

Indonesia in Comparative Perspective

INDONESIA'S RESOURCES BOOM IN INTERNATIONAL PERSPECTIVE: POLICY DILEMMAS AND OPTIONS FOR CONTINUED STRONG GROWTH

Ross Garnaut*

The University of Melbourne

In the decade to 2011, developments in the Chinese economy gave the world its biggest ever resources boom and set the scene for a resources deflation. The boom generated high incomes and investment in global resources, especially coal. It boosted Indonesian growth and diverted the policy focus from the productivity-raising reforms that are necessary for broad-based growth. Arbitrary interventions reduced the gains from the boom, especially in commodities other than coal, but also diminished the size of the boom and therefore the economic adjustment challenge that faces Indonesia now. Indonesia handled the Dutch disease and related challenges better than some countries and worse than others. Australia and Indonesia are now the world's largest coal exporters, so this comparison receives attention here. The end of the boom can create opportunities for a return to broad-based development, so long as policy settings are favourable to productivity growth and improved economy-wide competitiveness. The fuel-subsidy reforms are a good start.

Keywords: *resource economics, macroeconomic policy, energy*

JEL classification: P28, Q33, Q38, Q54

INTRODUCTION

The first decade of Indonesian democracy largely coincided with an extraordinarily powerful global resources boom. Indonesian participation in the boom was helpful to growth in average incomes, after a difficult climb out of the 1997–98 Asian financial crisis. It also encouraged the emergence of economic structures and policies (and features of the new democracy's political culture) that made sustainable and equitable growth more difficult. With the resources boom having retreated since 2011, Indonesia faces major challenges—but it also has the chance

* I am grateful for a great deal of support from members of the ANU Indonesia Project, especially Chris Manning, Budy Resosudarmo, and Pierre van der Eng, in the preparation of this article. I am also grateful to Mohamad Ikhsan and Sandiagio Uno, my discussants at the Sadli Lecture in Jakarta, for helpful suggestions; to Sui-Lay Tan and Derek Cheng for assistance with data; and to Veronica Webster for help at all stages.

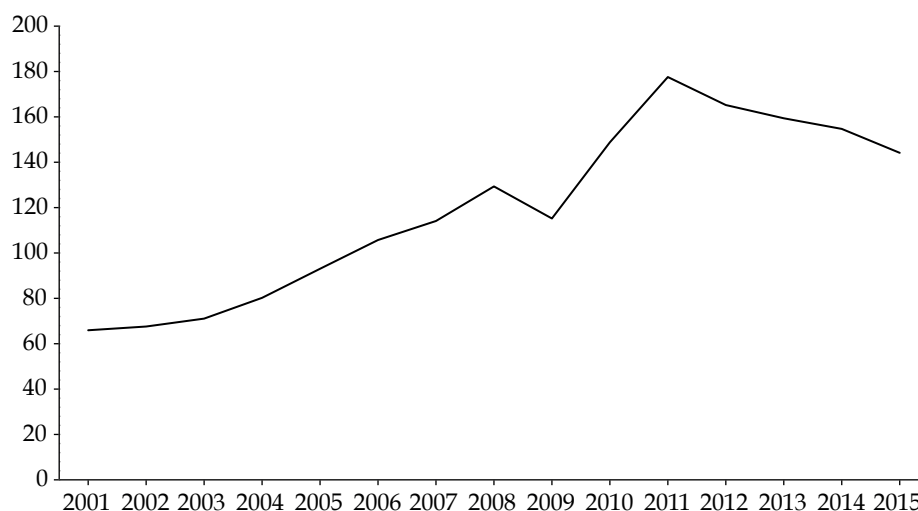
to resolve some long-standing problems of policy and development. These circumstances greeted President Joko Widodo (popularly known as Jokowi) on his inauguration in October 2014.

In the eight years after 2003, global prices, in real terms, for most energy and metals commodities and for some agricultural commodities rose to their highest levels ever. The boom was caused by exceptionally strong resource-intensive growth in China. It continued, with only a brief interruption during the 2008 global financial crisis, until 2011, when Chinese economic development began to show the influence of a new model of economic growth (Garnaut, Cai, and Song 2013). Up to that point, most resource-exporting countries experienced high terms of trade and strong growth in investment in expanding exports of resource-intensive goods. Incomes (and sometimes output) increased even more rapidly. Most resource-exporting countries spent much of this increased income as it arrived, causing export- and import-competing industries beyond resources to experience slower growth or to decline.

Indonesia's endowment of natural resources relative to population and capital stock falls between the low levels of Northeast Asia and the high levels of much of the developing world. Although Indonesia is not one of the world's most resource-intensive economies, its development has been strongly influenced by the global resources boom. Like all but a few countries, in the early period of its modern economic development Indonesia specialised strongly in exports of resource-intensive commodities; petroleum, for example, was the mainstay of early export growth under Soeharto's New Order government, from 1966, reinforced by the oil-price increases of the mid- and late-1970s (Hill 2000). While corruption reduced to some extent the amount of petroleum revenue available for public purposes, the balance nevertheless supported broad-based development through the public provision of education, health, and agricultural services and income support, and through the subsidised provision of agricultural inputs. Metallic minerals and timber also made substantial contributions during the 1970s (Manning 1971).

This all changed with the collapse of global oil prices in the mid-1980s. After the withdrawal of opportunities for economic growth based mainly on petroleum exports, Indonesia embarked successfully on reform to promote internationally oriented industrialisation of the kind that had underpinned development elsewhere in East Asia. For more than a decade, Indonesia's industrialisation supported sustained growth in economic output of 6%–7% per year and higher. The benefits were widely distributed through the growth in demand for labour and the associated increases in employment and wages, supported by considerable public expenditure directed at improving rural services. Yet the political and economic foundations of this rapid, broad-based growth were destroyed by the 1997–98 Asian financial crisis: Indonesia's total output fell by 13% in 1998 and the gains of the preceding decade in reducing poverty were partially unwound.

Indonesian governments elected in the aftermath of the financial crisis faced an immense economic policy challenge. It was a great achievement of President Susilo Bambang Yudhoyono's in his first term (2004–9) to demonstrate that it was possible to use economic policy to secure stable growth in democratic Indonesia. His economic team was working towards this end when the global resources boom offered new opportunities for resource-intensive growth; in response, Indonesia partially reverted to specialising in exports of resource-intensive commodities.

FIGURE 1 *Real Value of Indonesian Goods Exports, 2001–15 (\$ billion)*

Source: CEIC Indonesia Premium Database. Deflated using the unit value of US exports, from the IMF's International Financial Statistics.

Note: 2007 prices. Data for 2015 comprise an annual average based on values from January to April 2015.

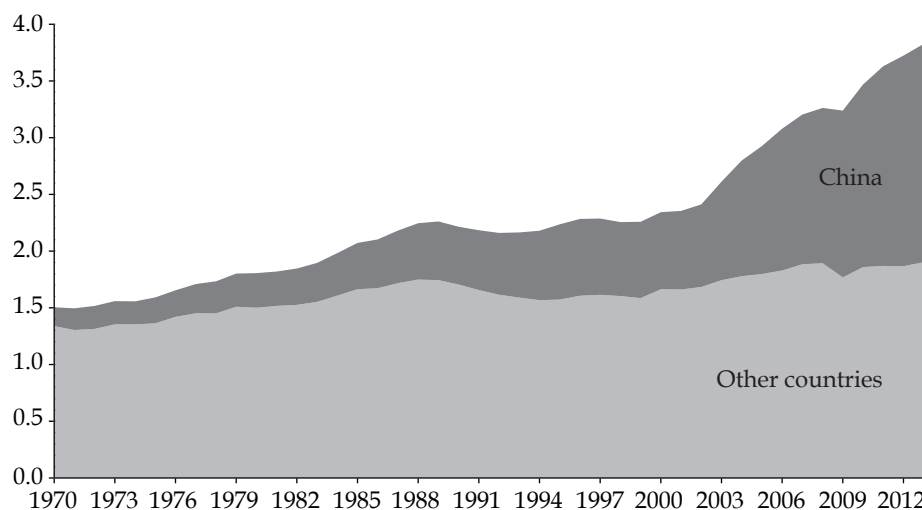
Indonesian exports in inflation-adjusted US dollars more than doubled in value between 2003 and 2011 (figure 1) and the share of commodities in total exports rose from 52% to 68% (World Bank 2015, box 2). Indonesian average incomes grew strongly for a while, without a sustained focus on policies supporting economic growth. It seems that because of these events, economic policy was more heavily compromised by pressures from vested and populist interests in Yudhoyono's second term (2009–14) than in his first.

