The pool of high-level creative talent was also larger in China, Malaysia and Thailand than in Indonesia (table 7). In 2000, the number of experts employed in research and development (R&D) was 213 per million people in Indonesia, 547 per million in China, 222 per million in Mexico, 276 per million in Malaysia and (2001 figures) 289 per million in Thailand. This outcome was probably the result of the Indonesian government and businesses spending less on promoting R&D than the other countries. In 2000, Indonesia spent 0.1% of GDP on R&D, while China spent 0.9%, Malaysia 0.5%, the Philippines 0.15% (2002) and Thailand 0.3%.

THE NEED FOR A NEW ECONOMIC POLICY FRAMEWORK

Soeharto's economic policy framework has essentially been continued by his successors except for one big change, the decentralisation of the fiscal system in 2001. The framework has four major characteristics. The first is fairly orthodox management of macroeconomic balances. The government budget deficit has not been a de-stabilising element, and this has been guaranteed by forbidding the central bank to monetise it. However, the central bank has been known to make bank reserves available to state-owned banks to enable them to extend cheap loans to state-linked bodies and private enterprises at the behest of ministers.²³ This was indirect monetisation of quasi-state deficits, because the government was in effect guaranteeing the loans. The fact that Indonesia's inflation has generally been higher than that of its Southeast Asian neighbours suggests that the monetisation of quasi-state deficits has not been insignificant.

The second major characteristic of Soeharto's economic policy framework is the roller-coaster pattern of microeconomic incentive creation – a constant cycle of intervention and liberalisation. During normal times, there was a steady proliferation of rent-seeking regulations²⁴ and non-tariff barriers. While these interventions were not always motivated by rents – Soeharto had a strong streak of economic nationalism and was partial to proposals to jump-start high-tech industries – the

23 For example, the central bank extended loans to the Timor (Kia) Car project of the late President Soeharto's son, Tommy. In the 1970s, Bank Indonesia established the Kredit Likuiditas Bank Indonesia (Bank Indonesia Liquidity Credit) facility to extend credit through the state-owned banks to targeted sectors.

24 For example, in 1996, Soeharto's grandson was put in charge of certifying that beer sold in Bali had paid the new sales tax (Bird 1996: 25–6).

TABLE 7 *Indicators of Research and Innovation Capacity*^a

	1981	1985	1991	1996	2000	2005
Indonesia						
Scientific & technical journal articles		72 ^b	89	141	182	205
R&D expenditure (% of GDP)					0.1	
Researchers in R&D (per million people)	112.1 ^c	129.8			212.5	
China						
Scientific & technical journal articles	1,100	1,943	6,186	10,526	18,479	41,596
R&D expenditure (% of GDP)				0.6	0.9	1.3
Researchers in R&D (per million people)				447.1	547.3	852.0
Brazil						
Scientific & technical journal articles	1,438	1,465	2,640	3,813	6,407	9,889
R&D expenditure (% of GDP)				0.7	0.9	0.8
Researchers in R&D (per million people)					367.5	461.0 ^d
India						
Scientific & technical journal articles	11,725	9,586	9,517	9,753	10,276	14,608
R&D expenditure (% of GDP)				0.6	0.8	0.7 ^d
Researchers in R&D (per million people)				153.5	110.8	
Mexico						
Scientific & technical journal articles	648	740	1,082	2,124	2,971	3,902
R&D expenditure (% of GDP)				0.3	0.4	0.5
Researchers in R&D (per million people)		225.7 ^e		212.8	222.3 ^f	464.2
Nigeria						
Scientific & technical journal articles	780	757	719	435	400	362
R&D expenditure (% of GDP)						
Researchers in R&D (per million people)		17.1				
Malaysia						
Scientific & technical journal articles		186 ^b	260	362	460	615
R&D expenditure (% of GDP)				0.2	0.5	0.6 ^d
Researchers in R&D (per million people)				89.7	276.0	502.9 ^d
Philippines						
Scientific & technical journal articles		151 ^b	148	158	185	178
R&D expenditure (% of GDP)					0.15 ^g	0.14 ^h
Researchers in R&D (per million people)			156.0 ^j			
Thailand						
Scientific & technical journal articles		226 ^b	298	387	663	1,249
R&D expenditure (% of GDP)				0.1	0.3	0.3 ^b
Researchers in R&D (per million people)				103.8	289.4 ^k	291.6 ^h

^a R&D = research & development.

^b 1986.

^c 1982.

^d 2004.

^e 1984.

^f 1999.

^g 2002.

