

**Indonesia's growth experience in the 20<sup>th</sup> century:  
Evidence, queries, guesses**

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## **1. Introduction, purpose of the paper**

This paper intends to further discussion about Indonesia's growth experience since 1880, particularly during the 20<sup>th</sup> century, and about possible ways of improving our knowledge of that growth experience on the basis of a national accounts framework.

The next section contains a sweeping summary of the growth and development experience, largely on the basis of my published research. Apart from setting the scene for the conference, the section serves the purpose of underlining the continuity of economic change in Indonesia, beyond the years demarcating the end of the colonial era.

Section 3 tries to throw some doubt on that available evidence by discussing some of problems in historical national accounting for Indonesia. The purpose of section 4 is to provide an overview of some of the fundamental issues that need to be discussed in a forum of potential users of Indonesia's historical national accounts, before an effort to compile them is undertaken.

## **2. Evidence: A summary of economic development since 1880**

Taking Gross Domestic Product (GDP) per capita in constant prices and an indicator of economic change, Figure 1 shows that the Indonesian economy increased faster in size than its population during 1900-30 and 1967-97. There were temporary setbacks in both periods, but on balance economic growth was quite significant during both periods of 30 years. The intermediate period 1931-66 contained ups and downs. The global slump caused a downturn in the early 1930s, followed by significant recovery until 1941, after which the Japanese occupation caused a downturn. Economic recovery started in the late-1940s and was significant in the early 1950s. Economic growth stagnated in the late-1950s and turned negative in the chaotic early 1960s.

Figure 2 shows that, from comparable levels of GDP per capita, economic growth in Indonesia (1900-97) has been much faster than in Western Europe in the past. (1500-1913). Economic growth in Japan (1870-1960) was faster, but Indonesia's growth experience was better compared to the rest of Asia (1913-97, dominated by China and India), was better. In the light of Western Europe in the past and Asia (except Japan) during the 20th century, the question economic historians have to answer is: "Why was growth so fast in Indonesia during 20<sup>th</sup> century", despite the setback of 1930-66?

### **2.1 Assessment of economic growth since 1880**

To start to answer that question, we may start on the output side of the economy. Figure 3 shows structural change in Indonesia's economy. As services were highly heterogenous and generally dependent on the development of the other two sectors, we may conclude that, until the 1970s, agriculture was the single most important sector in the economy. Hence, growth and stagnation in the economy at large were largely caused by growth and

stagnation in the agricultural sector. The share of agriculture decreased slightly during 1900-30, largely as a consequence of the gradual commercialisation of agricultural production by both farmers and large-scale plantations. This brought about a concomitant increase in the total share of the services sectors.

The share of industry (manufacturing, non-oil mining, utilities and construction) only increased in the late 1930s, largely as a consequence of the growth of manufacturing output. This was caused by policies in pursuit of import-replacing industrialization. These were continued in the 1950s and 1960s, but industrial growth was not sustained. The chart shows that the economy's reliance on the agricultural sector increased. Hence, the slow-down of economic growth was caused by a reduction in agricultural growth.

Only after the 1960s did the structure of the economy change drastically, with a consistent increase in the share of industry and an accompanying decrease in the share of agriculture. The share of the services sectors decreased slightly. This suggests that economic growth during 1967-97 was largely carried by the industrialisation of the economy; until the mid-1980s largely based on import-substitution and since then on export-orientation.

Another way of analysing economic growth is by decomposing growth to trace the role of the resources that are used in the production process. The most important resources are human labour and capital goods. Unfortunately, capital stock estimates are only available since 1940. Table 1 shows that the growth of capital stock exceeded the growth of GDP in both periods by far. A rough calculation suggests that for 1940-67 the growth of the labour force and capital stock together explain the lowly rate of GDP growth. In other words, economic growth was simply due to the fact that more people entered the labour force and more capital was invested in the reconstruction and expansion of the stock of capital goods. It is likely that economic growth before 1940 was also largely caused by the mobilisation of these key inputs, in addition to land for agricultural production.

During 1967-97 the expansion of the labour force and the capital stock explains about 60 percent of GDP growth. In other words, about 40 percent was due to a more productive use of the available labour and capital. This may not be surprising, given that the expansion of industrial output explains a large part of economic growth in the latter period. Industrial expansion was largely based on the employment of new imported production technology (embodied in capital goods such as machinery and equipment) and the improvement of education and skill levels of employees, which both furthered productivity growth.

Another way to analyse economic growth is by distinguishing between overseas and domestic demand for Indonesia's products. Table 2 shows that the volume of exports increased considerably by 5 percent per year during 1900-30 and 7 percent during 1967-97. Given that economic growth was lower in the first period, the direct contribution of export growth to economic growth was around 40 percent, while it was around 25 percent in the latter period. The contribution of export during 1930-67 was

small at around 10 percent. Assuming a multiplier of 1.3 to take account of backward linkages of export production, the total contribution of exports was more than 50 percent in the first period and around 30 percent in the second.

These rough calculations suggest that the role of exports was most significant until the 1930s, when the colonial government in reaction to the global crisis started a policy of import-replacing development that affected both agricultural production, particularly rice, and manufacturing. This policy was broadly continued during the 1950s and 1960s and only changed as a consequence of the oil boom of the 1970s, and the expansion of export-oriented manufacturing in the 1980s and 1990s.

Why did high export growth during 1900-30 not result in a higher rate of economic growth? There are several relevant explanations.

Firstly, most of Indonesia's export earnings were used to finance merchandise imports. Until the 1930s these consisted for 50-60 percent of consumer items. The share of such products gradually decreased since to around 5 percent in the 1990s, when most imports consisted of industrial raw materials and capital goods. This reflects the impact of import-substituting development as a consequence of import-substituting trade policies and an autonomous expansion of production for domestic consumption.

Were export earnings wasted on consumer items until the 1930s? Such a suggestion contains the implicit counterfactual that the demand for consumer goods could have been met with domestically produced goods, if only the colonial government had implemented import-replacing trade policies much earlier. This ignores that such a policy stance raised production costs and diminished the competitiveness of Indonesia's traditional exports after World War II. Moreover, 80 to 85 percent of imported consumer goods was consumed by indigenous Indonesians, rather than ethnic European and Chinese people. The cost of import-substitution would therefore largely have been borne by indigenous consumers.

Secondly, Indonesia's commodity exports exceeded imports of goods by on average 36 percent during 1900-30, compared to 15 percent during 1967-97. In the first period, these net export earnings were used to finance overseas remittances, which largely reflected the fact that Indonesia was a net importer of the services of foreign-owned productive resources, particularly shipping, Western entrepreneurship and investment capital, and to a lesser extent ethnic Chinese wage labour and entrepreneurship (Van der Eng 1993: 30).

Thirdly, did such overseas payments represent a 'drain' of funds that were not available for productive investment? This suggestion contains the implicit counterfactual that it would have been possible to achieve a similar rate of economic growth without for instance preferential access to the Dutch capital market, and the skills and commitment of Western and Chinese migrants. It is difficult to provide a conclusive answer to such a question. We can say that the opportunity cost of such foreign-owned productive resources had to be met, and that there is no evidence that on the whole foreign

investment in colonial Indonesia was much more profitable than the next best investment option (Van der Eng 1998: 311-315).

Fourthly, the most important explanation is the fact that Indonesia experienced volatility in its barter terms of trade during 1890-1913, and a structural fall during 1914-41, which continued during 1950-72, as Figure 3 shows. Particularly during 1914-41, unlike 1973-85, the price of exports fell relative to the price of imports. The cause was that Indonesia's exports were long dominated by primary products, particularly sugar, rubber, copra and tin that were also produced by other less-developed countries. Indonesia long had to export greater quantities of produce to be able to maintain imports at the same level.<sup>1</sup> This only changed as a consequence of rising international oil and gas prices during 1973-85, and later a subsequent increase in the share of manufactures in exports.

The calculations in Table 2 suggest that the contribution of expanding domestic demand was quite significant to economic growth, much more so during 1967-97 than during 1900-30. Domestic demand consists of public and private consumption and public and private capital formation. Table 3 contains rough and very tentative approximations of the shares of each in total expenditure on GDP.

Total capital formation was on average 25 percent of GDP during 1967-97, more than double the share in 1900-30 and 1931-66 and five times the share in 1880-99.<sup>2</sup> If true, this would be a major explanation for the differences in growth during 1900-30 and 1967-97, and it triggers further questions about the sources of investment. The role of public consumption is likely to have been modest throughout the period under consideration, although it was significantly higher during 1967-97 than before. Added to the more significant role of public investment, this triggers questions about the differences between the periods in the ability of the government to raise revenues and/or borrow to cover expenditure. It is likely that the hike in revenues as a consequence of the expansion of oil and gas production and rising oil and gas prices, added to the increasing opportunities to borrow overseas on favourable terms for specific projects after the 1960s, is a significant difference between 1900-30 and 1967-97.