The challenges facing Indonesia now, after the resources boom, are in important ways similar to those that followed the fall in petroleum prices in the mid-1980s; for one, the boom encouraged economic interventions that damaged efficiency in resource allocation and prospects for long-term growth. So was the boom a blessing or a curse or both? Indonesia now has the opportunity to enter a new era of broad-based development, but only by implementing far-reaching reform. Business as usual would thwart the Jokowi government's hopes of accelerating growth, and create difficulties even in maintaining the rates of growth of recent years.

THE CHINA RESOURCES BOOM

During 2000–2011, China experienced economic growth that was faster over any comparable period and more resource-intensive than the world had ever seen. This growth underwrote extraordinary increases in global demand for almost all commodities. The effects were greatest on energy and metals commodities, which the Chinese pattern of development required in unprecedented amounts. From 2003 until the onset of the 2008 crisis (the effects of which extended into 2009), exceptionally rapid economic growth in China was accompanied by strong growth in demand outside China—in developed and developing countries

FIGURE 2 *Coal Consumption, China and Other Countries, 1970–2013*
(billion tonnes of oil equivalent)



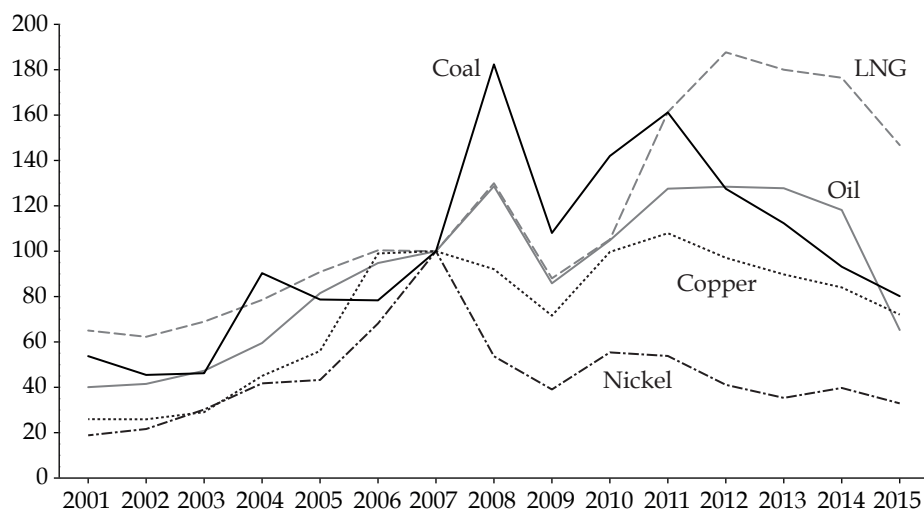
Source: Data from BP (2014).

alike. Even after the crisis hit, China's response of immense fiscal and monetary expansion returned the world to strong growth in demand from late 2009. China accounted for virtually all of the increase in global demand for energy and metals commodities; the global resources boom was a China boom (Garnaut 2012, 2014).

For coal, the commodity that turned out to be the most important in Indonesia's participation in the boom, China accounted for most of the increase in global demand from the late 1980s to 2013, including nearly all of the more rapid growth in demand since 2000 (figure 2). Fairly rapid rates of growth in demand in some other developing countries, including Indonesia and India, were from a much lower base and were offset more or less completely by declines in demand in developed countries.

Chinese economic growth decelerated moderately after 2011. More importantly for the global resources boom, China came to use much less energy – especially from coal and metals – per unit of economic output. A growing scarcity of labour and rapidly rising wage rates for unskilled workers in coastal cities from 2005 were early signs that the old pattern of economic growth was under pressure (Garnaut 2010). Public discussions of economic policy from about this time saw increasing recognition that the old model of growth was generating increasingly unacceptable levels of income inequality and pressure on the local and global natural environment (Huang et al. 2013).

The 2008 crisis eased for a while the pressures for a new model of economic growth, but these pressures re-emerged when strong growth resumed in China late in 2009. China's 12th Five-Year Plan (2011–15) became the overarching instrument for embodying policy objectives. From 2012, the plan's effect on demand for energy and metals commodities was apparent in the statistics on economic performance. The investment share of GDP stalled and began to fall. The standard measures of inequality also began to fall, after having risen since the mid-1980s

FIGURE 3 *Global Commodity Prices, 2001–15 (2007 = 100)*

Source: Monthly data from IMF Primary Commodity Prices. Deflated using the unit value of US exports, from the IMF's International Financial Statistics.

Note: Data for 2015 comprise an annual average based on values from January to April 2015. LNG = liquefied natural gas.

(Wang and Zhou 2014). Many fiscal and regulatory interventions encouraged greater efficiency in the use of energy and the substitution of all alternatives for coal in electricity generation. The publication in 2013 of a major study by the US and Chinese national academies of sciences showing that life expectancy was markedly lower in Chinese regions of intensive coal use intensified pressure to switch away from coal (Chen et al. 2013). After more than a decade of double-digit increases, the growth in the amount of thermal coal used in Chinese power plants slumped to only a few percent in 2012 and 2013 and turned negative in 2014 (Green and Stern 2015).

The shift of emphasis from investment to consumption within the new Chinese model of development means that moderately slower growth has much less effect on agricultural products and services than on energy and metals demand. Total Chinese expenditure growth will settle a few percentage points below the giddy heights of 2000–2011, but the share of consumption will rise. China will be a source of continuing strong increases in demand for high-value foodstuffs and services.

THE BOOM'S EFFECT ON GLOBAL PRICES

The strong growth in global demand led by China until 2008 – and dominated by China since – caused global prices for energy and metals to rise rapidly during 2003–11, with a brief interlude in the immediate aftermath of the global financial crisis. The pattern was similar across all energy and metals commodities and in most agricultural raw materials: persistent large increases to 2011, broken by a dip in 2009, with a substantial fall from 2011 that continues today (figure 3). Prices for nickel and coal never regained the heights reached immediately before the crisis.

Prices of oil, gas, and copper rose to all-time peaks in 2011 or 2012, before settling into declines that continued into 2015.

The acceleration of demand in the early 2000s took suppliers of resource-based commodities by surprise, leading to the shortfalls in supply that drove the increases in prices. Higher prices eventually encouraged investment that expanded the global supply of commodities. The global supply of agricultural commodities produced from annual crops (for example, maize, soybeans, and sugar) increased quickly, so that there was some moderation of prices after a year or two. It took longer to increase the supply of commodities produced from perennial trees (for example, palm oil and rubber). For agricultural oils, the expansion of annual crops of soybeans and maize affected prices for substitutes produced from tree crops, notably palm oil.

It took longer still – up to a decade – for supplies of metallic minerals and fossil energy to respond strongly to higher prices. It generally takes time for mining companies to recognise that market conditions have changed for long enough to justify investment, to plan new supply capacity, and to build facilities to expand production (Radetzki 1980). From 2011 onwards there were immense increases in the amount of oil, coal, and many metals coming onto world markets. The acceleration in growth in supply coincided with the end of the rapid growth in Chinese demand. The result was rapidly falling prices, in a massive commodity-market adjustment.

INDONESIA'S SUPPLY RESPONSE

Indonesia participated in the global supply response for only a few commodities, notably coal and palm oil. Nickel production also increased strongly, until restrictions on exports of unprocessed ore precipitated a rapid decline. Domestic policies and institutions inhibited expansion of output in other commodities.

For coal, laws requiring foreign enterprises to divest the majority of their equity to local parties – laws that came into effect prior to the boom – led to Indonesian enterprises quickly becoming deeply engaged in production for export. The Indonesian constitution (like those of most countries, including Australia) assigns ownership of natural resources to the state (Gandataruna and Haymon 2011). Large Indonesian businesses were built around the state's assignment of mining rights to leading military, business, and political figures – at a time when those rights were rapidly increasing in value, and with minimal payments to the state (reflecting the value being transferred to private interests). The supply response was especially rapid for coal, because production did not make heavy demands on complex mining and processing technology. The expansion of coal production was also supported by the provision of capital at low cost through arrangements with Chinese or Indian purchasers of the product.

Indonesia's main coal entrepreneurs became central players in the political economy of the new Indonesian democracy. They funded and played leading roles in political parties and were well placed to protect their new ventures from unfavourable changes in policy. This development hindered effective regulation and taxation of the mining industry in the Indonesian public interest.