^h 2003.

^j 1992.

^k 2001.

Source: World Bank, *World Economic Indicators*, <[http:// www.worldbank.org/ data/](http://www.worldbank.org/data/)>.

implementation of trade barriers was often rent-seeking in nature. At times of balance of payments difficulties, many of these distortions were removed wholesale.

The third major characteristic is the neglect of institution building for a market economy. For example, the adjudication process for commercial disputes was widely considered to be a corrupt one,²⁵ and the political succession process was not institutionalised in the Soeharto period. Such institutional flaws created uncertainties that discouraged large long-term investments by the private sector.

The fourth major characteristic was excessive reliance on the 'trickle-down' effects of growth to improve the welfare of the poor. That economic nationalism was allowed to delay Indonesia's offering of the same FDI incentives as Malaysia and Thailand to create low-skill jobs suggests that the welfare of the poor was not always a top policy priority.

In our opinion, the primary reason the Soeharto economic policy framework displayed these four characteristics is that many of its core principles are based on the Washington Consensus,²⁶ the present version of which is summed up by the twin prescriptions 'get your prices right' and 'get your institutions right'.²⁷ Indonesia's adoption of the Washington Consensus was understandable, because it has reflected mainstream development philosophy since the 1980s,²⁸ and had allowed economic performance under Soeharto to be superior to that under Soekarno.

The Washington Consensus framework is inadequate in several key areas, including two of particular importance for Indonesia.²⁹ First, the non-interventionist

25 Transparency International's corruption perception index rated Indonesia (in the view of international business people and financial journalists) as the most corrupt country in the world in 1995 (of 41 countries surveyed). The 2008 index gave Indonesia a rank of 126 among 180 countries surveyed (<http://www.transparency.org/publications/gcr/gcr_2009#6.3>).

26 The term 'Washington Consensus' was coined in 1990 by John Williamson (2000) when he codified the development philosophy of the World Bank and the IMF into 10 principles: (1) fiscal discipline; (2) a redirection of public expenditure priorities toward fields offering both high economic returns and the potential to improve income distribution, such as primary health care, primary education and infrastructure; (3) tax reform (to lower marginal rates and broaden the tax base); (4) interest rate liberalisation; (5) a competitive exchange rate; (6) trade liberalisation; (7) liberalisation of inflows of direct foreign investment; (8) privatisation; (9) deregulation (to abolish barriers to entry and exit); and (10) secure property rights.

27 Or 'market fundamentalism' and 'governance fundamentalism' respectively.

28 The theme of comprehensive deleterious effects from price distortions was discussed in chapter 6 ('Pricing for efficiency') of the 1983 World Bank World Development Report (WDR), *Management in Development*. This theme was then elaborated in the 1985, 1986 and 1987 issues of the WDR. According to a retrospective written by the World Bank Development Economics Vice Presidency (2005) 'during the mid to late 1990s, there was a re-evaluation of the idea that market liberalisation alone would spur development'. Perhaps as a result of this re-thinking, the 2002 issue of the WDR was titled *Building Institutions for Markets* (Woo 2004).

29 One could argue that there are several versions of the Washington Consensus, because the WDRs have highlighted a broad array of topics, and a diversity of views exists within the World Bank, the IMF and other Washington-based organisations. But the World Bank's 1996 appointment of Williamson as chief economist of its South Asia department suggests that his Washington Consensus framework found substantial favour among its senior members. We use 'Washington Consensus' to refer to the perspective that views development issues primarily through the lenses of price distortions and institutional imperfections.

bias of the Washington Consensus tends to discourage the state from providing an important range of public goods and fails to recognise the limitations of self-help in overcoming growth obstacles. This bias makes the Washington Consensus incapable of coming up with effective solutions to issues like meeting the basic needs of the poorest segment of the population.

The second analytical inadequacy is that the Washington Consensus is so 'hooked' upon trade-led growth that it fails to acknowledge the crucial role of science-led growth in a predominantly private market economy, and the leading role that the state can play in facilitating technological innovation. Without the recognition that trade accelerates the diffusion of technical knowledge, the state would overlook the need to supplement free trade policies with educational investments that would give workers the capacity to absorb and apply foreign technical know-how.

Beside the weaknesses of the Washington Consensus framework, there are other reasons why Indonesia needs a new policy framework. At the beginning of this paper, we likened the development task of the second SBY term to filling the empty half of a cocktail glass. We emphasised choosing not just the right ingredients but also the right procedure for loading the ingredients without cracking the glass. It is important for policy makers to have the right conception of the reform process in order for reforms to succeed. The prevailing conception of this process in Indonesia is, we argue, sub-optimal for many kinds of reform. The present focus on policy sequencing should be replaced with a more holistic approach that takes policy interdependence into account.