Private consumption was long 80 to 85 percent of expenditure on GDP, declining to 68 percent during 1967-97. The expansion of consumption of both imported and domestically produced products therefore explains most of the economic growth during 1900-30 and 1967-97, and the lack of growth during 1931-66. Although the expansion of domestic consumption, and therefore the increase of production for domestic consumption was a significant factor in economic growth, few studies have addressed the factors underlying this development. In the main, it is likely to have been a

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<sup>1</sup> Van der Eng (2002) found that average per capita GDY (GDP in constant prices, corrected for changes in the barter terms of trade) growth during 1900-29 was 1.1 percent per year, compared to 1.6 percent GDP growth.

<sup>2</sup> These are very rough and preliminary estimates and have to be taken with *extreme caution*. The estimate of private investment is likely to be too high up to the 1980s, although the estimate for public investment is

consequence of the development of domestic transport and communications infrastructure throughout the 20<sup>th</sup> century. Both furthered the integration of hitherto localised markets and the development of a national economy. A national economy did not exist in the late-19<sup>th</sup> century. The authority of the Dutch colonial government may have been established throughout Java, but in the rest of the country it was nominal. In economic terms, the rest of Indonesia was largely self-sufficient, or relied on trade with other parts of Southeast Asia.

The gradual development of the country's national economy since the late-19<sup>th</sup> century had three dimensions: (a) an increase of the volume of goods and the number of people transported; (b) the expansion of the transport and communications network across the country, first in Java and gradually encapsulating the Other Islands; (c) a change from one means of transport to another, depending on the relative economic viability of transport technologies. This process was not continuous. It ebbed and flowed with the availability of funds for the expansion and maintenance of public infrastructure, particularly railways and roads. It was interrupted during the 1940s, when the Japanese military governments requisitioned many means of transport and when the war further increased the loss of transport equipment. It stagnated in the 1950s and 1960s, and has accelerated since.

Improvements in transport and communications enhanced the mobility of people, products, finance and information, and facilitated the gradual integration of markets in Indonesia, first in Java and later throughout the country. Reduced transport costs widened markets for a wide range of producers and encouraged specialisation of production. In so far as specialising producers were able to generate economies of scale, market integration may have reduced production costs and advanced production for domestic consumption.

## **2.2 Changes in the standard of living**

What consequences did the changes in economic growth have for economic development, particularly the standard of living of people in Indonesia? There is no unambiguous definition of 'standard of living'. It is generally associated with changes in personal income and wealth, or with consumption. GDP encompasses much more than that, and GDP per capita is at best a broad indicator of the standard of living. It does not take account of non-market activity, the value of non-material aspects of consumption (education, health, leisure, art and entertainment), or the cost of negative externalities such as pollution and crime, the values of which are all a matter of judgement. A pressing problem with relation to Indonesia during the 20<sup>th</sup> century is the availability of comparable statistical data (Booth 1998:89-134). Three indicators of the standard of living will be discussed here.

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likely to be much too low. A comparison of Tables 2 and 3 shows significant differences in the ratios of exports and GDP.

Food consumption can be gleaned from information on the production and foreign trade of foods (Van der Eng 2000a). Figure 5 shows trends in the per capita availability of food in Java until 1953, and Indonesia as a whole since 1953. The prewar situation in Java is important, as it has long been regarded as an overpopulated island that would experience difficulties in feeding itself, while per capita food supply in the Other Islands was on the whole far less critical and significantly higher than in Java.

In terms of levels, it appears that rice has been the single main source of calories, but only for up to 50 percent, which underlines the importance of non-rice foods. The estimates of total calorie supply do not include a range of small food items (eg. eggs, poultry, fruits, vegetables) and are too low by about 110 Kcal (Van der Eng 2000a: 596). Average food requirements are difficult to specify, because they depend on the age-sex distribution of the population, average levels of physical activity, and average body size. A line indicates the level of 1,900 Kcal per day, which is an approximation of the minimum requirement.

The Japanese occupation was the most critical period in Java. Unlike earlier periods of food shortage, restrictions on transport and marketing of food triggered a disastrous fall in food production in Java. Those who depended on wage labour saw their food entitlements disappear. This caused widespread poverty and hunger, causing an excess mortality of 2.4 million Javanese during 1944 and 1945 (Van der Eng 1994: 40).

In terms of trends, Figure 5 reveals four broad phases. First, during 1905-20, the Engel effect increased the demand for food. A shortage of irrigated land, and the unavailability of suitable seed-fertiliser technology inhibited an expansion of rice production. Non-rice crops, particularly cassava, were produced in greater quantities in the uplands of Java to meet the growing demand for food. Second, during 1920-40, the demand for food stabilised and total demand is likely to have shifted away from food towards non-food items. Third, during 1950-70, population growth accelerated at a time when constraints were placed on the marketing of domestically produced food products and when stagnating and declining export revenues made it difficult to meet the shortfall with food imports. Consequently, average food consumption was at or just below average requirements. Fourth, food consumption increased continuously since 1970 to levels well beyond minimum requirements. Government support for rice farmers increased rice production, cheap low-quality rice replaced cheap non-rice foods, and an increase in per capita rice consumption drove the increase in calorie consumption. In the 1980s and 1990s, demand for food shifted away from basic foods towards luxury food items.

A second indicator of the standard of living is average educational attainment.<sup>3</sup> Unfortunately, good estimates are only available for the years of the postwar population

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<sup>3</sup> Some (including Van der Eng 2002) would argue that educational attainment is a proxy for human capital formation and a contributing factor to economic growth and productivity change, or the lack of both. However, studies into the contribution of education to economic growth in the USA raised substantial doubts about the immediate relevance of the cognitive content of formal education to the processes through which the productivity of the workforce was being enhanced. In fact, accumulation of work force

censuses. Figure 6 presents annual estimates that have been based on school enrolments and that approximate the census results well. During the first 80 years the level of education increased from less than 0.1 year of education per person to 0.5 years in 1930 and 1.3 years in 1960. Such levels compare to those of the poorest countries in Africa in 1990 (UNDP 1993: 136-7). The main gains were made since 1960, with an increase to 5.5 years in 2000, mainly based on primary education, but increasingly also secondary and tertiary education. This places Indonesia among the countries with a medium level of human development, according to the UNDP. Population census data confirm these trends, as the literacy rate increased accordingly from 8 percent in 1930, to 39 percent in 1961 and 84 percent in 1990.

Lastly, Figure 7 gives data on infant mortality rates (IMR) and life expectancy at birth for key years. In 1930, IMR was very high. Almost one in four children did not survive infancy. Consequently, life expectancy at birth was low at 30 years. While not extraordinary by the standards of less-developed countries then, not even the poorest of the world's least-developed countries had such levels in 1998 (UNDP 2000: 189). During the next 65 years, IMR decreased by a factor of almost 5 and life expectancy more than doubled. More and more children survived infancy and continued to live longer than ever before as a consequence of improvements in public health care facilities, hygiene awareness, and increases in the affordability of health care.

Each indicator suggests that the standard of living increased significantly throughout the 20<sup>th</sup> century. It is not easy to strike a balance between these and other indicators. However, together with GDP per capita, life expectancy, literacy rates and school enrolment are the key components of the UNDP's Human Development Index (HDI), which is widely hailed as a measure of the standard of living. In 1992, Indonesia's HDI was broadly equivalent to that of today's developed countries in 1913, and of Japan in 1950 (Crafts 1997: 310-311). This confirms Figure 2, and suggests that in terms of improvements in living standards Indonesia is following the developed world, albeit with a delay.

### **2.3 The distribution of income**

A shortcoming of the national accounts is that they may reveal the functional distribution of income, but not the size distribution of income. For the prewar years, reference is often made to the income estimates contained in Table 4, which shows significant differentials in average income between the main ethnic groups. These results should be taken with caution. Firstly, the total income of Indonesians was significantly underestimated. Secondly, a per capita average reveals nothing about the size distribution of income, which may have been more uneven among Indonesians than among other groups. Thirdly, in 1930, 66 percent of the 'other Asians' (including ethnic Chinese,

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experience was found to be a more important determinant of differential earnings (Abramovitz and David 2001: 157) Hence, educational attainment is perhaps more relevant as an indicator of the standard of living.



Indians and Arabs) and 71 percent of the 'Europeans' had been born in Indonesia and should be regarded as residents of Indonesia rather than foreigners.

Information to approximate the size distribution of income is available since the first national household budget survey was conducted as part of the National Socio-Economic Survey (*Susenas*) in 1964/65. These regular surveys record household expenditure, although some of the surveys since 1976 also include unpublished information on household income. Another source of income data is the Labour Force Survey (*Sakernas*) since 1978, albeit that it only includes wage income. Figure 8 contains estimates of income inequality in the form of Gini coefficients, derived from these sources. They are compared with similar estimates for Japan and the UK and plotted with the corresponding level of GDP per capita along the X-axis. The chart shows that income inequality in Indonesia was broadly comparable to that in Japan at moments when their GDP per capita was at a comparable level. In both cases it was much lower than in England and the United Kingdom in the 18<sup>th</sup> and 19<sup>th</sup> centuries.