Apprehension that the possession of mining rights on favourable terms depended on official decisions that might turn with the political wheel encouraged

the rapid development and depletion of known coal resources. It also discouraged long-term investment in exploration, mine development, and environmental management.¹ The rapid expansion of production from known coal resources was encouraged by the entry of small-scale, informal miners, who increased in numbers during the global financial crisis. From 2003, high prices made small-scale production highly profitable.

Although the national government had sovereign powers over mineral leasing (and although all mineral deposits known to have substantial value were subject to mining rights allocated from Jakarta), it decided to delegate its powers to local governments. This decision was taken and partially implemented in the early 2000s but not given full legislative effect until 2009 (World Bank 2015), when the centralised system of contract-based concessions was replaced by licence-based mining administered locally. Something of a free-for-all ensued, with provincial and district governments allocating rights to new, smaller players – often rights over mineral deposits that had already been allocated by the national government to large corporations (Spiegel 2012). The World Bank (2015, 41) estimates that the market share of smaller producers of coal increased from 26% in 2005 to 37% in 2012, when a moratorium was placed on new licences.

Regardless of whether smallholder mining is illegal or the subject of a conflict of jurisdiction, the weakness of property rights has accelerated the depletion of known coal deposits. If production is profitable now, no one – not even the large enterprises – has much interest in holding production over to tomorrow simply because it is expected to be more profitable then. The weakness of title and the conflict between regulatory powers in different levels of government unambiguously discourage exploration and long-term investment to expand production later. They also discourage forward-looking expenditure on training and safety and on the management of the environmental consequences of mining.

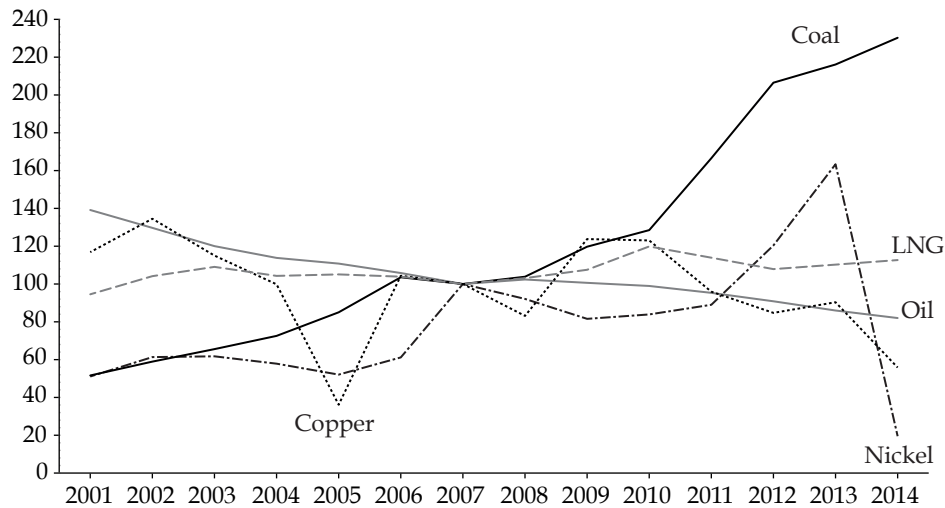
Small-scale mining is also important for gold in alluvial and other easily extracted forms. It has a much smaller presence where more sophisticated technology in exploration, mining and processing is required. In such commodities, the expertise of large foreign enterprises is necessary for substantial resource development. Technological complexity excludes most of the non-ferrous metals, and usually petroleum. The exception for petroleum is near Bojonegoro, in East Java, where small-scale miners using inexpensive, makeshift equipment have reopened old abandoned fields.

Foreign enterprises have been required since 1967 to divest equity in resources projects upon completion of the initial contract of work. Since the turn of the century, foreign investors in coal projects have been required to divest a majority of the equity upon issue of a contract of work. New direct investment in the exploration and development of petroleum and non-ferrous metal ores by large foreign enterprises has shrunk to low levels.

While oil and gas production is technologically complex, long experience has helped the state-owned company Pertamina to establish commercial access to the intellectual property of major multinational companies. The old and

1. On the collapse in oil and gas exploration expenditure after 1998, see the World Bank's (2015, figure 45) report.

FIGURE 4 Commodity Production, Indonesia, 2001–14 (2007 = 100)



Source: Datastream.

Note: LNG = liquefied natural gas.

well-developed ‘production-sharing agreement’ has proven to be a workable instrument for foreign investors to recoup outlays with an acceptable return on investment while the state takes a high proportion of mineral rent (Emerson, Garnaut, and Clunies Ross 1984). Nevertheless, unusually among the world’s large producers of oil and gas, Indonesia had no substantial increase in gas production and a large fall in oil production through the period of extraordinarily high petroleum prices (figure 4). Indonesia’s resource base would have supported a substantial increase in gas and probably oil production with less restricted access to international expertise and capital.

For non-ferrous metals, the conflict between national, provincial, and local government jurisdictions, the weak administration of provincial and local government leasing powers, the requirements for divestment of majority ownership by foreign enterprises, and the local-processing requirements that came into effect at the beginning of 2014 have caused production to fall in established mines and have stopped investment in large-scale exploration and in mine construction. Production of nickel and copper fell sharply in 2014 (figure 4). These barriers to development have been large enough to cause the potential investment and production effects of the resources boom beyond coal and agriculture mostly to pass Indonesia by.

Coal has been different. Coal exports from Indonesia grew more rapidly than from any other major producer and by a larger quantity than from any other country, with Indonesia overtaking Australia as the world’s largest exporter of thermal coal during the boom. The greatest supply response in Australia and Indonesia took place after 2010, when Chinese demand growth decelerated and then went into reverse. Yet much of the coal production in Indonesia and Australia (and China) – and a high proportion of new production capacity installed from 2011 – was not profitable at the prices of early 2015. Producers everywhere are seeking

BOX 1 *Informal Mining in South Sumatra and South Kalimantan*

In October 2014, I was part of a group that visited a number of mining sites in Indonesia. On one national mining lease, in South Sumatra, a state-owned company, PT Bukit Assam, was extracting about 15 million tonnes of coal per year. The company's senior managers estimated that small-scale miners had been extracting almost that amount at the peak of the coal boom but that lower prices from 2012 had caused them to pull back to about half the volume of large-scale production. In South Kalimantan, on a property leased from the national government by a private company, PT Arutmin, small-scale operators were extracting an estimated 6–7 million tonnes per year, alongside the 23 million tonnes extracted by the large-scale miner.

In South Sumatra, small-scale mining is undertaken with mechanical shovels. It involves scraping off overburden to obtain access to the coal seam in places where it is not far below the surface, and then extracting coal. Many hands place the coal in plastic bags of sugar-bag size, each holding 20 kilograms or so. Motorcyclists collect the bags and take them on minor roads to roads large enough to take 10-tonne trucks. Thousands of these trucks—we estimated that 4,000 were on the road at the same time between the mine and Palembang during our visit—carry the bags to collection points in Palembang, where their contents are aggregated and transported by barge to coal users in Java.

Small-scale mining reduces the potential value of the main lease, as it removes high-grade and easily accessible (and therefore more valuable) material, and increases the unit cost of mining the remainder of the deposit. It transfers a large amount of value from the owners of the large mine to the small miners, their suppliers and organisers, and the people in government who facilitate mining and trade. There is often legal ambiguity. While the large companies have prior claims deriving from national government leases, the small-scale producers sometimes have licences allocated through apparently valid exercises of powers delegated to local authorities.

We asked the managers of the large mine in South Sumatra what they thought about the informal activity and what they could do about it. They reported that there was little recognition anywhere in government that there was a problem. The managers noted that when small miners were asked about the possible illegality of their activities, they would declare that Allah has given Indonesia these natural riches and would want them to be shared equitably.

to lower costs; coal prices will continue to fall until global supply has decreased enough to meet lower demand. Producers everywhere are hoping that they can hold on long enough for the downward adjustment of supply capacity to be borne by others. The result is likely to be a long period of low prices and the slow attrition of supply capacity.

In October 2014, miners in South Sumatra and South Kalimantan spoke of small-scale production having been significantly larger in 2010, 2011, and 2012, when prices were higher than in early 2015 (box 1). Attrition among large-scale producers with their proportionately higher fixed costs is more difficult. In Australia, 'take or pay' provisions for transport increase fixed costs and encourage continued production.

Rupiah depreciation has helped to lower costs and hold up the Indonesian share of global supply. Here the question is how far Indonesian costs can fall relative to those in Australia and China. Australia, too, is experiencing a falling real

exchange rate and producers are under great pressure to reduce costs after the boom. The much larger Chinese production is battling a rising real exchange rate, and producers have to accept a large share of the decline in global capacity unless they are favoured by local protective measures.