We propose for discussion that a new Indonesian policy framework should emphasise 'getting right' both the role of science and the conception of the reform process.³⁰

Getting the role of science right

The Washington Consensus imputes numerous positive growth effects to increasing the degree of trade openness, as measured by the export-GDP ratio, and notes that East Asia is more trade-oriented than Latin America. However, it does not acknowledge that the export composition of East Asia shows even greater economic dynamism than does the rise in its export-GDP ratio. In East Asia, higher value added manufactured exports have rapidly been displacing lower value added manufactured exports (and, in some cases, agricultural exports), whereas

30 Kamarck (1976), Diamond (1997), Sachs (2000) and Démurger et al. (2002) have argued that geographical factors (such as disease burden and transport costs) could be fundamental determinants of economic performance. In future work, we will examine how Indonesia can improve upon what is usually considered a satisfactory record of regional development; that is, has Indonesia been 'getting regional development right'? The fact that the country greatly decentralised economic decision making immediately after the demise of the Soeharto regime suggests that most Indonesians were highly dissatisfied with the pattern of regional development produced by Soeharto's centralised approach to economic management. While Indonesia has a more equal regional income distribution than some other large economies (such as Brazil), this outcome could have been due not to better economic policies but to a more favourable economic structure, meaning that regional income distribution could have been even better. The post-Soeharto decentralisation of economic policy making could of course be improved (Azis 2009).

in most of Latin America the composition of manufactured exports has been relatively stable even when there is a rise in the export–GDP ratio (compare, for example, Malaysia and Brazil in table 6). (Mexico is the only large country in Latin America that shows the East Asian trait of the rise in the export–GDP ratio being driven by high value added manufactured exports.)

In short, what has been described as trade-led growth in East Asia could instead be called science-led growth. In many of Indonesia's least developed regions, where agriculture continues to be the mainstay of the economy, employing the bulk of the population, the central government should focus much of its increased aid on raising agricultural productivity and demand for agricultural output through the application of science, establishing regional agricultural research centres for each of the distinct ecosystems in the least developed islands to:

- conduct research on new seed varieties (including agro biotechnology), and new approaches to water and environmental management and agricultural mechanisation;
- improve local livestock through cross-breeding and through better access to veterinary services;
- enhance agricultural extension services to assist farmers in adopting new technologies; and
- develop new processed food products from the agricultural products of these least developed regions.

A key component of a science-led growth strategy for the provinces is the mobilisation of their universities as drivers of growth. The central government and the international donor community should expand and upgrade these universities, especially their agricultural, scientific and technical departments. The universities should adopt incentive schemes to promote university–business partnerships that improve production techniques and develop new products, especially those anchored in the regional resource base. The universities in the poorest provinces must of course give high priority to agricultural development by working collaboratively with the new regional agricultural research centres to effect technology transfers to farmers.

Finally, 'getting the science right' is necessary also for environmentally sustainable growth. By improving its scientific capability, Indonesia will also make a technological contribution to the global fight against climate change.

Getting the reform process right

In discussions on economic reform in Indonesia, one concern that constantly arises is the sequence in which reforms should be undertaken.³¹ Cole and Slade (1996) and Hanson (1992) rejected for different reasons the well-known McKinnon (1982) prescription that current account opening must be completed before the capital account is opened. More light can now be thrown on this Indonesian preoccupation with policy sequencing, because of the rich array of reform strategies pursued in the 1990s by the centrally planned economies in their transition to market economies.

31 The fiscal decentralisation in 2001 sparked the warning by Ahmad and Mansoor (2002) that 'proper sequencing [was necessary] to avoid jeopardizing macroeconomic stability or the effective delivery of public services' (see also Fane 1994).

In the heated debate about gradualism versus 'big bang' reform, many economists have claimed that the secret to China's sustained high growth (as contrasted with the extended recession in Russia) was its patient implementation of the correct reform sequence, the by-product of which was a gradual reform pace. For example, Griffin and Khan (1993) held that China's success came from liberalising the economy before liberalising the politics; McMillan and Naughton (1992) contended that it came instead from liberalising agriculture before industry; and Olson (1992: ix) held that unless institutional reforms (such as establishment of a legal system) were completed, the output response to the economic liberalisation would be low, if not negative.