A second observation is that the degree of inequality of both wage and total income in Indonesia appears to be decreasing from their peak in the late-1970s/early 1980s, which seems to confirm the existence of the 'Kuznets curve'. The main reason is that access to salaried jobs, albeit still low-paid by Western standards, improved rapidly as a consequence of deregulation and export-oriented development in the 1980s and 1990s. This helps to understand the decrease in inequality in wage income.

Another significant indication of inequality is the regional distribution of GDP. In the first half of the 20th century, two countervailing processes took place that were part and parcel of the development of Indonesia as a national economy and a nation state. (a) An increasing reliance of the economy on exports generated in the Other Islands. (b) Administrative and political centralisation, radiating from the core island of Java, despite a late-colonial change to a greater degree provincial autonomy. The late conversion to decentralisation was reversed after independence. Indonesia's foreign exchange policies effectively taxed export producers in the Other Islands heavily. Goods had to be shipped through ports in Java, adding handling costs. Such centralising tendencies fed allegations that import-consuming Java was 'milking' the export-producing Other Islands. They contributed to regional secessionist uprisings during 1956-58 that were subdued with military force. The extent to which the provinces outside Java generated foreign exchange and revenues for the national government increased with the growth of natural resource based industries such as petroleum, natural gas, mining and logging.

Since the late 1960s, provincial GDP data have consistently indicated significant differences in GDP per capita between the provinces that are well endowed with natural resources and those that are densely populated and/or sparsely endowed with natural resources. This seems to have continued a pattern established during the colonial era (Touwen 2001) Table 5 provides some indications of considerable regional economic differences, with East and West Nusatenggara at the lower end of the scale, while the spin-off from oil production placed East Kalimantan at the higher end. The table reveals

significant regional dynamics. Riau, South Sumatra, Maluku, Bengkulu, North Sulawesi, Jambi and Southeast Sulawesi have seen a consistent decline, while West Papua, Bali, West Sumatra, and most provinces in Java experienced an improvement relative to the national average.

The Gini ratio and the weighted coefficient of variation both indicate that the inequality of regional GDP has slightly increased over time, although the degree of inequality was still low in 1997. The evidence confirms Williamson's (1965) thesis that during a process of economic development the spatial distribution of economic activity first concentrates and then disperses. This causes the inequality of regional income distribution to first increase, due to the disequilibrating effects of factor mobility. This is congruous with the fact that the degree of infrastructure development in the Other Islands lags behind Java. The Williamson thesis predicts that inequality will decrease at a later stage, as equalising forces of factor mobility take effect.

The GDP data in Table 5 exclude value added in oil and gas production, which significantly reduces GDP in the provinces of Aceh, Riau, East Kalimantan and West Papua. The central government benefits most from the revenues which these activities generate, and redistributes them to bolster the poorer provinces, particularly in Java. The fact that public revenues have in recent decades been channelled into the development of manufacturing industry in Java articulated the economic dichotomy between Java and the Other Islands, and arguably prolonged the existence of the significant interregional inequalities in non-mining GDP per capita (Akita and Lukman 1995).

## **2.4 Why was Indonesia's growth relatively fast during the 20<sup>th</sup> century?**

Indonesia's development experience is not unique. Today's developed countries have all gone through a similar process in the past, albeit each with their own historical peculiarities. What is relatively unique to Indonesia is the pace of economic change in the 20<sup>th</sup> century, which was higher than Western Europe in the past, and higher than in most of Asia during the same period. Very unique to Indonesia is that this process of rapid economic development was part and parcel of a process that involved the forging of a national economy and a nation state involving a number of disparate people and spanning a geographical area, and even a population of equivalent proportions to Western Europe in the past.

In Western Europe the budding nation states and national economies were long much smaller than Indonesia in the 20<sup>th</sup> century. This gave the people of such states the opportunity to forge a common identity. However, that process was accompanied by occasional setbacks to economic development caused by wars with devastating direct and indirect consequences. Only during the last 40 years have European nation states strived to achieve a higher degree of economic integration, and have they started to hand some of their sovereignty to a supranational body.

Although there are significant differences with Europe, the processes of establishing a nation state that spanned a large number of disparate people, and achieving economic integration took place at a much faster rate in Indonesia during the 20<sup>th</sup> century. A supranational body was imposed from the start in the form of the Dutch colonial government and the succeeding government of the Republic of Indonesia. Economic integration was a goal from the start. Unlike Europe, both were not outcomes of longwinded processes of compromise. Consequently, the processes were bound to lead to tensions that called for resolution, and they were bound to be incomplete. The economic stagnation during 1930-66, which was in part caused by a transition of regime and a nationalistic development ethos, may be regarded as a necessary part of this process. If so, it should be noted that this phase of stagnation did not last as long and may not have been as destructive as similar phases of retrogression in Western Europe in a distant past.

A major factor in an explanation for economic development in Indonesia having been relatively fast in the 20<sup>th</sup> century was that the country was a latecomer to economic development. Gerschenkron (1962) has drawn attention to 'the advantages of backwardness' that latecomers enjoy. They have the opportunity to absorb technological know-how from more advanced countries, without having to bear the cost and time of research involved in the development of new production technologies. However, they require access to technologies (as a consequence of export earnings and foreign investment that can pay for them) and they need to have the capacity to absorb such technologies.

Both phases of per capita GDP growth in Indonesia were characterised by a relatively high exposure to foreign markets, which was conducive to this process. At the same time, the country had governments that took a 'developmentalist' stance as far as the means to do so were available. This led for instance to an expansion of investment in public infrastructure, which was not only conducive to export growth, but also to the slow process of market integration and the expansion of production for domestic consumption and investment.

### **3. Evidence or merely hypotheses?**

The description and some of the proximate explanations of Indonesia's development experience in the previous section rely quite heavily on available consistent long-term estimates of GDP and its components. Anyone familiar with my earlier work (Van der Eng 1992, 2001 and 2002), on which section 2 was largely based, may know that the estimates contain various weaknesses that are a consequence of both the shortcomings of the available basic data on which they have been based and of the assumptions that had to be made in order to arrive at the estimates. How then can the interpretations presented in the previous section be trusted?

The estimates of GDP and its components published in 1992 were only ever intended as stop-gap estimates to further discussion about how to improve on them, if not explore other approaches to estimating GDP for Indonesia. Apart from some suggestions by Booth (1995, 1998), that never happened, and the estimates have started to lead a life of their own. This is unfortunate, as others may be in a better position to improve on them than I am.

For instance, the valuable *Changing Economy in Indonesia* series started off with a volume in which the expectation was expressed that, after all planned volumes had been published, it would be possible to aggregate all collected indicators of business cycles for a comprehensive analysis of macro-economic change. Unfortunately, the editors of the volumes have forgotten about that goal and have generally sought to publish the available basic data, rather than seek to generate times series that were corrected for inconsistencies and that could be readily used for aggregation, for instance in a national accounts framework. Beyond the CEI series, there are few (sub-) sector studies available that have sought to establish the macro-economic relevance of a sector with a national accounts framework in mind.

As a consequence, economic historians of Indonesia are forced to continue to make do with the available data, however flawed they are. There are not only shortcomings in my own published work (as I will explain below), but also in other estimates that are still widely used. For instance in the most frequently used set of estimates of Polak for 1921-39, conveniently reproduced in CEI Vol.5 (1979). Creutzberg, the editor of that volume, already noted that 'the application of modern techniques would have produced different – usually higher – results' (pp.14-15). However, no effort has hitherto been made to employ the insights that postwar estimates of national income in Indonesia by for instance Neumark, Muljatno and BPS (all ignored in CEI Vol.5) generated, in a revision of Polak's work (see Van der Eng 1997). Nor, for that matter, has anyone sought to estimate national income for 1921-39 on the basis of the methodology developed and used by particularly Muljatno and BPS, using the data readily available for that period. Why not? After all, the techniques involved are very simple. Perhaps a key reason is that it is rather labour intensive, and few can spare the time required. Still, this is necessary, because Polak's methodology is highly unconventional in the light of the recommendations of the UN System of National Accounts, and because the lack of a conventional approach may impede the use and interpretation of Polak's results.

In short, economic historians of Indonesia would do themselves and their discipline a tremendous favour if they could make a concerted effort to generate a set of long-term historical national accounts that are as complete and systematically estimated as possible and that are based on a methodology, however idiosyncratic, that is widely supported if only because it is generally agreed to be the best possible given the available data.

What is wrong with the estimates in Van der Eng (1992, 2002)? Appendix A explains that they involve backward extrapolations of the estimates of gross value added (GVA) made by the Indonesian Bureau of Statistics (BPS) for 17 sectors in 1983, on the basis of a heterogeneous set of indicators of economic activity in each of these sectors. This method has some legitimacy, as BPS uses it to estimate series of gross value added in constant prices through forward extrapolation, albeit that its set of indicators is much more extensive.

Whereas BPS also estimates GVA in current prices, the main shortcoming of my method is that it only produces series in constant 1983 prices and not in current prices. I have constructed a 'reflator' to generate current price series of total GDP on the basis of a combination of linked retail and export price indices, but that is not satisfactory. In part because the 'reflator' may not represent the products in GDP, in part because it cannot be used for reflation of the different sectors.

