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Growth in Indonesia: is it sustainable?

The impact of the commodity price boom

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Preface

Oxford Policy Management Ltd. (OPML) is delighted to present the study entitled 'Growth in Indonesia: is it sustainable?' The study present analysis on the sustainability of Indonesia's economic growth model conducted for the UK Climate Change Unit (UKCCU) in Jakarta.

This paper reviews the impact of the commodity boom as part of our study of whether Indonesia's growth is sustainable. Our other papers review the environmental sustainability of growth, the political economy of deforestation, the impact of the commodity boom, and the drivers of recent economic growth. We use the World Bank's 'adjusted net savings' framework to integrate these papers in an overview paper.

OPML is grateful to the many individuals who generously gave their time to the preparation of this study. We are particularly grateful to the stakeholders who met team members in Jakarta and gave us their valuable time and insights, and to Smita Notosusanto and the OPML Jakarta office for their support during our visits to Jakarta. We would also like to thank the UK Climate Change Unit (UKCCU) in Jakarta for their assistance and comments throughout the process.

This study was led by OPML Chief Economist Mark Henstridge and co-authored with Gaber Burnik, Federica Chiappe, Mateo Cabello, Lee Crawford, Sourovi De, Maham Farhat and Maja Jakobsen. It was peer reviewed by David Bevan, Kurnya Roesad and Gustya Indriani.

Any errors or omissions are, of course, the responsibility of the authors. For more information about OPML please visit www.opml.co.uk/.

Executive Summary

In this paper we explore further the question 'Is growth in Indonesia sustainable?' by focusing on to the potential impacts of the commodity boom. Indonesia's recent economic growth has been driven primarily by domestic demand, but to some extent has also been boosted by strong commodity prices. We explore direct and indirect impacts of the commodity price boom by analysing export performance, fiscal management, private sector investment and real effective exchange rate (REER) movements to investigate the impact of the boom on Indonesia's economic growth.

Global commodity prices have risen over the last decade. Demand from large emerging markets, especially China, has sustained the commodity price boom since 2002. The global financial crisis saw a dip in prices which have since then continued to rise. We focus our analysis on Indonesia's most important commodities in terms of shares of exports and production. These are: oil, gas, copper, coal, nickel and palm oil.[1]

Most key commodity sectors have not increased the volume of production in response to the boom. Only the coal and the palm oil increased production volumes. Other key commodity sectors show non-existent or weak supply responses. The lack of supply response in energy and mineral sectors is linked to a lack of investment, primarily due to a difficult business climate. This, in part, explains the lack of contributions by commodity sectors to real GDP growth since 2002. The commodity boom itself has not directly led to significant structural changes to the Indonesian economy.

Direct impacts uncover only part of the story. A commodity price boom also affects decisions made by both private and public stakeholders to spend or invest their commodity earnings.

In the public sector, Indonesia's budget became less dependent on oil and gas revenues, although these revenues remain important. Despite the commodity boom, resource revenues declined as a share of total revenues, from 28% in 2002 to 20% in 2012, of which an average of 94% came from oil and gas sectors. Commodity sectors with supply response, such as coal, appear relatively insignificant in revenue terms.

Nonetheless, higher commodity prices allow us to estimate windfall gains to revenue relative to a lower-price counterfactual. Our rough estimates show that total windfall gains to central government were around Rp.89 trillion (2000 prices) from 2002 to 2011, or the equivalent of 3.6% of GDP in 2011. Windfall gains are split between central and subnational governments under the resource revenue sharing arrangements (see overview in Annex B). However, other government transfer mechanisms partly nullify producing regions' windfall gains, as resource transfers reduce other transfers allocated.

A key policy challenge is to ensure that the windfall gains are utilised in a manner than benefits public welfare and generates growth, which is a function of the quality of fiscal management.

Although Indonesia has prudently spent resources on fiscal consolidation and improving the debt situation accumulated during the Asian Financial Crisis (AFC), there has also been substantial spending on energy subsidies, which limited fiscal space for spending on development and public

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[1] In 2002 oil, gas, copper, coal, nickel; and palm oil accounted for almost one third of total exports, in 2011 the share had increased to 46% (see Figure A.1; BPS 2008; BPS 2012a) We have excluded most agricultural products from our analysis, as the value of exports of cocoa, coffee, shrimp, and other commodities is too small to make a significant impact on export figures. Nonetheless, these products are important sources of income for small farmers (Enrique et al., 2010).

investment. With high energy prices, the opportunity costs of subsidies go up restricting spending elsewhere. Spending on fuel subsidies almost equals total resource revenues in 2011.

Consequently there has been a decline in real public investment. The backlog in infrastructure (e.g. power generation and inter-island connectivity) affects, among other things, production efficiency. A lack of public procurement capacity and clear regulations appears to be the main hindrance to infrastructure development.

The lack of efficiency in public spending is also linked to a poorly managed decentralisation process (as we also found in our *Political Economy Analysis*)**.** Since decentralisation in 2001, a large part of service delivery has been placed at the subnational level. With the main share of revenues collected at the central level, province and district governments depend on the fiscal gap filling transfers (DAU and DAK) that put little emphasis on service delivery outcomes. Combined with confusion about roles and responsibilities between the central line ministries and the subnational governments and a lack of capacity in procurement at local level, this has a negative effect on spending efficiency.

Looking at private sector rents, our analysis indicates larger indirect impacts of the commodity boom on other sectors. Public sector expenditure of windfall gains is only part of the story. Windfall gains have also accrued to the private sector as rents.[2]

Our analysis points towards significant rents in the private sector, accounting for 1.3% of GDP or 4.5% of gross national savings on average each year between 2003 and 2011. As with policy decisions on public revenues and expenditure, private decisions on the allocation of rents shapes the influence of the commodity price boom on the Indonesian economy. We investigate how resource rent has indirectly affected other sectors' growth performance.

The private sector in Indonesia has a large number of big conglomerates. As a business model they diversify into different sectors to internalise the cash flow needed to expand business activities. Half of these conglomerates are active in commodity sectors with total revenues in 2011 equivalent to US$62.5 billion, or 7.4% of GDP. This corporate structure means that resource rents from commodity exports can be invested for instance, in the construction arm of a conglomerate. With a growing middle class in Indonesia, investment in construction, or shopping malls, is thus an attractive proposition.

Another channel through which the commodity boom can indirectly impact growth in other sectors is 'Dutch disease' – when a boom in the natural resources sector leads to an appreciation of the real exchange rate. As a result, the competitiveness of tradable sectors declines. Some symptoms appear to be present in Indonesia. There was a 14% appreciation of the real exchange rate from 2003 to 2008 combined with slow growth in the manufacturing sector and a decline in the importance of manufacturing export.

However, we find inconclusive evidence of 'Dutch disease'. At the macro level, weak performance in some sectors of the economy cannot conclusively be linked to the commodity boom. Our own econometric analysis of firm-level manufacturing data does not offer any evidence of 'Dutch disease' in the manufacturing sector. In short, we cannot attribute the weak performance of the manufacturing industry and exports to a REER appreciation. Instead it is possible that manufacturing exports' relative decline is more affected by strong competition from countries like China and high transportation costs due to Indonesia's poor transport infrastructure.

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[2] The surplus value after all costs and normal returns have been accounted for.

'Dutch disease' might still be present as we observe a decline in the share of exporting firms, as well as higher productivity for exporters. This could indicate that the appreciation of the REER has resulted in exit for less productive firms.

We started out by posing the question: what have been the impacts on Indonesia of the commodity price boom?