Coal producers worldwide are hoping that growth in demand from India and Southeast Asia will ease adjustment in the exporting countries. Indian imports contributed to the coal boom. India has substantial coal reserves and backlogs of excess demand for power, but poor capacity to expand domestic coal and electricity output. Importing coal has been a quick path to easing one of these bottlenecks, often involving financing by Indian enterprises in Australia and Indonesia. Indian enterprises have suffered losses on their overseas investments in coal since 2011. Rupee depreciation since mid-2013 has meant that import prices have fallen less than prices on global markets. The Modi government, elected in 2014, has made strong commitments to reduce bottlenecks in domestic coal supply and has elevated the priority of renewable energy to supply power to rural communities in particular. In November 2014, India's energy minister announced that Indian coal imports would fall to zero within a few years.

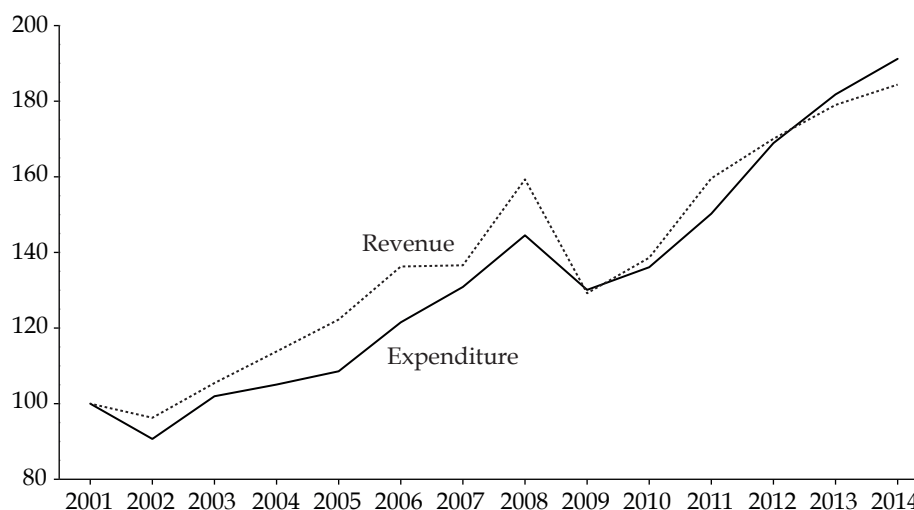
Indonesian coal demand is likely to grow strongly, giving rise to the climate-change policy dilemmas discussed later in this article. Indonesian exporters are better placed to supply other parts of Southeast Asia than are their competitors in Australia and Africa, so may increase their shares of the Southeast Asian import markets that may grow for some time. The extraordinary resources boom has run its course, but it will be a while before global markets for energy and metals find a new balance.

MACROECONOMIC IMPACT

The resources boom influenced the Indonesian economy first of all through the increase in prices of established exports and in the terms of trade. The World Bank (2015, 42) estimates that the terms of trade increased by 74% from 2002 to 2013. Investment in the resources sector contributed several percentage points to GDP growth at and immediately after the height of the resources boom (2010–12), but fell away after that (BI 2015, tables V.36, V.40, and VII.3).

After a lag, export volumes rose. Figure 1 captures relative price and volume effects, with the total value of Indonesian goods exports falling considerably from 2011 onwards. The fall in export revenues and business investment together had a powerful contractionary effect on GDP after 2012. The contractionary effect on incomes was larger. Figure 1 also shows that higher export incomes from prices and volumes directly lifted domestic incomes by about \$100 billion (in 2007 prices) in total between 2003 and 2011, roughly equivalent to an eighth of national income. Increased resources investment added more. Much of the increased income accrued to private parties, which spent all of it and more on consumption and investment. Higher government revenue was spent mostly as it arrived, so total government expenditure rose (figure 5) – although government debt as a share of GDP fell gradually until export prices started to fall in 2011. The increased domestic expenditure was the main cause of a large appreciation of the real exchange rate. Real appreciation can occur through a rise in the nominal exchange rate or through higher inflation than in other countries. Indonesian

FIGURE 5 *Real Government Revenue and Expenditure, Indonesia, 2001–14*
(2001 = 100)



Source: Data from Euromonitor International.

Note: 2007 prices. Deflated using GDP data from the Economist Intelligence Unit database.

monetary policy throughout the boom was sufficiently accommodating for the real appreciation to manifest more as the latter.

The contribution of Indonesia's persistently high inflation to real-exchange-rate appreciation is of critical importance to the adjustment required to maintain growth after the resources boom. A substantial nominal depreciation against the US dollar since 2011, mainly in 2013, has been offset to a considerable extent by nominal appreciation against some third currencies and by higher Indonesian inflation. A much larger nominal depreciation, supported by the moderation of inflation differentials, is required if competitiveness is to be restored. The restoration of competitiveness, in turn, is a condition for maintaining reasonably strong economic growth without running the risk of an external financing crisis.

The real appreciation of the rupiah during the resources boom discouraged investment and production in other tradables industries. The share of manufactured and agricultural exports fell markedly. The net effect was that the years of the boom saw a moderate acceleration of overall growth in output to just over 6% per year from the low levels immediately after the 1997–98 Asian financial crisis. As the resources boom began to recede, in 2011, real export growth and business investment went into decline and output growth decelerated moderately. Declining export prices affected nominal income more than GDP, and this fed back into lower output growth through pressure on private consumption and the budget. The decline in the real purchasing power of resource exports has further to run and is unlikely to be balanced by increased exports of other kinds without a large increase in competitiveness. The value of manufactured and agricultural exports and of resource exports actually fell in 2012 and 2013.

What we have seen in Indonesia since 2000 is the standard economic response to large increases in prices and volumes in booming export industries. The

expansion of a booming sector leads to real appreciation of the exchange rate and the decline of other tradables industries, and to adjustment problems after the boom recedes (Corden and Neary 1982). Many studies explore the effects for particular countries (for example, Chowdhury 2004 for Indonesia, Nigeria, and Papua New Guinea; Garnaut 2013 for Australia).

In Indonesia, the effect of the resources boom was not as large as it would have been if uncertainties about property rights, barriers to foreign direct investment, and the new requirements for local metals processing had not discouraged investment in (and the export of) petroleum and metals. Regulatory interventions that reduce production and investment, however, are highly inefficient ways of moderating a boom and stabilising an economy. Better to run regulatory and taxation policies that maximise economic value and to support them with countercyclical budget surpluses during the boom, which would allow higher levels of public expenditure in productivity-raising activities after the boom.

More effective mechanisms for taxing resource rents and for saving the increased revenue until after the boom would have had a larger stabilisation effect at a lower cost. The ideal of mineral rent taxation is to collect a high proportion of value in excess of the level necessary to attract investment, without deterring marginal investments (Garnaut and Clunies Ross 1983; Emerson, Garnaut, and Clunies Ross 1984). Outside petroleum, Indonesia's mineral leasing and taxation policies are poorly designed for collecting the economic value of resources made available for development (Van der Eng 2015). Worse—in the coal sector, at least—the legal obligations to pay taxation and leasing charges are avoided to an extent that has macroeconomic consequences (World Bank 2015).

What would effective stabilisation policies during the boom have looked like? Ideal stabilisation policy has two elements. One is to minimise the temporary contraction of non-resource industries, a contraction that will have to be reversed after the boom. The other is to prevent real expenditure and incomes from rising so high during the boom that they later have to be reduced—since adjustment to lower real incomes or even to markedly lower growth in incomes reduces welfare and generates political tension. The ideal outcome would have required substantially larger budget surpluses at the height of the boom, and even larger budget surpluses if more effective mineral rent taxation regimes had been in place. These surpluses would then have been available to support economic growth after the boom, through public investment in infrastructure and other productivity-raising activities.

During a resources boom, it is difficult for policymakers to judge whether higher commodity prices and the income and revenue that come with them are permanent—allowing increases in expenditure and costs on a sustainable basis—or temporary. Historical experience urges caution: large increases in commodity prices have always been temporary. It is always tempting to think that this time is different. However, the economic cost and political difficulty of having to reverse a large real appreciation that turns out to be temporary are much greater than the cost and difficulty of unnecessarily delaying the expenditure of large new revenues from the resources sector. It is always sound policy to be cautious, and to plan on the reversal of increases in the terms of trade until circumstances have proven that this time really is different.