Secondly, the method implicitly assumes that the relative prices in 1983 are representative for the whole period 1880-1982. It is highly likely that relative prices in the Indonesian economy changed considerably over time.

A third issue is that the selection of indicators can be problematic. Appendix A shows, for instance, that inland and sea fish catch was used as an indicator of GVA in fisheries. This implicitly assumes that the share of non-fish (squid, turtles, pearls, tripang, crustaceans etc) and fish did not change over time.

Fourthly, using output as an indicator of trend implicitly assumes that the input-output ratio did not change over time. For instance, that the efficiency of producing fish or marine products in general did not change over time.

Fifthly, in some cases not really the production of services is used as an indication, but rather the means that may be used to produce them. For instance, the number of registered trucks and buses as a part-indicator of GVA in transport implicitly assumes that these motor vehicles were used with the same intensity for commercial purposes throughout the period 1880-1982 as in 1983.

Yet another problem is that for some sectors multiple indicators are used with arbitrary weights.

Can we do better than this? Yes, most likely, provided time and resources are available. To start with, except for manufacturing industry, my estimations largely neglected the available estimates of Muljatno and BPS for 1951-82. A revision of those estimates in the light of later revisions in national accounting procedures may yield more consistent, and possibly higher estimates of GDP for at least those years than my very rough approach can do. We can also do better than Polak on the basis of the extensive postwar national accounting experiences. However, the use of a more conventional approach will lead to a loss of certain elements in Polak's results, particularly his estimates of income in the three key ethnic sectors of the economy. Lastly, on the basis of data collected for the years before 1921, it should be possible to go further back in time than 1921, Polak's starting point.

#### **4. Guesses: The Indonesia volume for the AHSTAT project**

Economic historians of Indonesia are now in the fortunate situation that the Asian Historical Statistics (AHSTAT) Project at Hitotsubashi University has offered the opportunity to generate and publish better estimates of Indonesia's historical national accounts data. The project will be extended beyond the years for which it was funded (1996-2000) with the aim of finalising the volumes containing such data for several key Asian countries by 2005.

Any effort to go well beyond the work discussed in section 3 is likely to exceed the capabilities and resources of the one person who has been asked to assume the editorship of the volume. The volume will benefit from constructive criticism and, if possible, active participation from colleague economic historians of Indonesia. This section sets out some of the general issues that are best discussed in a panel consisting of the potential users of Indonesia's historical national accounts. There are many details relating to the compilation of such accounts to be discussed, but that may hopefully be done at a later stage in a similar forum.

These are some of the general issues, in no particular order.

##### **Should we try at all?**

Perhaps the task is too hard in the face of data limitations. Perhaps there is no need for national accounts data to tell the story of economic change (or the lack of it) in Indonesia. After all, national accounts data can at best give us an indication of the proximate explanations of economic growth, not the ultimate factors which are likely to remain the subject of contention.

In addition, from what we know now, it seems likely the most growth was based on extensive exploitation of natural resources and eventually the substitution of tangible capital for labour. It is unlikely that it was, on the whole, based on rising rates of intangible investment in the formation and exploitation of technological and organisational knowledge, signified for instance by the growth of total factor productivity.

And, once the task is done and the consequences of the users of the estimates are able to understand the data problems, would economic historians of Indonesia still deem the national accounts estimates relevant to the analysis of economic change?

##### **Can we trust any of the available numbers?**

There are various allegations, often casual ones, that have suggested that the numbers available for Indonesia cannot be trusted. It has been suggested that the colonial regime polished up the numbers. Likewise, it has been said that after independence the quality of statistical data remained poor, as the Sukarno and Soeharto regimes wanted to look their best in statistical terms. Perhaps such criticism applied to administrative data that were

collected by local dignitaries and collated and aggregated up the ranks of administrative layers, and for which no cross-check mechanisms were in place. On the whole, there has been a consistent professionalisation of number gathering in Indonesia, starting with the colonial predecessors of BPS (Van der Eng 1996). Hence, trust in the available numbers has to be a matter of degree.

### **What approach to follow: output, expenditure, income, or all three?**

Given data availability, it seems that the output approach is likely to produce the most complete results. A major obstacle to the employment of the expenditure approach is private consumption, as far too few indications of household expenditure are available to approximate long-term expenditure patterns (Van der Eng 2001). However, in combination with the output approach, the expenditure approach may take private consumption as the residual, and focus on the other expenditure items, of which particularly total capital formation seems crucial.

The income approach seems wishful thinking. Polak's eclectic method was partly based on income data, as quite reliable income tax data were readily available for 1921-39, after the changes in the income tax legislation. Unfortunately such data are not readily available for the postwar period, and not at all for the years before 1921. Until the 1980s, other income data are largely restricted to wages rates for unskilled and semi-skilled labour. Hardly anything is known about income from self-employment, rents, interest, etc. Even today, BPS does not employ the income approach.

### **What does GDP mean if Indonesia did not have a national economy?**

A GDP number for the country as a whole may be artificial if there was no national economy with integrated markets. It has been argued above that the formation of a national economy in Indonesia was a gradual process with leaps and bounds, reaching well into the postwar years. Hence, any starting year seems to be arbitrary. Rather than for fundamental reasons, there may be practical reasons to make separate estimates for at least Java and the Outer Islands, as severe data constraints for large parts of the Outer Islands would affect the quality of the economy-wide estimates considerably in years when estimates for Java would still be of reasonable quality.

### **What does GDP mean anyway?**

Is GDP at market prices a sufficient indicator of economic change? After all, it does not say much about the broader aspects of economic development (e.g. standard of living, income distribution and poverty), or for that matter the ultimate factors to help to understand economic change or the lack of it, such as the various institutions that are crucial to that process. In addition, does GDP tell the entire story, or would GNP and NNP (or national income) be required for that purpose?

### **How to reconcile inconsistencies in available time series?**

The compilers of the various CEI volumes, particularly on agriculture, already noted that the available time series data for the colonial period suffer from inconsistencies caused by changes in for instance estimation procedures or geographical coverage. The same holds for the period since independence.

Specialist knowledge of the ways in which the series were compiled before informed efforts can be made to correct them for inconsistencies. Specialists of historical changes in the sectors that the statistics cover would be best suited for that task. Who are they, and is it possible to call on their cooperation?

### **How to reconcile available inconsistent national accounts data?**

The same applies to the available national accounts data produced by BPS since 1958. At first glance, it seems easiest to draw on that work and reconcile the inconsistencies caused by the various revisions of estimation procedures to generate consistent time series, rather than seek to 'build up' GDP estimates from scratch. Perhaps it would be best to work backwards, starting with the series BPS produces since the latest revision in 1993 (available for 1987-2000). However, this task is hard, because BPS has become increasingly less generous with providing details of its estimation procedures since the 1960s (Van der Eng 1999).

In addition, the use of a 'modern' categorisation raises questions that are pertinent for historical analysis. For instance, the processing of agricultural commodities is now part of manufacturing GVA, whereas in the past it was part of agricultural GVA. Disregarding the technical problems of disentangling cane and sugar production within the one sector, including GVA in sugar production in manufacturing (not done in Figure 3!) is likely to boost the share of industry in GDP and make the economy of colonial Indonesia appear to be much more industrialised than current common perceptions dictate.

### **How to estimate GVA in services?**

Perhaps it is possible to estimate GVA in the agricultural and industrial sectors, as most available output data refer to material production. But what about services, which is possibly the biggest sector in the economy (see Figure 3)? Estimating services output has always been a headache in national accounting, and is for several services sub-sectors generally approximated on the basis of the total wages paid in such sub-sectors or estimates of that wage sum. But for Indonesia today and especially in the past, the paucity of data on employment and wages in services is significant. What can be done to overcome such data problems?

Then there is a host of smaller, technical issues that need to be discussed and reconciled. Of a more general nature is for instance the need to reconcile the balance of



payments data available for colonial Indonesia in *Changing Economy in Indonesia Vol. 7* with such data available for Indonesia since 1949, in order to be able to identify factor payments overseas consistently. There also is a pressing need to find a way of estimating total private capital formation (rather than only that of Dutch firms, as can be found in *Changing Economy in Indonesia Vol. 3*). And there is the need to approximate indirect taxes and subsidies to gauge the difference between GDP in factor costs and market prices. For each economic sector it would be possible to raise many specific technical issues. For instance, how to approximate food crop production in the Outer Islands for the years before the statistical reporting system on food production was extended to that part of Indonesian in the 1950s? But perhaps such details and their consequences can be discussed at a later stage.

## **5. Conclusion**

As the introduction mentioned, the purpose of this paper is to further discussion about Indonesia's growth experience, particularly during the 20<sup>th</sup> century, and to raise the question whether a national accounts framework will be of use to that end. To that end, the paper provided a summary of the growth and development experience, indicated some weaknesses in the currently available national accounts data, and provided an overview of some of the fundamental issues that the conference may discuss.