It appears that Indonesia has missed the opportunity to place itself on a higher, more sustainable growth trajectory. Export revenues have been driven almost entirely by higher global prices, with little supply response. So, the boom did not result in structural changes of the economy. In public finances resource revenues have been a declining share of government revenue. In 2011 resource revenues were about the same magnitude as the fuel subsidy. At the same time, fiscal consolidation has achieved an impressive macro-economic position, as witnessed by the transformation of the external debt position. But it appears at the same time that Indonesia's opportunity presented by extra natural resource revenues to achieve fiscal consolidation and sustain infrastructure investment has not materialised – in effect the extra money has sustained the fuel subsidy. In the private sector there has been an indirect boost to domestic consumption driving GDP growth as private exporters invest in shopping malls and re-cycle the rents from high commodity prices, leading to less focus on tradable sectors. Although, we find no inconclusive of 'Dutch disease', manufacturing sector performance and job creation have still been poor.

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List of Abbreviations

AFC	Asian Financial Crisis
BIS	Bank of International Settlement
BP	British Petroleum
BPS	Badan Pusat Statistik, Indonesia National Statistical Office
CPO	Crude Palm Oil
DAK	Special Allocation Grant
DAU	General Purpose Transfer
EIA	US Energy Information Administration
GDP	Gross Domestic Product
GFC	Global Financial Crisis
IMF	International Monetary Fund
LPG	Liquefied Petroleum Gas
MGI	McKinsey Global Institute
OECD	Organisation for Economic Corporation and Development
OPML	Oxford Policy Management Limited
PPP	Public Private Partnership
REER	Real Effective Exchange Rate
Rp	Indonesian Rupiah
TFP	Total Factor Productivity
UKCCU	UK Climate Change Unit

Introduction

In this paper we explore the question 'Is growth in Indonesia sustainable?' by focusing on what happened to the economy as a result of the commodity boom. Indonesia's recent economic growth has been driven primarily by domestic demand, but to some extent has also been boosted by strong commodity prices. We explore direct and indirect impacts of the commodity price boom through export performance, fiscal management, private sector investment and real effective exchange (REER) appreciation to investigate the impact of the boom on Indonesia's economic growth.

Commodity prices have risen over the last decade. Demand from large emerging markets, especially China, has sustained the commodity price boom since 2002. During the global financial crisis there was a dip in prices, but since then, they have continued to rise. We focus our analysis on Indonesia's most important commodities in terms of shares of exports and production. These are: oil, gas, copper, coal, nickel and palm oil.[3]

To assess such impacts of the commodity boom on the Indonesian economy, we divide the analysis into four components. Section 1 is linked to the analysis of the structure of the economy in the paper on 'Drivers of recent economic growth', we explore whether there has been a supply response in key commodity sectors (a direct effect on exports and value-added) that has shifted the structure of production; in Section 2 we then look at the proceeds of commodity sectors accruing to government revenues as well as we analyse the public expenditure composition; Section 3 focus on the proceeds accruing to the private sector in the form of rents; and in Section 4 we analyse the impact of the boom on other sectors in the economy both at national and at firm-level. In particular, we ask whether there has been a 'Dutch disease' effect on tradables firms from any real exchange rate appreciation during the commodity boom.

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[3] In 2002 oil, gas, copper, coal, nickel; and palm oil accounted for almost one third of total exports, in 2011 the share had increased to 46% (see Figure A.1; BPS 2008; BPS 2012a) We have excluded most agricultural products from our analysis, as the value of exports of cocoa, coffee, shrimp, and other commodities is too small to make a significant impact on export figures. Nonetheless, these products are important sources of income for small farmers (Enrique et al., 2010).

1 Direct impact of the commodity boom – a supply response?

Energy, mineral and metal prices increased by more than 250% in real terms between 2003 and mid-2008.[4] Prices took a dip around the global financial crisis, but in early 2010 they were on the rise again (Enrique et al., 2010). Indonesia's key commodities have had significant price increases over the last decade.

We examine the supply response of the natural resources sectors to the boom in prices. How much of the increase in value of production and export has been generated by increases in volumes and how much just by higher prices? Increases in volumes, or a supply response, imply sector contributions to real GDP growth – that is, at constant prices – and a shift in the composition of GDP.

There is prior work: World Bank analysis indicates the lack of supply response. Between 2005 and 2007 commodity prices explained 82% of commodity export value growth (Enrique et al., 2010).

1.1 Few sectors show significant supply response

The response in the coal industry stands in sharp contrast to most other commodity sectors. While coal prices rose by almost 400%, coal production volumes more than quadrupled from 77 million ton in 2000 to 325 million ton in 2011 (see Figure 1). In 2011 Indonesia became the world's largest exporter by volume with concentration in thermal coal used in power plants. The increase in production has been from existing mines, rather than new ones (Enrique et al., 2010; EIA, 2013).

Figure 1 – Coal[5]
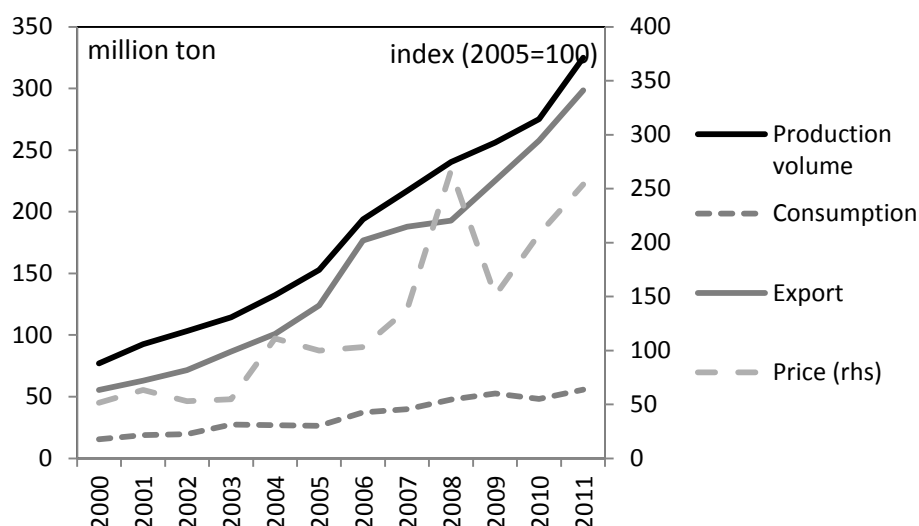
Source: BP, 2012; EIA, 2013; IMF, 2012a.

A supply response also occurred in the palm oil sector. However, low productivity indicates non-optimal output from increased production volume. Palm oil production volumes (crude and kernel palm oil) increased by 153% from 2002 until 2011. During the same period the

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[4] World Bank estimates from Enrique et al., (2010).
[5] Price index used: COAL AUSTRALIA INDEX (Units: Index Number) 19376CODZF (Source: Australia) (Source: IMF, 2012a).

international palm oil price increased by 200%. Today Indonesia is the largest producer of palm oil in the world (in terms of volume), but Indonesia's palm oil production is characterised by low productivity, low quality and low value-added. More than 75% of Indonesia's palm oil output is exported in a raw form, as crude palm oil (CPO), mainly to Malaysia for processing. Production value per hectare is only a third of Malaysia's. Consequently, Malaysia earned a 30% premium on their export compared to Indonesia due to their higher unit value (Enrique et al., 2010; UN Comtrade, 2012),[6] and real value-added to GDP has not been impressive.

In 2011, palm oil accounted for 91% of Indonesia's estate crop production, but saw a decline in the share of real GDP from 2.4% in 2002 to 2.0% in 2011 (BPS, 2007; BPS, 2011; BPS, 2012a; see Figure 2). The characteristics of Indonesia's palm oil industry indicate that the effect of the supply response could have been bigger. In addition, the on-going expansion of Indonesia's palm oil industry is threatened by serious environmental concerns. The high cost of securing land for oil palm expansion is, in particular, causing companies to develop peat lands and primary forests for production (see discussion in our *Environmental Paper*).