Now, after the boom, Indonesia must manage a tendency for budget deficits to drift beyond prudent limits, while maintaining public expenditure on activities

that are crucial to a new pattern of growth. A good start has been made on the budget challenge with Jokowi's decisive early action on fuel subsidies. But that is only a start. Three developments are required now if Indonesia is to move to a new growth strategy built on non-resource exports: continued discipline in budget policy in support of higher levels of productivity-raising public expenditure, including in infrastructure; large real depreciation; and the removal of policy interventions (some of which are in the resources sector) that are reducing economic efficiency and investment for no good reason.

Some circumstances in the domestic and international macroeconomic environment are favourable to these developments. The tightening of US monetary policy from 2013 has supported depreciation against the US dollar, reinforced by China's real appreciation within the new model of economic growth. China's real appreciation has opened up new opportunities in global markets for labour-intensive manufacturing and in China itself for high-value consumer goods and services.

However, the currencies of many other countries are tending to weaken against the US dollar and the yuan by as much as or more than as the rupiah, making the overall depreciation of the rupiah much less impressive. Of special importance is the depreciation of the currencies of Indonesia's main competitors in global markets, both for the old commodity exports and for the manufactures and high-value agricultural products and services that must become the new locus of export expansion. Since 2011, when the resources boom began to recede, Indonesia's competitiveness has gone backwards against its competitors in exports of resources, manufactures, agricultural products, and services.

Nominal depreciation can be facilitated by running a combination of tighter budgets and easier monetary policy. Nominal depreciation can be converted into real depreciation only if domestic costs are insulated from the price-increasing effects of depreciation itself. Tighter fiscal policy allows lower interest rates without increasing inflation.

The political culture after the resources boom has not been conducive to either restraining regulated wages or confronting the widespread monopoly and protection that support the passing through of rising import costs from currency depreciation. Clear recognition of the need for reform is going to be necessary for success, combined with effective leadership and with strong support for good policy from independent participants in the policy discussion.

How much real depreciation is required? Incentives for investment in the tradable goods and services industries will have to be high for a while to dispel pessimism about manufactured export prospects after a long period of sluggish growth and decline. A return towards the competitiveness levels of the early years of the boom (2002–5) may turn out to be necessary. A full return would involve an increase in international prices relative to purely domestic prices of around half from their level in 2014. Early real depreciation would be smaller than that. Assessments of the investment and export responses to more limited early real depreciation would form the basis of judgements about how much more is necessary.

STRUCTURAL CHANGE AND THE RESOURCES BOOM: THE NEED FOR REFORM

The economic structure that emerged between 2000 and 2011 is in several ways inimical to strong growth after the boom. I do not have comprehensive data on

total factor productivity for the years covering the whole of the boom to compare with the years that went before, but three quantitative analyses of the early years of the boom come to a broadly similar conclusion: total factor productivity growth was moderately strong throughout the first seven or eight years of the century, both by historical standards and in comparison with other Asian economies (Van der Eng 2010; APO 2011; Alisjahbana 2009). Preliminary estimates suggest that a similar trend continued through to 2013 (Van der Eng, pers. comm., Apr. 2015). However, growth in labour productivity, a partial measure, slumped across all sectors in Indonesia between the early (2003–5) and late (2011–12) years of the boom. Labour productivity growth in manufacturing fell from around 6% per year to near zero over this time. Azis (2015) recently presented data indicating that Indonesian total factor productivity in 2011 remained below the levels of the mid-1990s, with a slower recovery from the Asian financial crisis than in other ASEAN countries.

High prices and expectations that these would continue led to wasteful overinvestment in coal, with investments being made late in the boom that are unlikely to return the cost of capital. The resources boom encouraged large increases in minimum wages and other labour-market interventions (Manning and Miranti 2015). The stronger real exchange rate increased pressure to raise protection of various kinds against import competition (Aswicahyono, Bird, and Hill 2009). The boom encouraged investment-inhibiting interventions in the resources sector. And it provided the context for vested interests to play a larger role in policy-making at a formative time for Indonesian democracy.

The announcement in the early 2000s of mandatory requirements to process non-ferrous mineral resources into metals in Indonesia contributed to the low levels of investment in expanding capacity during the resources boom. Law 4/2009 on Mineral and Coal Mining legislated the requirements with effect from 2014, sharply reducing the output of established bauxite, nickel, and copper mines. The new rules led to a stand-off between multinational mining companies with operations in Indonesia. (This stand-off has since been slowly resolved through negotiations.) The overall effect of these requirements has been to diminish the extent of the resources boom and to reinforce the downturn in the growth of national business investment after 2012.

Forcing domestic processing can lead to higher investment, but it dissipates economic value. For highly profitable projects, such as the Freeport McMoRan and Newmont copper and gold mines in eastern Indonesia, the requirements have transformed untaxed mineral rents into subsidies for domestic processing. For projects that are closer to the margin of profitability – of which there are many, following the decline in world prices since 2011 – the effect has been to reduce investment, output, and economic value. The increased investment in and output of manufacturing itself are welcome during the adjustment after the boom. The real depreciation and domestic reforms that are part of Indonesia's adjustment are reducing the costs of the domestic processing requirements. But it is unlikely that the increased investment from now on will outweigh the mining value foregone as a result of the processing requirements.

Any economic case for requiring local processing depends on the absence of effective mechanisms to tax mineral rents. Where there are large untaxed rents, investors – most of whom, in the metal-mining industries, are foreign – carry the

cost of the reduction in economic value that accompanies mandatory domestic processing. Economic analysis has established that it is better from a national point of view to allow the economically efficient use of a resource and to tax mineral rents efficiently than to force domestic processing where investors do not think that there is a commercial case for doing so (Garnaut and Clunies Ross 1983).

The requirements for local processing in Indonesia have been negotiated with the largest established producers of non-ferrous metals. The loss of economic value associated with the local processing requirements for these producers' projects is now largely water under the bridge. To the extent that there is an indelible commitment to local processing, it would be more efficient to collect mineral rent as taxation and to allocate part of it to the development of infrastructure that would lower the cost of manufacturing activity, including minerals processing, at favourable locations.

Energy subsidies, which have been a major budgetary problem in Indonesia for a long time, rose with global oil prices during the boom. Until late in 2014, subsidies for domestic fuel users were set at whatever level was necessary to support a fixed domestic price, while subsidies for electricity were influenced by global energy prices (among other factors). Some subsidy reductions against an automatically rising tendency were achieved on occasion, but with a huge diversion of economic policy effort and, until late 2014, with little long-term impact on the problem. The fall in global oil prices in 2014 and early 2015 established a congenial environment for a new president to deal with the problem in more permanent ways (World Bank 2015).

Under long-standing arrangements, Indonesia's commitment to fixed prices for petroleum products was a treadmill. Indonesia habitually runs inflation at rates above those of its major trading partners and competitors, so it requires currency depreciation from time to time. Its macroeconomic adjustment after the resources boom is going to require a substantial currency depreciation, giving the treadmill a considerable upward slope. The slope was reversed as petroleum prices on world markets fell in the second half of 2014 and the first quarter of 2015, but this would have been a temporary respite.

By 2005, subsidies absorbed 3.8% of GDP and 20.5% of government expenditure. Discretionary increases in controlled prices reduced the percentages for a while, but on the eve of the 2008 crisis the cost of subsidies rose to 4.5% of GDP and 22.6% of government expenditure. Politically painful reductions in prices again hauled in the subsidies for a while, but they drifted back out to around 3.5% of GDP and 19.7% of the budget in 2011. The effects of falling international prices after the peak of the boom were offset significantly by rupiah depreciation.

The big fall in global fossil-fuel prices from mid-2014 created an opportunity to reduce prices decisively and to remove the fixed-price treadmill. In the months after his inauguration in October 2014, Jokowi announced the abolition of the petrol subsidy and the restructuring of the diesel subsidy so that it was a fixed amount per unit of fuel. There is provision for the prices of both petrol and diesel to fluctuate with international prices, which is the subject of current debate.

The reform of fuel subsidies is a major step towards the budget adjustment required if Indonesia is to maintain momentum in development after the resources boom. It frees budgetary resources for investment in development infrastructure and services. It frees leadership resources from the treadmill of periodic

adjustments in energy prices, for the immense task of economic reform that lies ahead. And it greatly reduces an artificial encouragement of greater petroleum use that has had unfortunate effects on energy efficiency and Indonesia's contribution to the global effort to mitigate climate change.

The size of the electricity subsidy has typically been about one-quarter to one-fifth of total energy subsidies. The lower costs of electricity generation associated with the fall in global prices for fossil fuels provide an opportunity to reduce the quantitative importance of this subsidy and to change its form.