## List of references

- Abramovitz, M. and P. David (2001) 'Two Centuries of American Macroeconomic Growth: From Exploitation of Resource Abundance to Knowledge-Driven Development.' *Stanford Institute for Economic Policy Research Discussion Paper No.01-05*. Stanford: Stanford University.
- Akita, T. and R.A. Lukman (1995) 'Interregional Inequalities in Indonesia: A Sectoral Decomposition Analysis for 1975-92', *Bulletin of Indonesian Economic Studies*, 31, No.2, pp.61-81.
- Asra, A. (2000) 'Poverty and Inequality in Indonesia: Estimates, Decomposition and Key Issues', *Journal of the Asia-Pacific Economy*, 5, p.102.
- Booth, A. (1995) 'Real Domestic Income of Indonesia, 1880-1989: A Comment', *Explorations in Economic History*, 32, pp.350-64.
- Booth, A. (1998) *The Indonesian Economy in the 19<sup>th</sup> and 20<sup>th</sup> Centuries: A History of Missed Opportunities*. Basingstoke: Macmillan.
- Cameron, L. (2000) 'Poverty and Inequality in Java: Examining the Impact of the Changing Age, Educational and Industrial Structure', *Journal of Development Economics*, 62, pp.149-180.
- Crafts, N.F.R. (1997) 'The Human Development Index and changes in standards of living: Some historical comparisons', *European Review of Economic History*, 1, pp.299-322.
- Gerschenkron, A. (1962) *Economic Backwardness in Historical Perspective*. Cambridge (Mass.): Belknap.
- Hugo, G.J. et al. (1987) *The Demographic Dimension in Indonesian Development*. Oxford: OUP.
- Lindert, P. (2000) 'Three Centuries of Inequality in Britain and America' in A.B. Atkinson and F. Bourguignon (eds.) *Handbook of Income Distribution*. (Amsterdam: Elsevier) pp.167-216.
- Maddison, A. (1991) *Dynamic Forces in Capitalist Development: A Long-Run Comparative View*. Oxford: Oxford UP.
- Maddison, A. (1995) *Monitoring the World Economy 1820-1992*. Paris: OECD.
- Maddison, A. (2001) *The World Economy: A Millennial Perspective*. Paris: OECD.
- Mizoguchi, T. and Y. Terasaki (1995) 'Kakei no Shotoku Bunpu Hendo no Keizai - Shakai oyobi Sangyo Kozei-teki' [Fluctuations in Household Income Distribution as a Consequence of Changes in Economic, Social and Industrial Structures], *Keizai Kenkyu*, 46, pp.59-77.
- Mizoguchi, T. (1985) 'Economic Development and Income Distribution: The Experience of East and Southeast Asia', *The Developing Economies*, 23, p.310
- Muljatno (1960) 'Perhitungan Pendapatan Nasional Indonesia untuk Tahun 1953 dan 1954' [The Calculation of Indonesian National Income for 1953 and 1954], *Ekonomi dan Keuangan Indonesia*, 13, pp.162-211.
- Polak, J.J. (1943) 'The National Income of the Netherlands Indies, 1921-1939' in P. Creutzberg (ed.) *Changing Economy in Indonesia Volume 5: National Income*. (The Hague: Nijhoff, 1975) pp.26-94.
- Ravallion, M. and M. Huppi (1989) 'Measuring Changes in Poverty: A Methodological Case Study of Indonesia during an Adjustment Period', *The World Bank Economic Review*, 5, pp.57-82.

- Touwen, J. (2001) *Extremes in the Archipelago: Trade and Economic Development in the Outer Islands of Indonesia, 1900-1942*. Leiden: KITLV Press.
- UNDP (1993, 2000) *Human Development Report*. New York: United Nations Development Programme.
- Van der Eng, P. (1992) 'The Real Domestic Product of Indonesia, 1880-1989', *Explorations in Economic History*, 28, pp.343-373.
- Van der Eng, P. (1993) 'The "Colonial Drain" from Indonesia, 1823-1990.' *Research School of Pacific Studies, Economics Division Working Paper, Southeast Asia No.93/2*. Canberra: Australian National University.
- Van der Eng, P. (1994) 'Food Supply in Java during War and Decolonisation, 1940-1950.' *Centre for South-East Asian Studies Occasional Paper No.25*. Hull: Centre for South-East Asian Studies.
- Van der Eng, P. (1996) 'Historical Economic Statistics in Indonesia: Continuity and Change', *Newsletter of the Asian Historical Statistics Project*, No.3, pp.12-15.
- Van der Eng, P. (1997) 'Gauging Growth: Development of National Accounting in Indonesia', *Newsletter of the Asian Historical Statistics Project*, No.4, pp.9-11.
- Van der Eng, P. (1998) 'Exploring Exploitation: The Netherlands and Colonial Indonesia 1870-1940', *Revista de Historia Económica*, 16, No.1, pp.291-321.
- Van der Eng, P. (1999) 'Some Obscurities in Indonesia's New National Accounts', *Bulletin of Indonesian Economic Studies*, 35 (1999) No.2, pp.91-106.
- Van der Eng, P. (2000a) 'Food for Growth: Trends in Indonesia's Food Supply, 1880-1995', *Journal of Interdisciplinary History*, 30, No.4, pp.591-616.
- Van der Eng, P. (2000b) 'Growth and Inequality: The Case of Indonesia since the 1960s.' Unpublished paper, Department of Economic History, The Australian National University, Canberra.
- Van der Eng, P. (1996) 'Historical Economic Statistics in Indonesia: Continuity and Change', *Newsletter of the Asian Historical Statistics Project*, No.3, pp.12-15.
- Van der Eng, P. (2001) 'Long-Term Trends in Gross Domestic Expenditure in Indonesia', unpublished paper presented at the *International Workshop on Modern Economic Growth and Distribution in Asia, Latin America and the European Periphery: A Historical National Accounts Approach*, Hitotsubashi University, Tokyo, 16-18 March 2001.
- Van der Eng, P. (2002) 'Indonesia's Growth Performance in the 20<sup>th</sup> Century' in A. Maddison, D.S. Prasada Rao and W. Shepherd (eds.) *The Asian Economies in the Twentieth Century*. (Cheltenham: Edward Elgar), forthcoming January 2002.
- Williamson, J.G. (1965) 'Regional Inequality and the Process of National Development', *Economic Development and Cultural Change*, 13, pp.3-45.

## APPENDIX A: ESTIMATION OF INDONESIAN GDP, 1900–1982

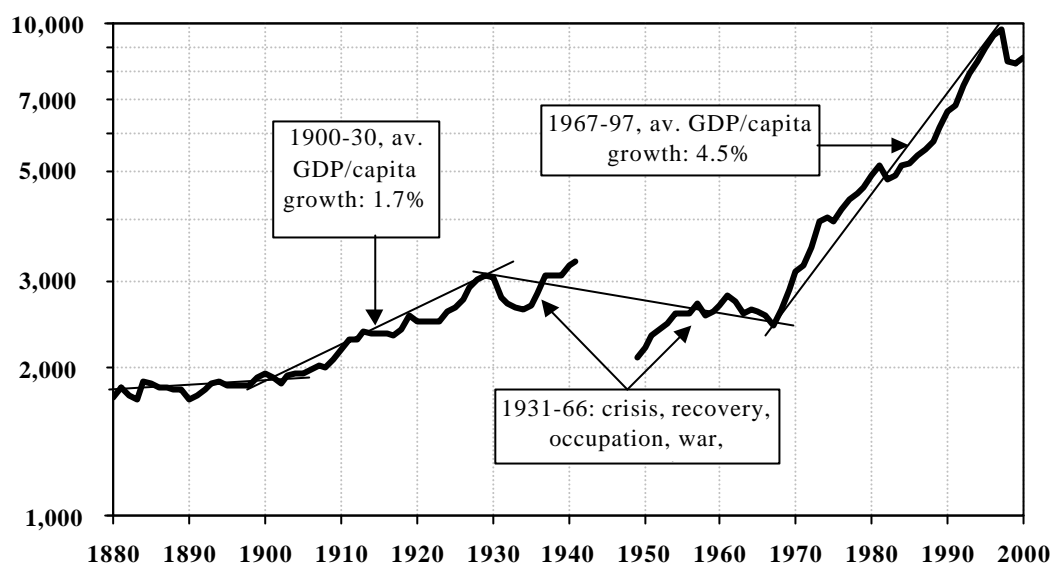
GDP for 1900–82 was re-estimated for 17 main sectors of Indonesia's economy, using broad indicators of productive activity and linked those to the official (at 1983 prices) for 1983–99.