Figure 2 – Palm oil[7]
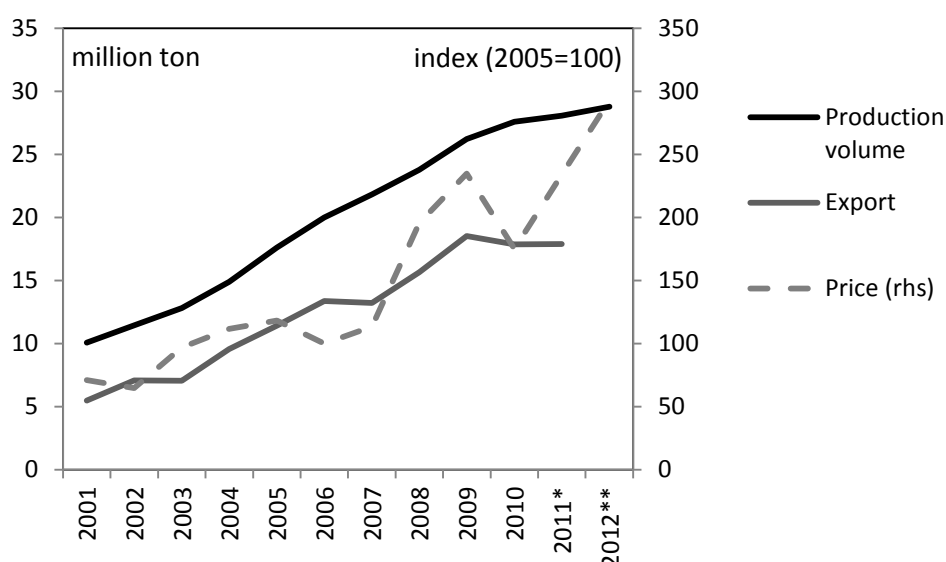
Source: BPS, 2007; BPS, 2011.
Note: for production figures * preliminary ** estimation.

Other key commodity sectors show non-existent or weak supply responses. Rising prices present a potential to increase production to create real economic gains from commodity sectors. But instead production volumes for copper show stagnation, oil volumes have decreased, and gas and nickel production show some increase. [8, 9, 10]

A lack of supply response in both energy and mineral sectors is linked to lack of investment. Reduced investment in oil exploration caused exploratory well-drilling to fall steadily,

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[6] Unit value is obtained by division of palm oil export value (Palm oil and its fractions, whether or not refined, but not chemically modified) by its quantity. The premium reported is relative to the Indonesia unit values.
[7] Price index used: PALM OIL MALAYSIA (U.K.) (Units: Index Number) 54876DGDZF (Source: Malaysia) (IMF, 2012a).
[8] The volume of production of copper declined by 29%, while the price of this commodity increased by 465% from 2002 to 2011. During the same period, nickel production volume increased by 45% while prices rose by 238% (BPS, 2012a; BPS, 2008; IMF, 2012a; see Figure A.1, Figure A.2 and Figure A.3). Other minerals: bauxite shows increase, while gold, silver, and tin metal all show declines in production volumes (BPS, 2012a; BPS, 2008).
[9] Indonesia's oil production declined steadily from 1,456 thousand barrels per day in 2000 to less than 942 thousand barrels per day in 2011. Exports followed the same development (see Figure A.5).
[10] The gas sector has expanded production volumes from 53 billion cubic meters in 2001 to 76 billion cubic meters in 2011. Since 2005 production volume increased by over a third (See Figure A.4).

from 106 new exploratory wells in 2001 to 34 in 2007 (Enrique et al., 2010). Consequently, the discovery of new oil reserves has decreased dramatically and proven oil reserves have stabilised since 2000 (Agustina et al., 2008). Low levels of investment have also been the problem in the mineral sectors. Indonesia has not signed a single new Contract of Work with a major international mining company since the start of the commodity price boom (Enrique et al., 2010).

One of the main reasons for declining investment is a difficult business climate. Indonesia is ranked as one of the countries with highest mining potential in 2005, but it ranks badly in terms of its business climate (Enrique et al., 2010; World Bank, 2012a). The government has not managed to improve the oil and gas and mining regulatory environment; for example, the new mining code of 2009 still waits to be fully implemented.[11] Some impediments to investments are ambiguity in regulations and uncertainty in revenue systems (Enrique et al., 2010; EIA, 2013). For example, from 6 May 2012, a Ministerial Degree has imposed restrictions on unprocessed metal exports. This was called off by the Supreme Court[12] earlier this year, whilst the government announced that its plans are unchanged: it will go ahead with a full ban on unprocessed mineral ore from 2014 as part of the new Mining Law. The implementation of the decree has roughly cost nickel mining companies Rp.6.5 trillion in losses, which covers investment for infrastructure in mining areas and operational costs, according to Indonesia's Chamber of Commerce estimates (Amahl et al., 2013; Rusmana et al., 2012).

The inherent uncertainty of exploration also affects the outcome of a price boom. For commodities, any increase in supply normally has a time lag. New exploration generated by price increases cannot lead to increased supply immediately or might not be successful. The impact of the recent increase in foreign direct investment (FDI) into mining is yet to be seen.

With limited supply response the commodity boom has not led to significant structural changes to the Indonesian economy. Only two key commodity sectors showed strong supply responses: coal and palm oil. The lack of supply response largely explains the slow real growth in mining and energy related sectors found in our paper on economic growth. The commodity price boom has not led to a change in the structure of the Indonesian economy as the government has not managed to facilitate supply responses by creating an appropriate investment climate. Even though the direct effect on the real economy is largely absent. We continue to explore how the high prices have affected the Indonesian economy in the following sections.

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[11] The government passed the 2009 Law on Mineral and Coal Mining No.4 to increase foreign investment into the mining sector. The law introduces more transparent and standardised tenders and licenses for mining blocks. As of 2012, the law is not fully implemented (EIA, 2013).
[12] This decree, along with the Energy and Mineral Resources Ministerial Decree No. 11/2012, restricts exports of raw mineral ores by demanding mining firms to obtain a clean and clear status from the Energy and Mineral Resources Ministry to be able to export them.

# 2 What happened to the increased commodity export earnings?

The impact of the commodity price boom depends on the decisions made by both private and public stakeholders, and other institutions, to spend or invest their earnings. We next look at government revenue and expenditure. With an understanding of the size of public earnings generated from natural resources and in particular windfall gains, we have the foundation to assess how effectively these have been managed. We then move on to the impact on the private sector.

2.1 Importance of resource in government revenues

The commodity sectors make a relatively high direct contribution to government revenues through tax and non-tax revenues (such as royalties). However, getting an overview of exact revenues to government is difficult. Non-tax revenues such as rents and royalties receive less scrutiny than taxes and thus are more likely to be used for political or patronage purposes. Furthermore, a lot of revenue is conveyed to the government in the form of production sharing agreements in the oil and gas sectors (Enrique et al., 2010; Brown, 2008). Looking at budget data for our analysis gives an overall indication of resource revenues contribution to total revenues, but do not keep any separate account of revenues generated from one of the key commodities palm oil.[13]

Non-resource domestic taxes are driving government revenues. Indonesia's budget is becoming less dependent on oil and gas revenues, although these revenues remain important. A brisk division of revenue sources shows that resource revenues (oil and gas tax revenues and all natural resource non-tax revenues) increased slower than other sources during the commodity boom. Resource revenues decreased from 28% of total central government revenues in 2002 to 20% in 2012 – the lowest in 20 years – and their share of GDP fell from 4.5% to 3.8% during the same period. Of non-resource revenues, the largest components are non-oil and gas income tax and VAT under the domestic tax category. Higher growth in non-resource revenues has resulted in an increased share of GDP from 11.9% in 2002 to 12.6% in 2012 (BPS, 2012a; BPS, 2008; Brondolo et al, 2008; see Figure 3).