In our opinion, '*post hoc ergo propter hoc*' reasoning explains the embarrassingly large number of 'correct' policy sequences that have been identified for China,³² and for the policy sequence debate in Indonesia too. The notion of 'sequencing' misrepresents what really happened in China. China's reform process cannot be described as a step-by-step process. It consisted, instead, of partial deregulation on a number of dimensions simultaneously and, over time, additional deregulation undertaken in each dimension, just as the number of dimensions under deregulation was being increased. The point is that a 'partial deregulation' is not a 'completed step'.

For microeconomic liberalisation reforms and institutional reforms, whose implementation is a lengthy process,³³ the analytical issue is usually the optimisation not of the reform sequence but of the coherence of the reform package. Let us consider state-owned enterprise (SOE) reform in China. Because SOEs were used to guarantee full employment during the central planning period, SOE reform (including privatisation) could lead to the shedding of surplus workers and the termination of company-based pensions to retired workers. Unless the state can provide relief payments to displaced workers and pensioners, their reduced welfare could trigger a political backlash that would stop the SOE reform process. A social cost would be incurred because SOE reform is out of phase with social welfare reform.

The optimal solution is to privatise SOEs and establish state-funded social safety nets simultaneously, but simultaneous reforms are not technically feasible in this case, because it is beyond the capability of the state to handle two such large tasks at the same time. The relevant issue here is not which sequence of reforms is optimal, because instituting social safety net reforms before implementing SOE reform will also generate a welfare loss. With the establishment of the social safety nets, embezzlement by managers (an endemic feature of China's SOE sector) will accelerate, because the managers will now pocket payments due to workers and pensioners, and unload these people onto the new state-funded welfare programs, rendering the latter too expensive to be continued.

The Chinese SOE reform example demonstrates that, owing to the interdependence between reform of SOEs and reform of the social safety net system, a lack of

32 It is important to stress that the optimum reform strategy does not rule out an output decline. The inherited economic structure could necessitate a fall in output regardless of how reform is implemented (Sachs and Woo 1994).

33 In contrast, almost instant implementation of macroeconomic reforms to stop hyperinflation is technically feasible, and is, in most cases, also optimal (Fan and Woo 2009).

progress on either could constrain the continued progress of the other. This could be described as a 'reform bottleneck'. One way to avoid such a bottleneck is to undertake simultaneous *partial* reforms that will maintain coherence between the two sets of reforms. The key is to keep the pace of SOE reform consistent with the pace of reform of social safety nets.

In the aftermath of the Asian financial crisis, it has become fashionable to say that reformers must first conjure up an economically vibrant and prudentially supervised domestic financial system before opening the capital account. In reality, without opening up to capital flow, a country is unlikely to succeed in transforming its domestic financial institutions to deal adequately with external financial risks. Unless part of the domestic financial market is liberalised, allowing participation by some foreign financial institutions, prudential financial regulations and financial market efficiency will not be established. The usual sequencing strategy of 'putting down regulations first and then opening up to capital flows' is not achievable in practice, because it neglects the valuable learning-by-doing that would occur in a partially opened capital account, enabling regulatory authorities to improve through experience and domestic banks to improve through heightened competition.

The above arguments lead us to an alternative formulation of the institutional reform process that not only captures the transition in China more accurately, but also reveals its welfare implications more clearly.³⁴ We call this alternative formulation the 'parallel partial progression' approach to reform. At the outset, the government should start the reform on as many dimensions as possible and, because it is technically impossible to complete any institutional reform in a short time, should undertake only part of each reform at one time, for example, completing 20% of the reform required for each institution. The government must keep the reform of different institutions compatible so that the reforms can enhance each other and chaos can be avoided.

To summarise, let A, B and C represent three different reform policies. Under 'sequencing', reform policy B would not be started until after reform policy A is completed. The mapping of the sequential reform strategy is depicted as:

$$A \rightarrow B \rightarrow C \rightarrow \dots$$

$$0 \text{ ————— } \rightarrow \text{ time}$$

The parallel partial progression reform strategy would be mapped as below:³⁵

$$\begin{array}{cccc}
 10\% A \rightarrow & 20\% A \rightarrow & 20\% A \rightarrow & \dots \\
 \downarrow & \downarrow & \downarrow & \\
 10\% B \rightarrow & 20\% B \rightarrow & 20\% B \rightarrow & \dots \\
 \downarrow & \downarrow & \downarrow & \\
 10\% C \rightarrow & 20\% C \rightarrow & 20\% C \rightarrow & \dots \\
 0 \text{ ————— } & \rightarrow & \text{ time} &
 \end{array}$$

34 Fan and Woo (2009) provide a quantitative example of the welfare consequences under each reform strategy.

35 There can of course be no perfect synchronisation of institutional reform in practice. The important requirement is that the rate of progress of each reform is not too different. It is acceptable, for example, for A to move 20%, B 25% and C 15% in period 2, and for A to move 20%, B 15% and C 25% in period 3.