- 1-4. *Farm and plantation agriculture.* For the sectors food crops, farm cash crops, estate crops and animal husbandry, estimates of GVA in constant prices are from Van der Eng (1996). These are based on an old classification of farm cash crops and estate crops, which recorded the production of some farm cash crops (such as sugar produced from cane purchased from farmers) as estate production. The original GVA estimates for 'farm non-food crops' and 'estate crops' for 1983–89 were re-arranged. Estates are assumed to have produced 44.5 per cent (1982–83 average from the 1971–83 national accounts data) of GVA in the sectors 'farm non-food crops' and 'estate crops' together.
5. *Fisheries.* GVA in fisheries linked to the total landed fish catch for the years 1940 and 1951–82. Per capita production in 1940 (6.5 kg.) was used to estimate fish production during 1900–39. For 1941 and 1949–50 fish catch is assumed to have moved parallel to real GVA from food crops.
6. *Forestry.* GVA in forestry linked to production of sawn wood, including firewood and charcoal for 1925–82. For 1900–24 forestry production was assumed to move parallel to real GVA of farm cash crops and estate crops.
7. *Mining and quarrying.* GVA in mining and quarrying (excluding oil and gas production) linked to an index of the physical production of six key mining products. The index was calculated with weights obtained by extrapolating GVA in 1980 from the old national accounts data to 1983, and by retropolating the value of gross output in 1985 from the newer national accounts data to 1983, and averaging the two sets of shares for each product. The 1983 weights were as follows: coal 0.027, tin 0.514, nickel 0.193, bauxite 0.021, copper 0.181, salt 0.064.
8. *Manufacturing.* A weak estimate was previously used (Van der Eng 1992: 363–4), because of incomplete information on industrial output in manufacturing industry. In particular, aggregated data on output in the important small-scale and cottage industries are absent (Segers 1988, Gordon 1998). For this chapter, GVA in manufacturing was retropolated back to 1958 by linking it to GVA in manufacturing in constant prices from previous rounds of estimates of Indonesia's national accounts for 1958–60, 1960–71, 1971–83. The 1971, 1975 and 1980 Input-Output Tables were used to approximate the degree of underestimation in manufacturing GVA. The BPS estimate of GVA in manufacturing in 1971 was multiplied by 1.5, in 1975 by 1.2. In 1980 the degree of underestimation was negligible and no correction was introduced. It was assumed that the correction factor decreased during 1971–75 and 1975–80. For the intermediate years the correction factor was interpolated and the result used to inflate real GVA for 1971–80. The GVA series for 1958–60 and 1960–71 were used for retropolation without corrections. 1951–58 industrial output (manufacturing, utilities and construction) linked to constant price series of industrial GVA from Suhartono (1967: 123), 1938 and 1951 linked to series of industrial GVA from Mangkusuwondo (1975: 15); 1928–38 linked to constant price series of industrial output from Van Oorschot (1956: 93). Manufacturing GVA estimated by deducting real GVA in utilities and construction from total industrial output for 1928–57, and by assuming constant per capita output during 1900–28.
9. *Utilities.* GVA in utilities estimated for 1958–82 as for manufacturing GVA. The BPS estimate of GVA in utilities was multiplied by 2.25 in 1971 and 1.2 in 1975. 1940–57 GVA estimated by linking the 1958–89 series to the consumption of electricity, 1900–39 GVA estimated by linking to production of electricity and gas for public consumption with weights of 0.5 each.
10. *Construction.* GVA in construction estimated for 1958–82 as for manufacturing GVA. The BPS estimate of GVA in construction was multiplied by 1.5 in 1971 and

- 1.2 in 1975. Import and production of cement and real GVA in forestry, with weights of 0.75 and 0.25, were used as indicators of construction activity during 1900–57. For 1900–10 the volume of imported cement was estimated from the current value of imports, using the 1911 unit value.
11. *Trade*. GVA in trade estimated assuming that the following percentages of real GVA in the above sectors were marketed: food 30 per cent, animal husbandry 70 per cent, farm cash crops 70 per cent, estate crops 100 per cent, fisheries 90 per cent, forestry 80 per cent, manufacturing 100 per cent. Added was 100 per cent of imported commodities, converted to 1983 prices with the retail price index (see below). The total real value of marketed products was used to reproject real GVA in trade.
  12. *Transport and communication*. Two compound indicators were used to reproject GVA in transport and communication. For 1943–82: 0.05 railway freight, 0.05 railway passengers, 0.50 registered trucks and buses, 0.20 and index of shipped freight (1900–57 domestic and international shipping in 1 000 m<sup>3</sup> net, 1957–83 cargo handled in Indonesian ports for domestic and international shipment in 1 000 tons), 0.15 mailed items and 0.05 telephone connections. For 1900–42: 0.175 railway freight, 0.175 railway passengers, 0.25 registered trucks and buses, 0.20 shipping index, 0.15 mailed items and 0.05 telephone connections.
  13. *Financial services*. GVA in financial services estimated, using GVA in trade (sector 11) and the value of all circulated currency (M1), deflated with the retail price index (see below) as indicators for 1900–82, each with a weight of 0.5.
  14. *Housing*. GVA in housing estimated, using population and the sub-total of sectors 1–13 as indicators for 1900–82, each with a weight of 0.5. The assumption is that growth of per capita income induces people to invest in the quality of houses, which increases the rental value of dwellings.
  15. *Public administration and defence*. GVA in public administration was estimated, using gross public expenditure, deflated with the retail price index (see below) as an indicator for 1900–82.
  16. *Other services*. GVA in the remaining sector was estimated, using the number of primary and secondary school children, population and the sub-total of the sectors 1–15 as indicators with weights of 0.25, 0.25 and 0.50 respectively.
  17. *Oil and gas*. The production of crude petroleum during 1900–82 was used to estimate GVA in oil and gas production.

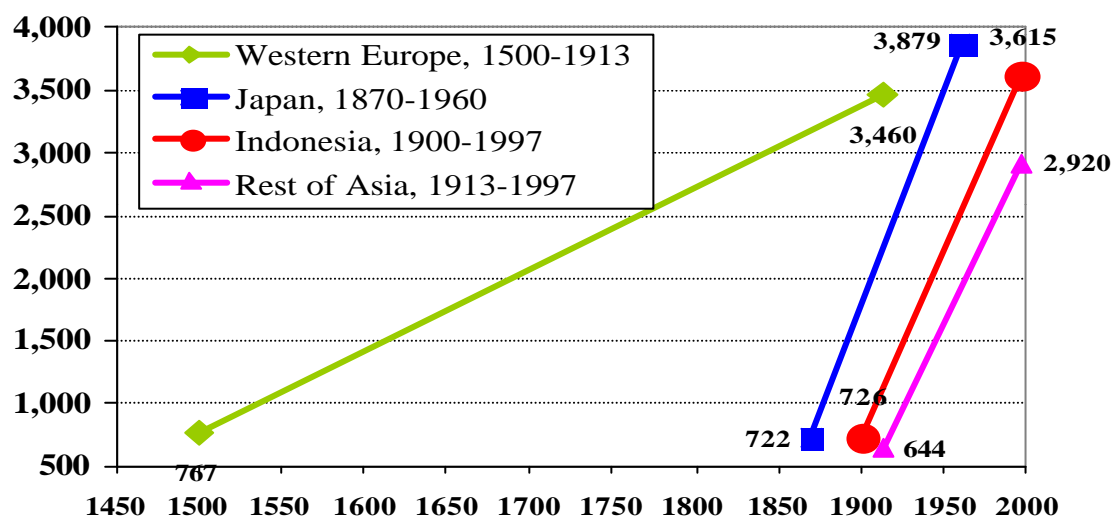
Source: Van der Eng (2002).

Figure 1: GDP per capita in Indonesia, 1880-2000 (1,000 1983 Rupiah)



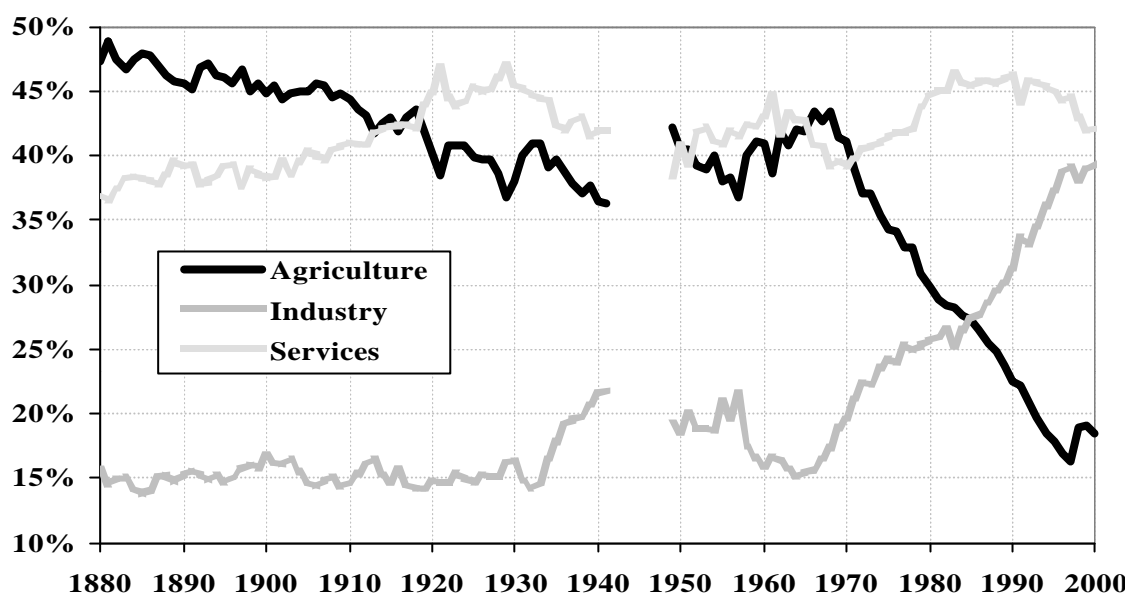
Source: Van der Eng (2002), re-estimated to include 1880-99 and updated for 1999-2000.