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[13] There are no official data for the revenues from palm oil. They come from two different sources: non-tax revenue, under forestry (if the oil palm plantation is located in forest area), for: HGU, IPK (timber Use Permit; includes Resources Royalty Provision and Reforestation Fund) and tax revenue, from BPHTB (Fees for Acquisition of Rights to Lands and Buildings), PBB (land and building tax), export tax. It is hard to assess the development, overall trade taxes has increased whereas non-tax forestry revenues have shown a relative decline.

Figure 3 – Non-resource and resource revenues
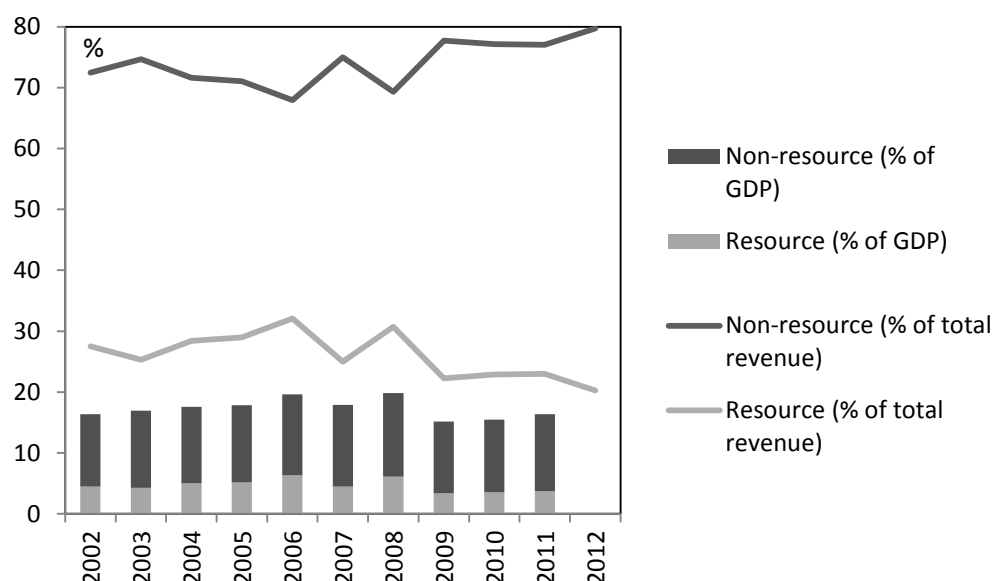
Source: BPS, 2012a; BPS, 2008; IMF, 2012b.
Note: 2002-11 figures are LKPP, 2012 figures are APNB-P.

Oil and gas revenues dominate resource revenues. The increase from mining revenues has little overall importance. Total oil and gas revenues accounted for 94% of resource revenues on average since 2002, or 31% of total revenues. The disappointing overall development is therefore mainly due to the little addition to oil production capacity and to the decline in production from older oilfields. Also, many of the gas purchasing contracts have been agreed several years in advance at fixed price with little gain to harvest at high prices (Enrique et al., 2010). The only increase in revenue shares has been generated in other natural resource revenues, where the subcomponent mining increased from 0.6% in 2005 to 1.3% in 2011. Forestry's share of total revenue declined from 0.7% in 2005 to only 0.3% in 2011 (BPS, 2008; BPS, 2012a; see Figure 4).

Figure 4 – Individual resource revenues share of total revenue
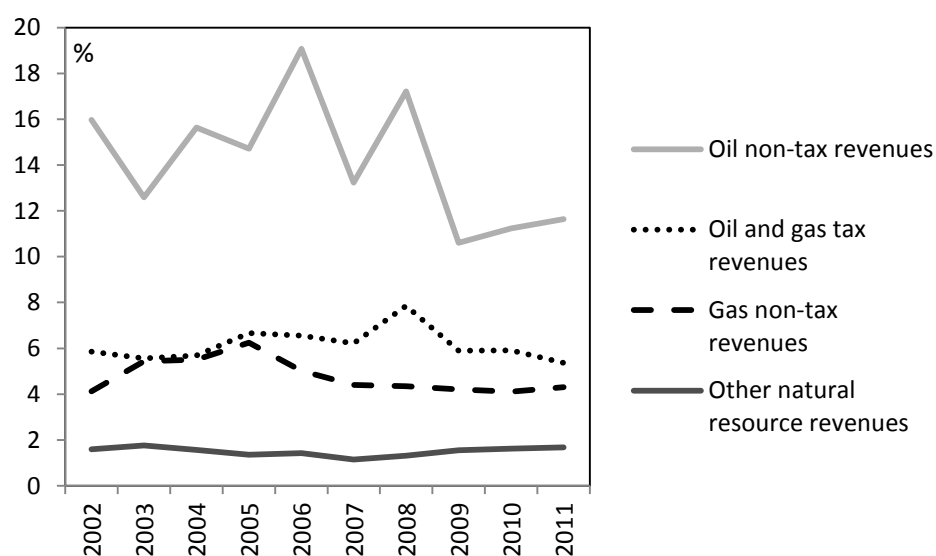
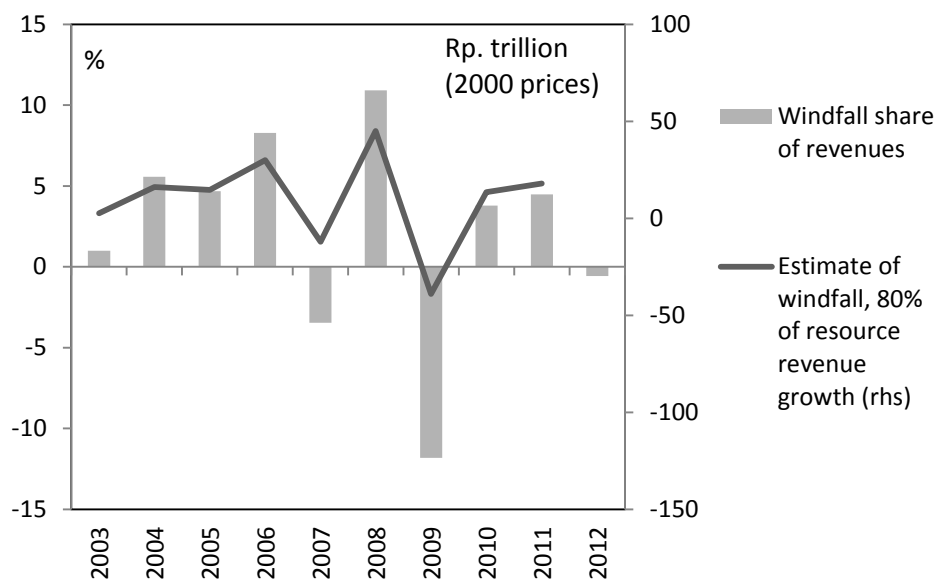Source: BPS, 2008; BPS, 2012a; IMF, 2012b.
Note: 2002-11 figures are LKPP.