Besides neglecting the interaction among reforms (the synergy that sustains the progress of each individual reform), the sequencing approach to reform strategy suffers from two other fundamental defects. First, because the sequencing literature does not adopt the structure of the economy and the dominant types of shocks as its central organising principles, there will be numerous exceptions to the McKinnon reform sequence, making it inapplicable as a rule of thumb. Second, the 'optimal' sequences are optimal only if the policy maker is constrained to introduce one new policy measure at a time. This optimality disappears once simultaneous implementation of policies is allowed. If simultaneous full implementation is not technically feasible, then simultaneous partial implementation would still be an improvement over sequencing, because it eliminates the costs of incoherence among policies.

We end by stressing two points to avoid potential misunderstanding. First, rather than reject the Washington Consensus framework, we have simply amended it to include (a) a greater mobilisation of science to hasten the climb up the value added ladder and to improve rural incomes; and (b) the adoption of the parallel partial progression approach to guide the reform of institutions. Second, we regard Soeharto's instinct to use advanced technology to accelerate economic growth as correct, but his method of implementing this idea guaranteed its failure. Building aeroplanes could not (and did not) impart a 'flying start' to the transition to knowledge-led growth. What is needed is painstaking efforts to improve the education system and increase enrolment at secondary and tertiary levels, and to incubate a government-business-university coalition to boost R&D activities. There is no shortcut to success.

Given the preliminary nature of this paper as part of a broader project, its bold call for replacement of the Soeharto economic policy framework is naturally an invitation to debate what should guide SBY's economic policy in his second term. One test of the correctness of SBY's framework will be how close it can bring Indonesia to implementing the Millennium Development Goals by their 2015 deadline. With substantial progress toward these goals, it would not be naive to be optimistic about Indonesia's economy in 2049.

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APPENDIX 1: EXPORT CATEGORIES

The exports discussed in this paper are classified according to the Standard International Trade Classification (SITC) system:

- SITC 0: Food and live animals
- SITC 1: Beverages and tobacco
- SITC 2: Crude materials, inedible, except fuels
- SITC 3: Mineral fuels, lubricants and related materials
- SITC 4: Animal and vegetable oils, fats and waxes
- SITC 5: Chemicals, dyes, pharmaceuticals, and perfumes
- SITC 6: Leather, rubber, cork and wood products, textiles, metallic and non-metallic manufactures
- SITC 7: Industrial machinery, office machinery, telecommunications equipment, electrical machinery, transportation equipment
- SITC 8: Prefabricated buildings, furniture, travel goods, clothing, footwear, professional and scientific equipment
- SITC 9: Commodities and transactions not elsewhere classified

We clustered some of the above product categories (and their sub-categories) and defined these clusters as follows:

- *the 'oil sector', where oil includes LNG (liquefied natural gas):* SITC P = SITC 33 (petroleum, petroleum products and related materials) + SITC 34 (gas, natural and manufactured);
- *the 'non-oil raw materials sector':* SITC N = SITC 0 to SITC 4 excluding SITC 33 and SITC 34 (SITC N covers food and live animals, beverages, tobacco, raw materials, mineral fuels, oils and fats excluding petroleum and gas related products, i.e. non-petroleum and non-gas natural resources); and
- *the manufacturing sector* = SITC 5 + SITC 6 + SITC 7 + SITC 8.

We then identified the technology level of the products *within the manufacturing sector* (goods within SITC 5 to 8) according to the 4-way grouping of technology levels in Hatzichronoglou (1997): (1) high technology level; (2) medium-high technology level; (3) medium-low technology level; and (4) low technology level.

Examples of products within each technology level are given below.

- High technology level (high-tech): aerospace, computers, office machinery, electronics-communications, pharmaceuticals;
- Medium-high technology level (medium-high-tech): scientific instruments, motor vehicles, electrical machinery, chemicals, other transport equipment, non-electrical machinery;
- Medium-low technology level (medium-low-tech): rubber and plastic products, shipbuilding, other manufacturing, non-ferrous metals, non-metallic mineral products, fabricated metal products, ferrous metals;
- Low-tech: paper printing, textiles and clothing.