Figure 2: GDP per capita growth in Western Europe, Japan, Indonesia, and the rest of Asia from comparable levels (1990 PPP dollars)



Source: Calculated from Maddison (1995 and 2001) and Van der Eng (2002).

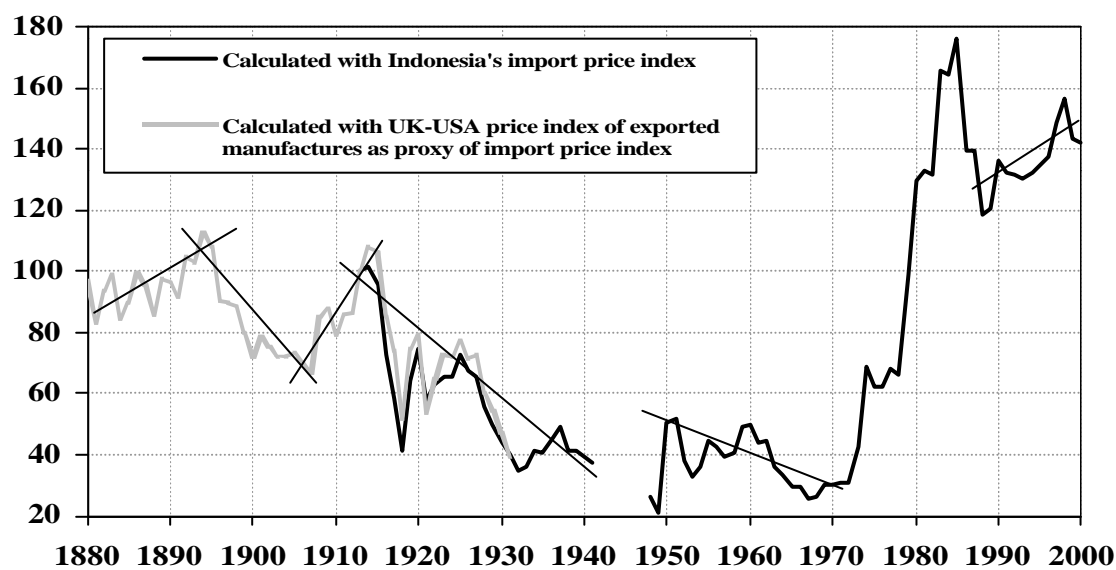
Figure 3: Sector shares in Indonesia's non-oil GDP, 1880-2000



Note: Calculated from output data in 1983 prices.

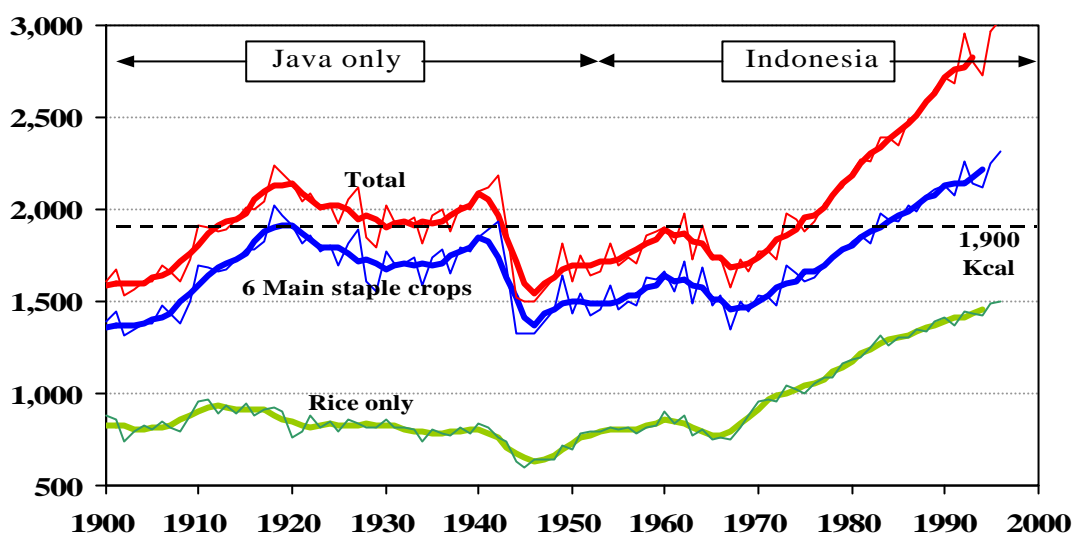
Source: Van der Eng (2002), re-estimated to include 1880-99 and updated for 1999-2000.

Figure 4: Barter terms of trade, 1880-2000 (1913 = 100)



Source: Van der Eng (2002), re-estimated to include 1880-99 and updated for 1999-2000.

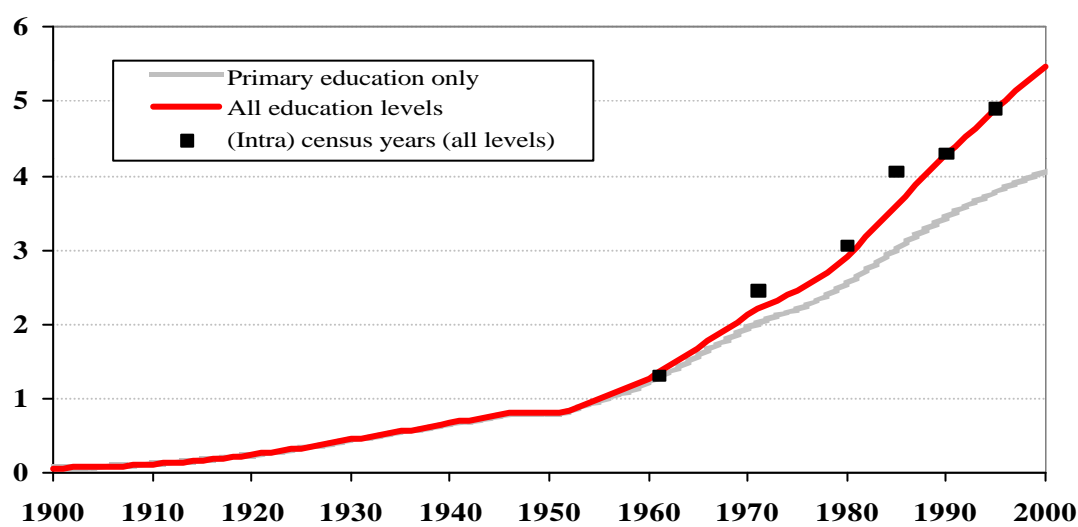
Figure 5: Net food supply per capita, 1880-96 (Kcal per capita per day)



Note: Bold lines are five-year moving averages.

Source: Van der Eng (2000a).

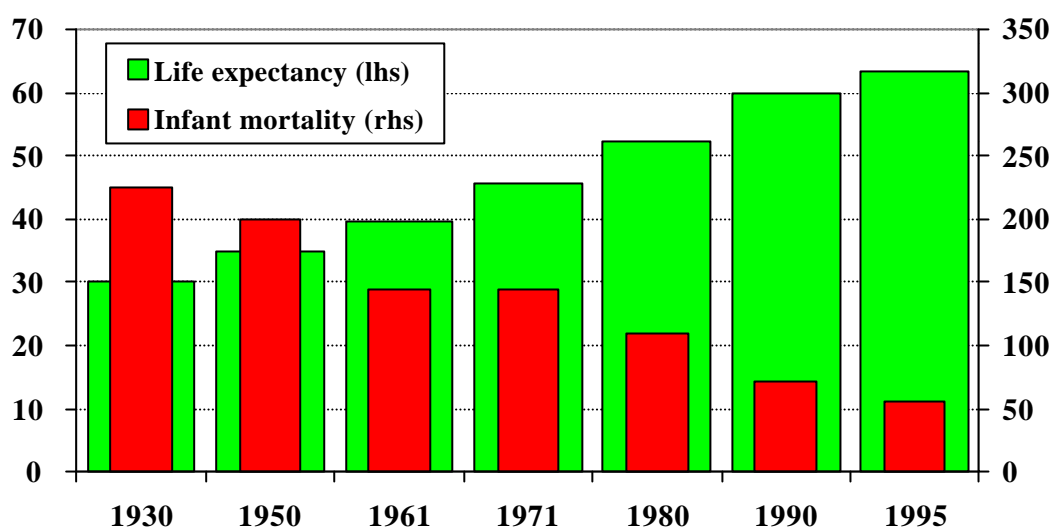
Figure 6: Educational attainment, 1880-2000 (years of schooling per capita)



Source: Van der Eng (2002), re-estimated to include 1880-99 and updated with enrolment data for 1997/98-2000/01.