Natural resources also generate other public revenues. The majority of natural resource revenues are captured in the oil and gas tax revenues and non-tax resource revenues (described above). But natural resource sectors also generate income to government in other revenue categories such as trade, corporate income, profits of public enterprises (Pertimina), and land and property taxes. Export taxes have increased during the commodity boom (but are still a small share of total revenues). We do not have exact figures for each sector, but with commodity driven export, these revenues are expected to come primarily from commodity sectors. Sub-national governments can also collect taxes related to mining activities (Agustina et al., 2012).[14]

Resource revenues show falling relative importance, but values still increased both in real and nominal terms during the commodity boom. Increased export revenues increased the trade balance surplus and helped Indonesia almost double its foreign reserves from 2002 to 2007, providing the economy with some cushion against external shocks. The World Bank presents different estimates of the magnitude of windfalls. They estimate that higher commodity prices increased Indonesia's GDP by an average of 1.2% between 2004 and 2007, or the increase in commodity production accounted for almost 40% of nominal GDP growth between 2005 and 2007 (Enrique et al., 2010).

But how large are the magnitude of windfall gains in revenues? Our rough estimates show that around Rp.89 trillion (2000 prices) from 2002 to 2011, or the equivalent of 3.6% of GDP in 2011, accrued to central government in windfall gains. Windfall gains, or unexpected revenues due to price change, are not straightforward to extract from revenue data, as, for example, not all revenues will be price dependent. But with little supply response and based on the World Bank's estimation that 82% of growth in commodity exports is due to price changes, we construct a rough estimate. We assume that 80% of growth in resource revenues is due to price increases. Our estimates show that the commodity sectors' windfall gains are volatile but significant in terms of total revenue generation (see Figure 5). The size of Indonesia's windfall gains still presents an opportunity to generate development if carefully managed. In fact, most likely we underestimate windfall gains as total resource revenue is larger than direct resource revenues (see paragraph above).

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[14] These include taxes on motor vehicles and heavy equipment, taxes on the collection and utilisation of underground water, taxes on non-metal minerals and rocks, etc. The rates of these various, sub-national tax ranges from 2% to 35% (Agustina et al., 2012).

Figure 5 – Estimate of windfall gains to revenue

Source: BPS, 2008; BPS, 2012a; IMF, 2012b; authors' calculations.
Note: 2002-11 figures are LKPP, 2012 figures are APNB-P.

With revenue sharing, windfall gains are split between central and subnational governments. Around one third of centrally collected resource revenues are transferred back to subnational governments in producing areas.[15] In effect, a lot of fiscal windfall gains accrue to subnational governments. About half of subnational governments, including non-producing districts within producing provinces, receive oil and gas revenue sharing. Rich oil and gas producing provinces, such as East Kalimantan, Kep. Riau, Riau, and West Papua, are top recipients. East Kalimantan received the highest per capita resource revenue sharing with Rp.3.8 million in 2005. Figure 6 illustrates clearly how these areas receive much larger resource revenue shares than other regions (Agustina et al., 2008; Agustina et al., 2012).

Figure 6 – Distribution of resource revenue shares (2005)
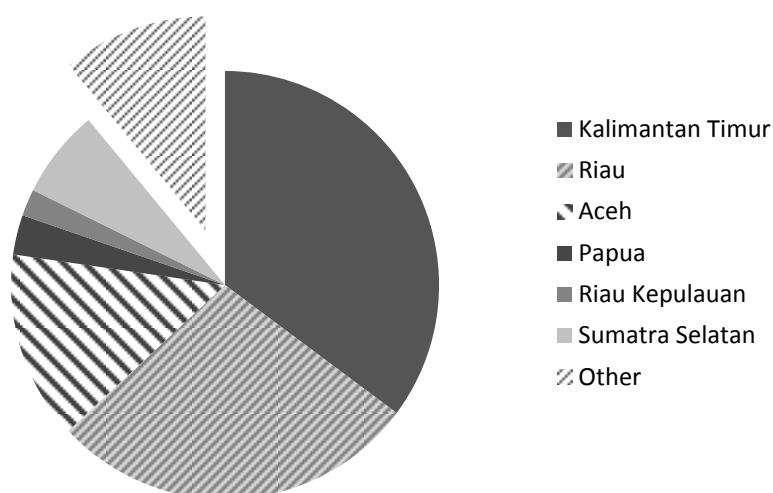
Source: Agustina el at., 2012.

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[15] Revenue collection in Indonesia is centralised. Central government collects taxes on personal income, property, and renewable and non-renewable natural resources. District and provincial governments only collect a limited number of taxes (Shah, 2012). Revenues sharing is organised under the decentralisation law UU33/2004 (see Figure B.1 for overview of sharing agreement).

However, other transfer mechanisms partly nullify producing regions' windfall gains – in effect reducing the impact of windfall gains. Large shares of natural resource revenues return to the producing regions to prevent centrifugal political forces. But transfers from central government also come from the general purpose transfers (DAU)[16] and the special allocation grant (DAK). Apart from few natural resource rich regions and Jakarta[17], most other regions receive similar combined levels of resource revenue shares and transfers (per capita) (Agustina et al., 2012). Entitlements for DAU, or fiscal gap filling, are reduced in producing areas as resource revenues are calculated as part of subnational governments' fiscal capacity (Shah, 2012). Consequently, inequalities between resource and non-resource areas are less pronounced in Indonesia than elsewhere (Agustina et al., 2008; Agustina et al., 2012).

2.2   Distribution of wealth: spending or investment?

As for all resource producing countries, the challenge for Indonesia is to ensure that the windfalls are spent in ways that benefit public welfare and generate growth. Commodity sectors can generate windfall revenues that can help finance development through infrastructure and human capital investments. In turn this can result in increased productivity and value-added in commodity production.

Ultimately the impact of government revenues is a function of the quality of fiscal management. During the period between the mid-1970s until the 1980s, Indonesia was acclaimed for its constructive use of its oil and gas revenues (Gelb, 1988). Indonesia invested its oil and gas revenues in agricultural productivity through extension services, new seeds and infrastructure. We analyse whether Indonesia today have managed to repeat this success: have revenues been invested or consumed? And, how effective spending is in producing a sustainable impact on growth?

Expenditure has increased slightly relative to the overall size of the economy during the commodity boom – partly driven by windfall gains. Total central government expenditures almost doubled from Rp.266 trillion (2000 prices) in 2002 to Rp.414 trillion (2000 prices) in 2008, reaching 20% of real GDP (see Figure 7). During the commodity price boom total real expenditures grew faster than GDP by an average 8% annually – our rough estimate of windfall gains to revenue suggest they contributed significantly to this increase.

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[16] These transfers according to UU34/2004 are intended to balance revenue means with expenditure needs for sub-national governments providing central financing in – proportionate, democratic, fair and transparent manner‖ by taking into account – local potential (fiscal capacity) and conditions and local needs (Shah, 2012).
[17] They have the highest per capita incomes as well as high transfers in many cases.