Indonesia has played a leading and respected role in international discussions of climate-change mitigation, especially since President Yudhoyono's hosting of the 2007 meeting in Bali of the United Nations Framework Convention on Climate Change (UNFCCC). Indonesia has made specific commitments to the UNFCCC to reduce its emissions. At the UNFCCC meeting in Cancun in 2008, it formally pledged to reduce emissions in 2020 by 26% below 'business as usual', or by 41% if it were given substantial international financial support.

While 'business as usual' is an elusive concept in relation to emissions, the rapid increase in Indonesian emissions since 2008 is impossible to reconcile with the pledge. The national electricity company, Perusahaan Listrik Negara (PLN) (2015, 7), expects most of the rapid increase in electricity supply over the next decade to come from coal. Much of this will be coal with low calorific content and high carbon-dioxide emissions per unit of electricity generated. Such coal has been unacceptable in Japan, South Korea, and Taiwan in this century and became unacceptable in China from 2011, when the country strengthened its environmental standards. It can be sold in India, but at a low price. The disproportionate use at home of low-quality coal intensifies the problem of reconciling development with climate-change objectives.

So far, Indonesia is one of only a few G20 countries that have yet to make noticeable progress on their UNFCCC commitments for 2020. The rapid growth in coal use for electricity generation is the single largest contributor to the divergence between reality and the pledge to the UN. This discordance between good intentions and weak outcomes has resulted partly from policy distortions that accumulated during the resources boom – the energy subsidies that discouraged both energy efficiency and the development of low-emissions alternatives – and partly from current local-processing requirements that artificially promote energy-intensive industries.

Even if it corrected these distortions, Indonesia – like all countries, but more acutely – would face dilemmas in reconciling the provision of energy for development with climate-change realities. Indonesia is more vulnerable than most countries to the effects of unmitigated climate change (Garnaut 2009), and indigenous coal resources are exceptionally abundant and cheap. The quickest, cheapest, and easiest way to make more electricity available to Indonesians in the most populous islands is to burn more Indonesian coal (which is now abundant, owing to years of over-investment during the boom). How, then, to reconcile rapidly growing demand for electricity, including meeting pent-up demand in locations that have not had access to an adequate electricity supply, with the need to make a fair contribution to the global mitigation effort?

The state-owned elements of the Indonesian energy industry are acutely aware of the dilemma. PLN has sought to reduce the greenhouse-gas output per unit

of electricity by offering higher prices for wholesale power produced with low-emissions technology. These higher 'feed-in tariffs' have been most important for geothermal and hydro-electric power. The feed-in tariffs are negotiated case by case when private entities express interest in investment. This discretionary process is associated with high uncertainty and therefore an unnecessarily high supply price of investment, with uneven incentives across alternative technologies and sometimes projects, and opportunities for political economy distortions in policy-making.

The policy challenge is to provide an optimal quantum of energy for development at the lowest possible cost, consistent with Indonesia contributing its fair share to global climate-change mitigation. In meeting the challenge, Indonesia has some opportunities to supply power from low-emissions sources at around – or even below – the cost of the centralised generation of coal. More efficient use of energy sometimes reduces greenhouse-gas emissions at no cost, and often with economic gain. The economic pricing of energy contributes to greater energy efficiency, and Indonesia's use of energy per unit of GDP is high by any standards. Many other countries have generated high returns simply by providing information to users on the efficient use of energy.

The costs of solar and wind power have fallen dramatically in the past half-dozen years as the global scale of deployment has increased. This has been greatest in relation to solar power, where the cost of photovoltaic panels made in China has fallen by around 80% since 2008. In some parts of Indonesia, the relatively small-scale decentralised generation of solar, wind, and hydro-electric power for local use is considerably less expensive than extending transmission and distribution networks to provide access to large centralised generators.

For the most part, the best places for the low-cost generation of geothermal and hydro-electric energy are located away from the main centres of power demand in Java. The costs of transmitting high-voltage, direct-current electricity have fallen considerably in recent years, justifying the systematic study of the costs and benefits of linking demand for low-cost, renewable generation in Sumatra and Kalimantan, and perhaps eventually in Papua, with demand in Java. Providing infrastructure to support energy-intensive minerals processing close to low-cost renewable energy sources, rather than in Java, is likely to improve the economics of such activity. To make good use of opportunities to reduce greenhouse-gas emissions at low and sometimes zero or negative cost requires policy innovation. To fail to keep up with other countries' efforts in reducing emissions is to risk high costs from catching up within compressed timetables in the future.

COMPARING THE EFFECTS OF THE RESOURCES BOOM

Many countries other than Indonesia experienced lifts and then declines in their real export values during the resources boom and its early aftermath. Australia, for instance, emerged from the boom as one of the world's two largest exporters of coal, alongside Indonesia, and is Indonesia's main competitor in the Chinese and other Asian markets.

Yet Australia's experience differed from Indonesia's for three main reasons. First, Indonesia's natural-resource endowment per capita is smaller, so its economy has a weaker tendency to specialise in exports of energy and metals. Second,

Australian export capacities are more complementary with Chinese import specialisation, with Chinese demand for steel-making raw materials meshing with Australian resources to an exceptional degree. Third, Indonesian institutional arrangements and policy discourage investment in and the production of all resources commodities except coal, whereas Australia uninhibitedly encourages expansion. These considerations amplified both the effects of the boom and the adjustment challenge of the boom's aftermath in Australia.

There was little systematic attempt to hold back income for use after the boom in either Australia or Indonesia; both countries spent most of the enhanced government revenues of the resources boom more or less as they came in. Government debt as a share of GDP in Australia and Indonesia fell steadily during the early years of the boom until the onset of the 2008 global financial crisis, despite considerable discretionary loosening of fiscal policy in Australia. Australia, but not Indonesia, engaged in a major and discretionary fiscal expansion to counteract the recessionary pressures of the crisis, and so experienced an increase in public debt as a proportion of GDP from 2009. The declines in the government debt share of GDP continued in Indonesia until export prices retreated from 2011.

Brazil and South Africa, two other resource-exporting countries, took their procyclical fiscal policy a step further: each country's debt as a share of GDP hardly fell in the early years of the boom and rose more strongly as the boom receded. Indonesia, Australia, Brazil, and South Africa can be contrasted with Norway and Chile. Norway used a sovereign wealth fund and Chile a stabilisation fund to save a high proportion of the lift in government revenues. Australia and Indonesia stood midway between the boom's big savers (Norway and Chile) and big spenders (Brazil and South Africa).

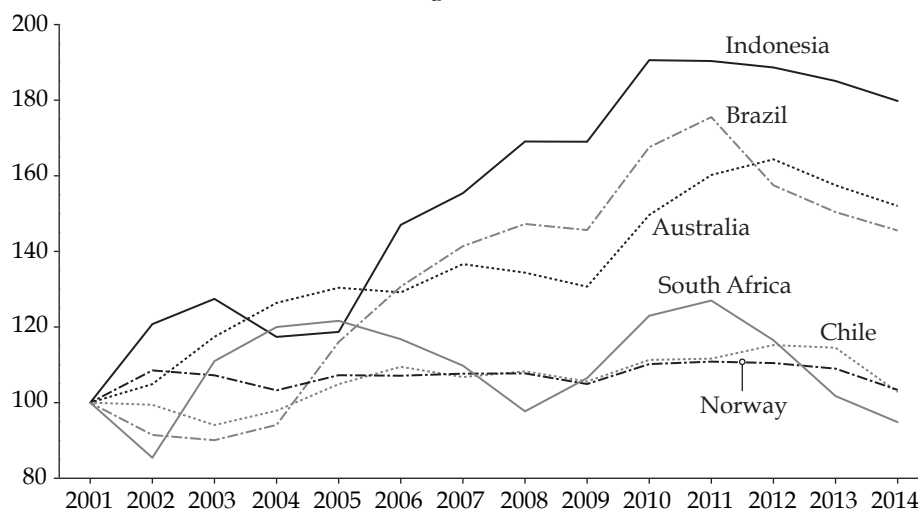
Spending the proceeds of higher terms of trade as they arrive puts upward pressure on the real exchange rate (figure 6). The general decline of international competitiveness helped end the growth in Indonesia's labour-intensive exports and send it into reverse in 2012 and 2013—a reversal that must be quickly corrected if strong growth is to be maintained. Restoring export growth outside the resource industries is a big challenge for Indonesia.