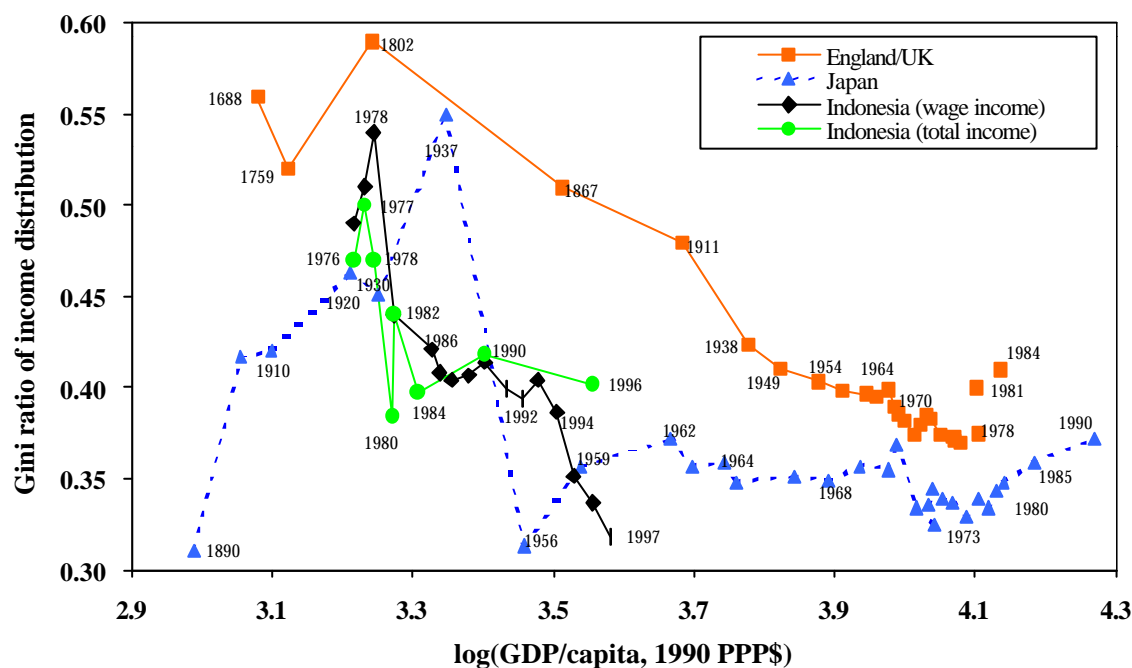


Figure 7: Life expectancy and infant mortality rates, 1930-95



Sources: Hugo et al. 1987: 373-4; Indikator Kesejahteraan Rakyat 1995: 130-1.

Figure 8: Long-term Gini ratios of per capita income distribution in England/UK, Japan and Indonesia



Sources: UK Gini ratios from Lindert (2000) p.175; Japan Gini ratios from Mizuguchi and Terasaki (1995) and Mizuguchi (1985); Indonesia Sakernas Gini ratios calculated from Keadaan Buruh/Pekerja di Indonesia (1982, 1986-88), Keadaan Pekerja/Karyawan di Indonesia (1989-94, 1996-97), Penduduk Indonesia: Hasil Survei Penduduk antar Sensus 1995, Seri S2. (1995); Susenas income Gini ratios from 1976-78 and 1982 Asra (2000) p.102, 1980 and 1984 Ravallion and Huppi (1989), 1990 and 1996 (Java only) Cameron 2000: 157; GDP per capita Maddison (1995) linked to own GDP estimates for Indonesia, UK pre-1820 linked to Maddison (1991) Tables A.5 and B.1.

Table 1: Contribution of key inputs and total factor productivity to GDP growth, 1940-97

	Labour force (millions)	Capital stock (bln 1983 rupiah)	GDP	Contribution to GDP growth	
				Labour & capital	Total factor productivity
1940	26.7	45.6	22.8		
1967	32.6	60.5	26.8		
1997	88.3	634.8	208.9		
Average annual growth					
1940-67	0.7%	2.8%	1.2%	115%	-15%
1967-97	2.7%	8.1%	7.1%	61%	39%

Source: Calculated from Van der Eng (2002). Labour and capital contribution to GDP growth calculated assuming income shares of respectively 70 and 30 percent in GDP, TFP is residual.

Table 2: Contribution of export growth to GDP growth, 1880-97

	GDP (bln 1983 rupiah)	Exports (bln 1983 rupiah)	Average Ratio of Exports/GDP	Contribution of exports to GDP growth	
				Direct	Total
1880	5,710	404			
1900	8,339	989			
1930	18,511	4,760			
1967	26,762	7,027			
1997	208,941	57,598			
Annual average growth					
1880-00	1.9%	4.6%	0.129	31%	41%
1900-30	2.7%	5.4%	0.209	42%	54%
1930-67	1.0%	1.1%	0.103	11%	14%
1967-97	7.1%	7.3%	0.227	23%	30%

Source: Calculated from Van der Eng (2002, re-estimated to include 1880-99), direct contribution as  $[(\text{av. ratio} \times \text{export growth}) / \text{GDP growth} \times 100\%]$ , total contribution assuming a multiplier of 1.3.

Table 3: Annual average shares of categories of expenditure on GDP, 1880--97 (percentages)

	1880-89	1900-30	1931-66 <sup>a</sup>	1967-97
Private consumption	87.6	82.5	81.5	68.1
Government consumption	6.5	5.3	10.8	9.5
Gross capital formation	4.9	10.7	9.5	24.7
Private	4.5	10.3	11.5 <sup>b</sup>	17.2 <sup>c</sup>
Government	0.4	0.5	0.3 <sup>b</sup>	6.3 <sup>c</sup>
Exports of goods and services	19.5	22.8	17.9	23.7
Imports of goods and services	-18.6	-21.3	-19.7	-25.9
Net foreign trade	0.9	1.5	-1.8	-2.2

a. 1931-41 and 1949-66

b. 1931-41 only

c. 1967-90 only

Source: Van der Eng (2001).

*Table 4: Population and per capita income by ethnic group, 1930*

	Population (× 1,000)	Per capita income (guilders)
Indonesians, Java	40,891	55
Indonesians, Other islands	18,247	66
Other Asians, Java	635	309
Other Asians, Other islands	714	214
Europeans, Java	193	2,321
Europeans, Other islands	48	3,198
Total, average	60,728	73

*Sources:* Calculated from *Volkstelling 1930 Vol.8.* (Batavia: Landsdrukkerij, 1938) Table 1; Polak 1943: 70.

Table 5: Inequality of regional GDP per capita, 1971, 1983 and 1997

Province	1971		1983		1997	
	National Av.= 100	Rank	National Av.= 100	Rank	National Av.= 100	Rank
Jakarta	247	(1)	328	(1)	371	(1)
East Kalimantan	247	(2)	218	(2)	246	(2)
West Papua	99	(14)	108	(8)	163	(3)
Riau	139	(6)	116	(6)	135	(4)
Central Kalimantan	116	(8)	130	(4)	127	(5)
Bali	107	(11)	98	(11)	122	(6)
Aceh	96	(15)	119	(5)	107	(7)
North Sumatra	158	(4)	103	(9)	100	(8)
South Kalimantan	111	(9)	109	(7)	97	(9)
West Kalimantan	101	(12)	90	(13)	97	(10)
East Java	88	(19)	99	(10)	93	(11)
West Sumatra	89	(18)	97	(12)	91	(12)
Yogyakarta	75	(22)	75	(21)	89	(13)
West Java	87	(20)	81	(18)	88	(14)
South Sumatra	201	(3)	143	(3)	87	(15)
North Sulawesi	122	(7)	85	(16)	75	(16)
South Sulawesi	79	(21)	77	(20)	75	(17)
Central Java	74	(23)	74	(22)	71	(18)
Maluku	106	(10)	88	(14)	66	(19)
Jambi	150	(5)	84	(17)	65	(20)
Bengkulu	91	(17)	86	(15)	59	(21)
Lampung	92	(16)	57	(24)	55	(22)
Southeast Sulawesi	99	(13)	81	(19)	54	(23)
West Nusatenggara	52	(25)	51	(25)	44	(24)
Central Sulawesi	56	(24)	73	(23)	43	(25)
East Nusatenggara	48	(26)	48	(26)	40	(26)
Gini ratio <sup>a</sup>	0.18		0.21		0.24	
CVw <sup>b</sup>	0.42		0.55		0.66	
Ratio highest/lowest	5.1		6.8		9.8	

a. Calculated with provincial totals of population and GDP<sup>Q</sup>, ranked by GDP per capita.

The implicit assumption is that income is distributed equally within each province.

b. Coefficient of variation weighted by population.

Note: GDP excludes Gross Value Added from oil and gas, and is not corrected for price differences between provinces.

Sources: Calculated with population data from *Statistik Indonesia*, and GDP data from *Pendapatan Regional Propinsi-Propinsi di Indonesia, 1971-1977*. (Jakarta: BPS, 1980), *Pendapatan Regional Propinsi-Propinsi di Indonesia menurut Lapangan Usaha, 1983-1990*. (Jakarta: BPS, 1992), *Produk Domestik Regional Bruto Propinsi-Propinsi di Indonesia menurut Lapangan Usaha, 1993-1997*. (Jakarta: BPS, 1998).