Figure 7 – Real total central government expenditure
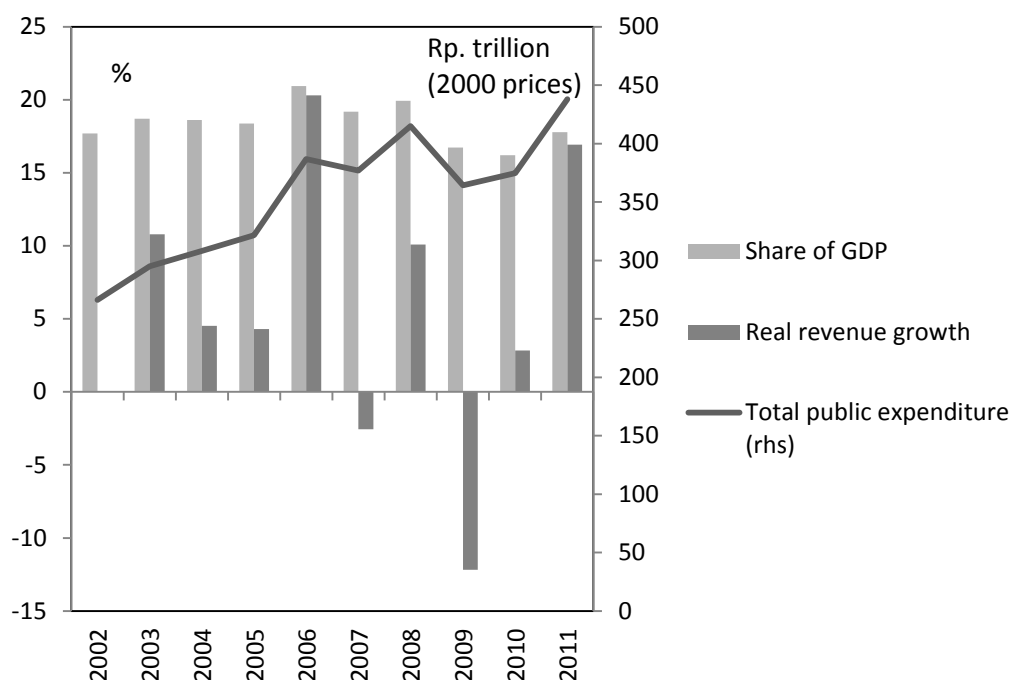
Source: BPS, 2008; BPS, 2012a; authors' calculations.
Note: 2002-2010 figures are LKPP, 2011 figures are APBN.

Indonesia's fiscal space, or the room for discretionary spending[18], is important when assessing efficiency of public spending to generate growth. Government spending is dominated by routine expenditures. More than half of the central and subnational governments' budgets are allocated to interest payment, subsidies and personnel expenditure. This leaves little room for public investment.

Part of routine expenditure was used to bring down public debt. This sensible and prudent fiscal policy has improved the central government's debt situation and reduced interest payments since the Asian Financial Crisis (AFC). Central government's foreign debt as a share of GDP peaked in 2000 at 89%; by 2011 it had been reduced to 24%.[19] Domestic and foreign debt repayments totalled Rp.289 trillion between 2004 and 2007, or almost four times our estimated windfall gains for the period. Macroeconomic stability and fiscal consolidation have been the underlying forces accounting for this improvement (OECD, 2012; World Bank, 2007). A decreased debt stock freed up space in the budget in terms of interest payments; as a share of central government budget they fell from 27% in 2002 to 8% in 2011, although appreciation of the exchange rate also played a role.

Another large chunk of expenditure goes on energy subsidies. Indonesia has the lowest fuel prices in the Asia Pacific region (where Indonesia is one of the few countries where the government still directly sets fuel prices). Fuel subsidies not only increased as a share of government revenues – from 9.6% in 2002 to 12.5% in 2011 – they also fluctuated widely, following movements in international prices and the exchange rate, as well as adjustments to the subsidy regime (see Figure 8). This adds significant uncertainty to the fiscal outlook and undermines macroeconomic stability.

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[18] Fiscal space definition: total expenditures minus personal expenditures, interest payments, subsidies and transfers to regions (World Bank, 2007).
[19] Subnational governments' debt is negligible (World Bank, 2007).

Energy subsidies are far from an ideal social safety net, as they remain highly regressive, inefficient and poorly targeted. The richer quintiles consume more fuel products (kerosene, gasoline and diesel) than poorer quintiles. As a result, the richest 20% of the population received almost two thirds of the direct benefits of the fuel subsidies, while the bottom 10% only received 1% of the direct benefits in 2009. Similar results are also found for electricity subsidies (World Bank, 2007; Enrique et al., 2010).

Subsidies also negatively impact Indonesia's competitiveness. Energy subsidies distort price signals to industry and households who consequently make inefficient and internationally uncompetitive choices. They make inefficient and polluting production technologies become competitive, and the costs of adjusting away from this uncompetitive capital stock increases as oil price rise (Agustina et al., 2008).

Figure 8 – Energy subsidies: share of expenditure and real values[20]
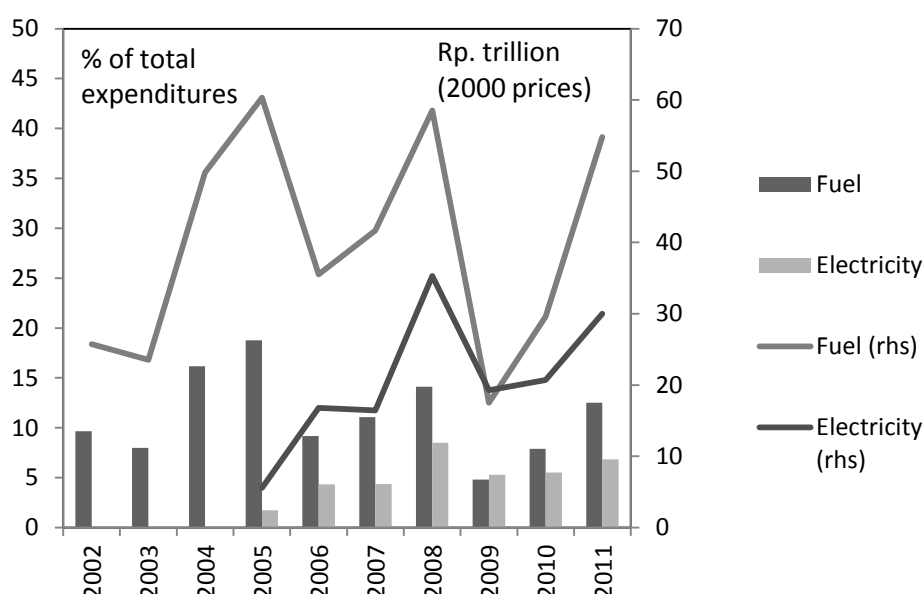
Source: BPS, 2008; BPS, 2012a; authors' calculations.
Note: 2002-2010 figures are LKPP, 2011 figures are APBN, no electricity figures before 2005.

Not only are subsidies unproductive and poorly designed, but they hollow out resource revenues and windfall gains. With high energy prices, the opportunity costs of subsidies rise as spending is restricted by the burden of large, unpredictable subsidies. The fact is that a US$10 increase in the oil price results in roughly 25% growth in revenues, but at the same time fuel subsidies increase by at least 80%, which means that windfall gains can end up with a negative or neutral impact on central government budget (Enrique et al., 2010). Furthermore, the central government ends up spending most of resource revenues on subsidies. Looking at the commodity balance (commodity revenues minus energy subsidies), it shows decline since 2005. The net effect from resource revenues is becoming almost insignificant with Rp.23 trillion in 2011 – 2% of total central government expenditures (Agustina et al., 2008; see Figure 9).

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[20] No data available for electricity subsidies before 2005.

Figure 9 – The commodity/energy balance[21]
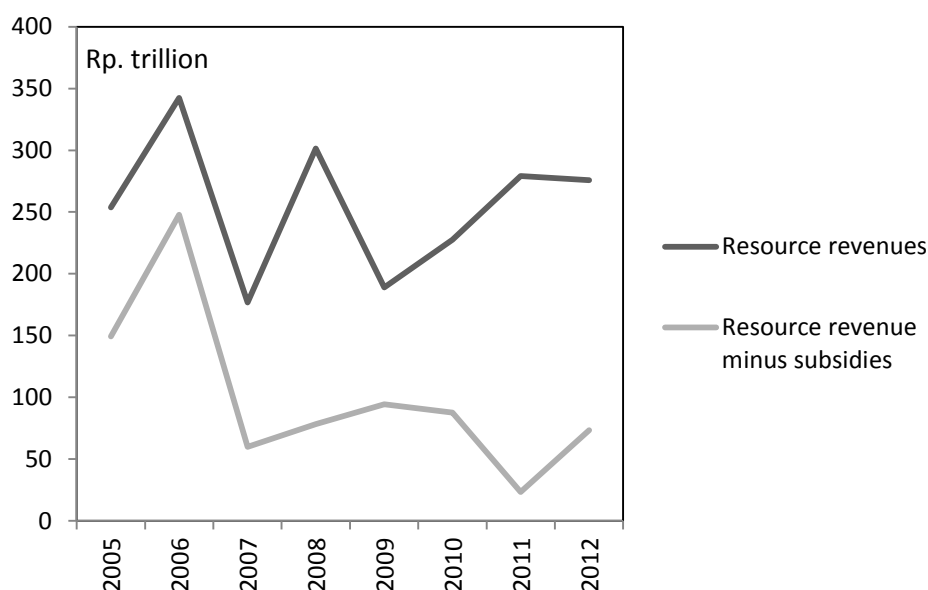
Note: 2002-2010 figures are LKPP, 2011 figures are APBN, 2012 figures are RAPBN.