Australia has a well-designed resource rent tax for offshore petroleum, now extended to onshore gas. In other commodities, it shares with Indonesia weaknesses in taxing mineral rents. These weaknesses diminished the returns to the community of the increase in value of natural resources owned by the state, and accelerated their depletion. Nevertheless, the higher export prices generated much higher total government revenue in both countries through standard taxation and royalty mechanisms in the early years of the boom.

The mineral tax (as distinct from general income tax) regimes for most Australian resources are defined by state governments, which apply mainly ad valorem royalties. The main exceptions are onshore gas and offshore oil and gas, for which only a federal resource rent tax applies. Indonesian mineral taxation is applied by the national government mainly in the form of specific and ad valorem royalties for hard minerals and in effect profits-based taxes through production-sharing arrangements for petroleum. Indonesian revenues from coal, at least, have been curtailed by widespread under-reporting of production volumes, under-invoicing, and other evasion mechanisms (World Bank 2015, 44).

At the same time as Australian and Indonesian fiscal imposts on hard minerals were poorly designed for generating high levels of revenue when prices were

FIGURE 6 Real Exchange Rates, 2001–14 (2001 = 100)



Source: Data from the Economist Intelligence Unit database.

Note: Based on consumer prices; common weights used for all countries.

high, they increased costs and reduced competitiveness when prices retreated from 2011. With resource markets oversupplied after the boom, royalty costs play a role in determining which producers survive and which become part of the contraction of production capacity that is necessary to rebalance global demand and supply. Australia and Indonesia are the main competing exporters of coal to Asian markets, so the fact that they both have inefficient taxation mechanisms may introduce some rough competitive neutrality.

The Australian government sought to introduce economically more efficient profit-based royalty systems in 2011, but was defeated by the novelty and poor design of the proposed arrangements and by the poor management of an extreme episode of rent-seeking by affected companies (Garnaut 2013). An efficient resource rent tax along the lines of that applied for the past quarter-century to offshore petroleum would have generated much higher revenues from most mines when prices were high, and probably from the highest quality mines at other times. It also would have reduced imposts on high-cost mines when prices were low, allowing more Australian mines to escape contraction or closure during the restructuring of global supply after the boom.

Australia and Indonesia have adopted contrasting policies on processing and on the supply of energy to domestic users. Australia recently completed a long transition from domestic to international pricing of fossil fuels for domestic use. This led to large increases in costs for domestic users, as the prices of coal and gas resources that had once been reserved for domestic use because of high international transport costs relative to value, or as a matter of policy, rose towards export parity. These price increases have put massive additional pressure on domestic processing and manufacturing industries to contract (Adams 2014).

Indonesia's policies on the domestic pricing of exportable minerals have moved in contradictory directions in recent years. The big step towards the international pricing of petroleum fuels removed an artificial incentive for energy-intensive

activities to expand. In this, it was similar to the effects of the emergence in Australia of a gas export industry on the east coast. The coincidence of the radical change of policy on fuel subsidies in Indonesia with the slump in global oil prices removed the domestic economic impact – in contrast with Australia, where the price effect of moving from a domestically oriented to an internationally oriented gas supply industry was much larger than the fall in international prices. Indonesia's new mandatory processing of non-ferrous minerals went in the opposite direction, and created powerful incentives for the domestic use of locally mined ores.

Australia and Indonesia face similar adjustment challenges after the boom: continued strong economic growth requires a large real currency depreciation and the removal of barriers to efficient expansion of trade-exposed industries outside resources. That the resources boom in Indonesia was proportionately smaller than in Australia means that the adjustment challenge for Indonesia at the end of the boom is correspondingly smaller. For Indonesia, the prospect is for subdued growth for some time – growth that is unlikely to meet Jokowi's ambition to raise the trajectory to around 7% per year. For Australia, the prospect is for a considerable period of stagnant or declining average incomes.

The resources boom has left Indonesia and Australia with domestic political cultures and institutions that are poorly structured to achieve productivity-raising reform. Indonesia has experienced additional costs from disruption of communities and environmental pressures generated by poorly administered resource developments during the boom (Ahmad 2015).

RESOURCES CURSE OR BLESSING?

A large economic literature suggests that a strong specialisation in exports of resource-based commodities is rarely an unambiguous blessing, and can be a curse for development (Sachs and Warner 1997; Collier 2007, 2008). Countries with rich endowments of natural resources relative to population and capital have tended to grow more slowly, experience larger and more damaging fluctuations in rates of economic growth, and ultimately have more corrupt government and less equitable distribution of the fruits of development.

There are exceptions. Several developed countries, including Norway, Australia, and Canada, specialise strongly in exporting resource-based commodities. The recent Australian experience, however, cautions against complacency, even in long-standing democracies with highly developed economies (Garnaut 2013). A number of developing countries enjoying sustained strong growth were helped in the early years of the catch-up process by using public revenues from the judicious taxation of mineral rents to support broad-based development. Indonesia during the petroleum booms of the 1970s and early 1980s (Hill 2000; Chowdhury 2004) and Botswana since independence in the 1960s (Collier 2007) are examples. Countries with unusually high resource shares in exports were over-represented in Collier's (2007) book *The Bottom Billion* and tended to be particularly vulnerable to corruption of their political cultures and institutions.

Resource booms are temporary and subject an economy to large adjustment stresses when they end. The test of the 'resources curse' is how a country responds to the end of a boom. Indonesia passed this test after the sharp decline

in petroleum prices in the mid-1980s (Hill 2000; Pardede 2015). National policy supported the adjustment to internationally oriented industrialisation built on diverse exports with a large component of labour-intensive manufactured goods.

This successful economic strategy descended into incoherence in the 1997–98 Asian financial crisis. By the time political order was restored within a new, democratic framework in the early 2000s, the international economic environment had changed fundamentally. Global and especially Asia-Pacific markets for manufactured goods embodying standard technology were now dominated to a much larger extent by China. And the resources boom was lifting international prices for resource-based products to unprecedented levels. Together, these two related developments shifted Indonesia's comparative advantage in international trade back towards resource-based commodities.

The evidence to date suggests that the resources boom had an ambiguous influence on Indonesian development. At best, it allowed reasonably strong economic growth to proceed through the first decade of democratic government, which was bound in any case to be fraught with difficulties of economic management (Aswicahyono, Bird, and Hill 2009). At worst, it lulled the newly democratic polity into a false sense of confidence that reasonable economic outcomes could be achieved despite weaknesses in economic policy; burdened the young democracy with rent-seeking practices that would make good policy less likely in future; and raised the cost structure and introduced or extended regulatory interventions that require painful and costly readjustment now the boom is over.

The final balance sheet will depend on what happens next.

The international environment after the resources boom should be conducive to the macroeconomic adjustment that Indonesia has to make if it is to maintain growth without risking an external financial crisis. The end of Indonesia's China resources boom and the shift towards the normalisation of US monetary policy are helpful to exchange-rate depreciation. The new pattern of growth in China offers expanded opportunities for exports of manufactures, high-value foodstuffs, and services. The dramatic fall in global oil and gas prices from mid-2014 has provided a congenial environment for the removal of energy subsidies, leaving fiscal room for a large expansion of public expenditure on productivity-raising infrastructure and other public goods. The markedly lower international real interest rates on sovereign debt since 2000 and especially since the 2008 crisis offer strong support for a government committed to increased expenditure on infrastructure. China's intention to increase its funding of infrastructure in developing countries is reflected in its commitment to found the Asian Infrastructure Investment Bank.

The hard part is what Indonesia must do itself. The unwinding of the subsidies for petrol and the substantial reductions and change in the structure of continuing diesel subsidies are a big step towards a successful adjustment after the boom (World Bank 2015, 19). There are pressures to at least partially unwind these reforms. It is essential that those pressures be resisted, and the energy reforms extended.

The budgetary adjustment that still remains after the fuel-subsidy reforms is daunting. Taxation revenue grew less rapidly than the economy in 2014 and, with nominal income growth unusually low after the boom, is likely to do so for several more years. Major public investments in productivity-raising infrastructure

are a necessary element of the economic adjustment. It will not be easy to accommodate these within firm budgets. The domestic macroeconomic and external conditions would warrant funding more public investment in infrastructure from long-term external loans.

Delivering sound budgets during the adjustment depends above all on restoring reasonably strong growth in output and incomes. That requires substantial depreciation of the real exchange rate. Reform to accelerate productivity growth can assist real depreciation, but policy reform and the reflection of reform in higher productivity take time. Firmer budgets and correspondingly easier monetary policy, supported by domestic cost and income restraint, are therefore the main supports for early depreciation of the exchange rate.