Energy subsidies and debt payments end up crowding out, or at least restricting, public investment and spending important for development and sustainable growth. With high spending on debt repayments and subsidies, increased revenues from commodities have not unleashed Indonesia's full growth potential. Fiscal consolidation after the Asian Financial Crisis was needed, but at the same time the government's failure to contain energy subsidies reduced the space for public investment. Budget figures indicate that public investment is sacrificed in years with high outlays on fuel subsidies. In effect, the government has used a large part of the commodity windfall revenue to pay for subsidies instead fostering development – our rough windfall estimate account for almost one fourth of fuel subsidies from 2003 until 2011. Central government spends the equivalent of two-thirds of education and health spending on maintaining constant prices on various energy products.[22]

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[21] Resource revenues: non-tax oil and gas, non-tax mining, forestry and geothermal, and oil and gas tax.
[22] Fuel subsidies averaged a share of 12% from 2001 until 2007, while the education sector accounted for an average 15% and the health sector accounted for 4% (BPS, 2008; BPS, 2012a; World Bank, 2007).

Figure 10 – Decline in public investment and a negative correlation with fuel subsidy expenditure[23]
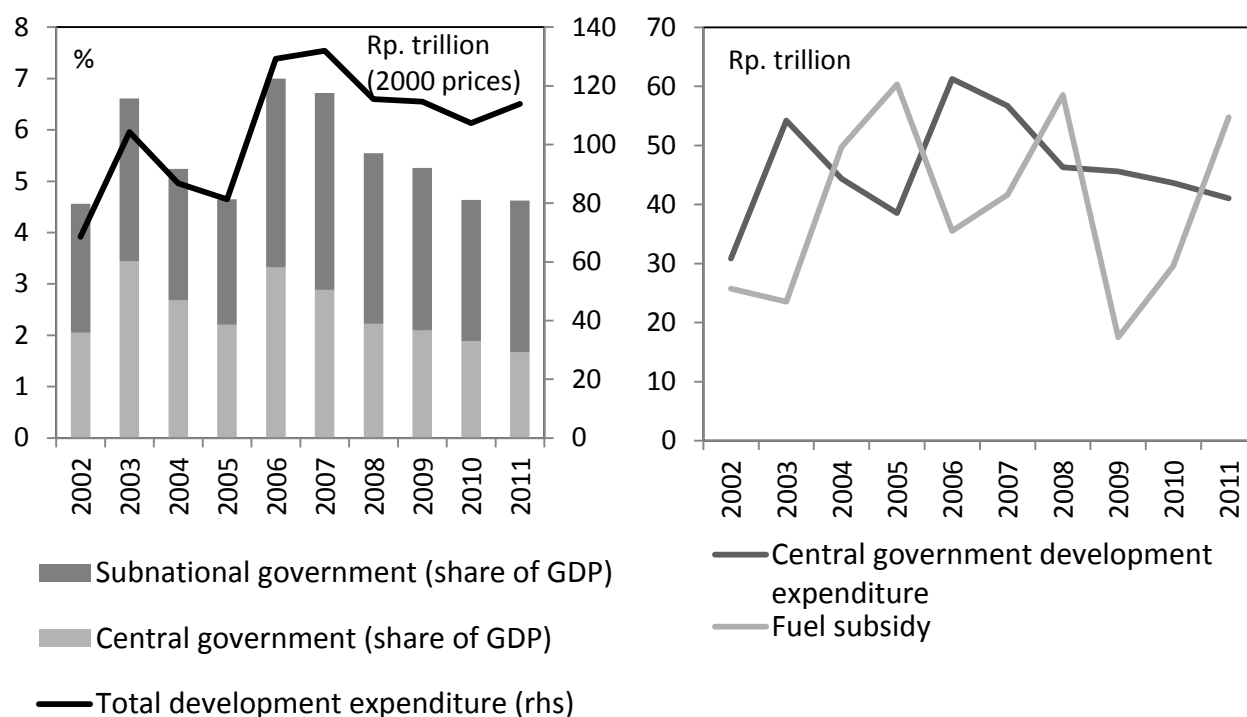
Source: BPS, 2008; BPS, 2012a; BPS, 2012b; World Bank, 2007; authors' calculations.
Note: 2002-2010 figures are LKPP, 2011 figures are APBN.

There has been a decline in public investment.[23] Combining central and subnational public investment, Figure 10 above shows public investment as a share of GDP returned briefly to pre-crisis in 2006, but has since then fallen both in real terms and as share of GDP. Throughout, half the aggregate public investment is procured at subnational levels (predominantly district level, as provincial government account only for a small share of expenditure) (World Bank, 2007).

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[23] Similar to World Bank (2007), we use development expenditure as a rough proxy for public investment. After 2004, public investment is linked to social and capital expenditure in the budget.

Box 1 – History of fuel subsidies

Suharto's New Order regime inherited fuel subsidies[24] in 1967. After the AFC, the government has experimented with a number of different subsidy regimes.

In 2002, the government had a unique opportunity to reduce the subsidy, domestic market prices moved with world prices, and even fell below world prices due to appreciation of the exchange rate. Following this, government made an attempt to close the gap between domestic and international fuel prices in 2003. But the poorly prepared reform by a government that was still rebuilding its reputations after the AFC, resulted in public protest. The government rolled back most of the increase in the domestic fuel price and broke the link to world prices.

In 2005 a spike in oil prices forced the government to review the subsidy of fuel products. The changes included increased price of subsidised products and a reduction in the number of products eligible for the subsidy. A subsidy was maintained for kerosene for household consumption, for low octane automotive fuel and diesel, and for liquefied petroleum gas (LPG) for household use. The government also continued to subsidise the state-owned electricity company. The reform included no link to further changes in world prices and subsidies remained regressive. So when prices continued to increase and consumption recovered the changes implemented did not stop large increases in expenditure paid out to subsidies.

The 2007 spike in fuel prices put renewed pressure on the government budget, even more than in 2005. To relieve some of the pressure on the budget and to reassure financial markets, the government was again forced to review the fuel subsidies. It adjusted the regulated fuel prices (by an average of 29% in May 2008) when the international price of crude oil rose beyond the US$110 per barrel threshold. The increase in subsidised fuel was still smaller than increases in world fuel prices, thus expenditure savings were once again eaten up.

Since 2008, no reform has been implemented. Reforms proposed for April 2012 was put off by parliament unless oil prices exceed a revised higher threshold. In general, attempts to reform have been met with street protests and parliamentary rebellion. As a result, Indonesia's maintains fixed prices for most fuels and for electricity well below their economic costs and the international price level.

Source: IMF, 2012b; Enrique et al., 2010; Agustina et al., 2008.