Maintaining reasonably strong productivity growth as a foundation for higher growth in the future requires the unwinding of distortions in the operation of markets. It also requires reform of the political system that shapes economic regulation and policy. The agenda here is long, and includes unwinding distortions introduced into the resources sector during the boom. Overcoming the political economy pressures to maintain inefficient taxation and leasing regimes in coal requires the removal of privileges conferred on private investors. Sound policy in the new circumstances also requires lower imposts on investment in marginally profitable activities than the current requirements for domestic processing and the divestment of foreign equity.

The biggest challenges relate to the political economy of policy-making in Indonesia's democratic polity (Aswicahyono, Bird, and Hill 2009). That the flow of easy money from the transfer of state mineral resources—especially coal—into private hands largely coincided with the formative years of democracy led to what would in any case have been powerful tendencies for private wealth to weigh excessively in contests over the definition of the public interest in economic policy. The active discussion of constraints on the business funding of political parties and campaigns in the lead-up to and since the 2014 elections is encouraging. Reform in this area is likely to be a precondition for successful policy adjustment that sustains and accelerates economic growth after the resources boom. Active discussion of policy choices among Indonesians concerned about policy because it is important to their country, and not because they want to further business or partisan political connections, is essential to the success of policy reform in the public interest in the difficult years ahead.

REFERENCES

- Adams, Philip. 2014. 'The Economic Impact of Rising Energy Costs'. Paper presented at the Melbourne Economic Forum, Victoria University, Melbourne, 20 November.
- Ahmad, Mubariq. 2015. 'A Missed Opportunity for Whom? A Discussion on Prof. Garnaut's Paper "Indonesia's Resource Boom in International Perspective: Options for Sustained, Equitable Growth"'. Presentation given at the Ninth Sadli Lecture, Jakarta, 21 April 2015. <http://asiapacific.anu.edu.au/blogs/indonesiaproject/?p=5601>.
- Alisjahbana, Armida S. 2009. 'Revisiting Indonesia's Sources of Economic Growth and Its Projection towards 2030'. Working Paper in Economics and Development Studies 200905, Department of Economics, Padjadjaran University.
- APO (Asian Productivity Organization). 2011. *APO Productivity Databook 2011*. Tokyo: APO.

- Aswicahyono, Haryo, Kelly Bird, and Hal Hill. 2009. 'Making Economic Policy in Weak, Democratic, Post-crisis States: An Indonesian Case Study'. *World Development* 37 (2): 354–70.
- Azis, Iwan J. 2015. 'Worrying Trend of Productivity'. Presentation given at the Ninth Sadli Lecture, Jakarta, 21 April 2015. <http://asiapacific.anu.edu.au/blogs/indonesiaproject/?p=5601>.
- BI (Bank Indonesia). 2015. *Statistik ekonomi dan keuangan Indonesia* (SEKI) [Indonesian financial statistics]. <http://www.bi.go.id/en/statistik/seki>.
- BP. 2014. *BP Statistical Review of World Energy 2014*. June. London: BP.
- Chen, Yuyu, Avraham Ebenstein, Michael Greenstone, and Hongbin Li. 2013. 'Evidence on the Impact of Sustained Exposure to Air Pollution on Life Expectancy from China's Huai River Policy'. *PNAS* 110 (32): 12936–41.
- Chowdhury, Mamta Banu. 2004. *Resources Booms and Macroeconomic Adjustments in Developing Countries*. Aldershot: Ashgate Publishing.
- Collier, Paul. 2007. *The Bottom Billion: Why the Poorest Countries Are Failing and What Can Be Done about It*. Oxford: Oxford University Press.
- . 2008. 'Laws and Codes for the Resource Curse'. *Yale Human Rights and Development Journal* 11 (1): Article 2.
- Corden, W. Max, and J. Peter Neary. 1982. 'Booming Sector and De-industrialisation in a Small Open Economy'. *The Economic Journal* 92 (368): 825–48.
- Emerson, Craig, Ross Garnaut, and Anthony Clunies Ross. 1984. 'Mining Taxation in Indonesia'. *Bulletin of Indonesian Economic Studies* 20 (2): 107–21.
- Gandataruna, Kosim, and Kirsty Haymon. 2011. 'A Dream Denied? Mining Legislation and the Constitution in Indonesia'. *Bulletin of Indonesian Economic Studies* 47 (2): 221–31.
- Garnaut, Ross. 2009. 'Climate Change and Indonesia: In Honour of Panglaykim'. *Bulletin of Indonesian Economic Studies* 45 (1): 107–16.
- . 2010. 'Macro-economic Implications of the Turning Point'. *China Economic Journal* 3 (2): 181–90.
- . 2012. 'The Contemporary China Resources Boom'. *Australian Journal of Agricultural and Resource Economics* 56 (2): 222–43.
- . 2013. *Dog Days: Australia after the Boom*. Melbourne: Black Inc.
- . 2014. 'China's Role in Global Climate Change Mitigation'. *China and World Economy* 22 (5): 2–18.
- Garnaut, Ross, and Anthony Clunies Ross. 1983. *Taxation of Mineral Rents*. Oxford: Clarendon Press.
- Garnaut, Ross, Cai Fang, and Ligang Song (eds). 2013. *China: A New Model for Growth and Development*. Canberra: ANU E Press.
- Green, Fergus, and Nicholas Stern. 2015. 'China's "New Normal": Better Growth, Better Climate'. Policy paper, ESRC Centre for Climate Change Economics and Policy, Grantham Research Institute on Climate Change and the Environment.
- Hill, Hal. 2000. *The Indonesian Economy*. Cambridge: Cambridge University Press.
- Huang, Yiping, Cai Fang, Peng Xu, and Gou Qin. 2013. 'The New Normal of Chinese Development'. In *China: A New Model for Growth and Development*, edited by Ross Garnaut, Cai Fang, and Ligang Song, 35–54. Canberra: ANU E Press.
- Humphreys, Macartan, Jeffrey D. Sachs, and Joseph E. Stiglitz (eds). 2007. *Escaping the Resource Curse*. New York: Columbia University Press.
- Manning, Chris. 1971. 'The Timber Boom: With Special Reference to East Kalimantan'. *Bulletin of Indonesian Economic Studies* 7 (3): 30–60.
- Manning, Chris, and Riyana Miranti. 2015. 'The Yudhoyono Legacy on Jobs, Poverty and Income Distribution: A Mixed Record'. In *The Yudhoyono Presidency: Indonesia's Decade of Stability and Stagnation*, edited by Edward Aspinall, Marcus Mietzner, and Dirk Tomsa, 303–24. Singapore: Institute of Southeast Asian Studies.

- Pardede, Raden. 2015. 'Resource Boom and Bust: Is This Time Different? Causes and Policy Responses'. Presentation given at the Ninth Sadli Lecture, Jakarta, 21 April 2015. <http://asiapacific.anu.edu.au/blogs/indonesiaproject/?p=5601>.
- PLN (Perusahaan Listrik Negara). 2015. *Executive Summary: Electricity Supply Business Plan; PT PLN (Persero) 2013–2022*. Jakarta: PLN.
- Radetzki, Marian. 1980. 'Changing Structures in the Financing of the Minerals Industry in LDCs'. *Development and Change* 11 (1): 1–15.
- Sachs, Jeffrey D., and Andrew M. Warner. 1997. 'Natural Resource Abundance and Economic Growth'. Working paper, Center for International Development and Harvard Institute for International Development, Harvard University, Cambridge, MA.
- Snape, Richard H. 1977. 'Effects of Mineral Development on the Economy'. *Australian Journal of Agricultural Economics* 21 (3): 147–56.
- Spiegel, Samuel J. 2012. 'Governance Institutions, Resource Rights Regimes, and the Informal Mining Sector: Regulatory Complexities in Indonesia'. *World Development* 40 (1): 189–205.
- Van der Eng, Pierre. 2010. 'The Sources of Long-Term Economic Growth in Indonesia, 1880–2008'. *Explorations in Economic History* 47 (3): 294–309.
- . 2015. 'Mixed Blessings: Mining in Indonesia's Economy, 1870–2010'. In *Natural Resources and Economic Growth: Learning from History*, edited by Marc Badia-Miró, Vicente Pinilla, and Henry Willebald, 226–47. London: Routledge.
- Wang, Xiaolu, and Yixiao Zhou. 2014. 'Structural Imbalance, Inequality and Economic Growth'. In *Deepening Reform for China's Long-Term Growth and Development*, edited by Ligang Song, Ross Garnaut, and Cai Fang, 51–71. Canberra: ANU E Press.
- World Bank. 2015. *Indonesian Economic Quarterly: High Expectations*. March. Jakarta: World Bank.