Lower public investment has meant insufficient infrastructure. This backlog in infrastructure (e.g. power generation and inter-island connectivity) affects production possibilities and efficiency. Growth rates in infrastructure investments have been high, with a growing share of GDP, but not high enough to close the financing gap or recover to pre-AFC levels (World Bank, 2007; see Figure 11). World Bank (2007) estimates show that Indonesia has to invest 2% of GDP, or US$6 million annually, to reach the pre-AFC level. It is a large task to address the backlog of past underinvestment while also undertaking major new projects to meet expanding demand and further drive growth (including commodity driven growth). Poor infrastructure reduces the competiveness of Indonesian products. It inhibits greater processing of commodities and the export of higher value-added products. It is 2.7 times more expensive to transport a container from Jakarta to Padang than the same container to Singapore (Enrique et al., 2010).

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[24] The fuel subsidy is defined as the difference between the regulated retail price and an agreed benchmark price which is an estimate of the 'economic price'. Given that Indonesia is a net importer of fuel products, the economic price is therefore the price in the international market, currently set as the Mid Oil Platts Singapore price MOPS), plus a factor to cover freight, taxes, and margins for corporate profit (i.e. so that the economic price allows for an agreed level of accounting profit) (Agustina et al., 2008).

Figure 11 – Infrastructure investment levels[25]
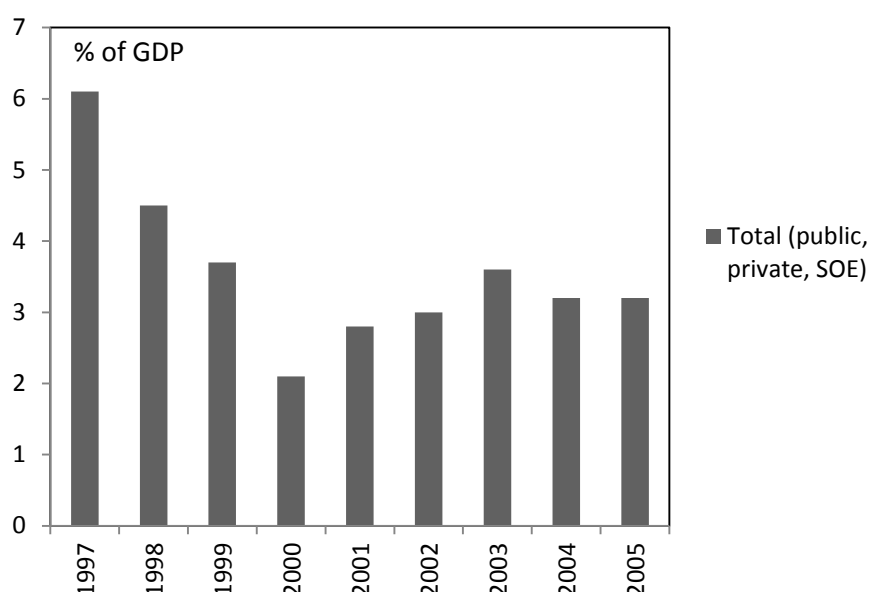
Source: World Bank, 2007.

Insufficient infrastructure is amplified by lack of private engagement. Infrastructure is a combination of public and private investment (like shown in Figure 11 where public investment in 2000 accounts for less than half of infrastructure investment). Private investment has not flown into infrastructure projects due to uncertainties of the legal system, the lack of a government strategy for investment guarantees, and the fundamental issues behind the under-pricing of services for social and political reasons (World Bank, 2007). Recognising the need for private funds, public private partnership (PPP) reforms have been a central element of the government's infrastructure agenda. Both the MP3PI and the Mid-Term Development Plan 2010-14 focus on PPP and there have been changes to the business climate such as the new law on Land Acquisition[26] (OECD, 2012; Chadari, 2009).

2.3   Governance structures impact expenditure efficiency

Decentralised structures complicate service delivery. There are 33 provinces, 405 districts, 97 cities and 6,543 sub-districts in Indonesia.[27] Subnational governments vary in size: some are too large and others are too small to deliver services efficiently. On paper, the majority of expenditure responsibilities are carried out by district and provincial[28] government (apart from foreign relations, defence and security policy, judiciary and law enforcement, monetary and macroeconomic policies and religious affairs).[29] In practice, the distribution of specific responsibilities is regulated by a number of sectoral laws and numerous government regulations and ministerial decrees. For most sectors, responsibilities are shared among government levels, with the central government

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[25] Total infrastructure investment from World Bank (2007) on exists until 2006. No complete data series has been identified between 2006 and 2008.

[26] It allows government to take over land for development while owners are guaranteed a compensation (OECD, 2012)

[27] Indonesia's political and administrative system consists of three formal government levels, the central; the provincial level (Daerah Tingkat I or Dati I); the district level (Daerah Tingat II or Dati II or Kabupatens) and the urban municipalities (cities, towns or Kotamadya) (Shah, 2012).

[28] Provincial government has a smaller role, more supervisory. It coordinates across the province and is the representative in the central government (Shah, 2012).

[29] Law 25/1999 on fiscal balance between the central government and the regions channelled budgetary flows to the district level. Subsequently in September 2004, the parliament (Dewan Perwakilan Rakyat) approved Law 32/2004 on sub-national governance and Law 33/2004 on fiscal decentralisation, thereby reinforcing Indonesia's effort to create a decentralised system of governance (Shah, 2012).

involved also in formally decentralised sectors. These structures put pressure on the fiscal system to ensure minimum quantity, quality and access in public service to enable the convergence of living conditions across Indonesia (Shah, 2012).

Focus on fiscal gap filling (through DAU and DAK) affects public spending efficiency at subnational level. The overall effect of the transfer system is to provide roughly equal transfers per capita, but also remains one of the most complex systems in the world. Indonesia's system of intergovernmental finance is primarily focused on fiscal gap-filling to ensure revenue adequacy and local autonomy. Expenditure allocations are not output based. Combined with confusion about roles and responsibilities between the central line ministries and the subnational governments and the lack of capacity in procurement at local level, this has a negative effect on spending efficiency (Chadari, 2009).[30] The result is a lack of accountability to local residents for service delivery performance (Agustina et al., 2008; Agustina et al., 2012; Shah, 2012).

In general, no one has the responsibility to reform the civil service. Improvements in Indonesia's fiscal institutions during the commodity boom have been notable. However, further reforms are needed to improve fiscal institutions and transparency (IMF, 2010). Overlapping authorities share responsibilities for managing and overseeing various aspects of the civil service. No agency has the recognised authority to undertake comprehensive civil service reform (World Bank, 2007).

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[30] For example, subnational reserves have been growing during the commodity boom linked to lack of capacity at subnational level to undertake procurement and service delivery (Lewis and Oosterman, 2009; Chadari, 2009)

3 Distribution of profits: Indonesian conglomerates

Public sector expenditure of windfall gains is only part of the whole story. Windfall gains also accrue to the private sector in the shape of rents (i.e. the surplus value after all costs and normal returns have been accounted for). As we discuss in our paper on economic growth, commodity sectors influence the Indonesian economy directly through exports as well as indirectly through investment of rents. To analyse the impact of the private sector, we need to understand the size of resource rents. With high commodity exports during the recent commodity price boom, it is expected that these rents will be significant. As we have not found an account of the magnitude of resource rents, we construct our own estimate.

Our brief analysis points towards significant rents in the private sector. We assume that 80% of value increases in commodity exports are due to price changes based on World Bank estimates.[31] Subtracting export taxes from this figure gives us a rough rent estimate. Figure 12 shows that resource rents are of significant magnitude, accounting for 1.3% of GDP or 4.5% of gross national savings between 2003 and 2011. Even if we reduce the share to 60% of the increase in export value attributable to price changes, the total rents are larger than total domestic direct investment in most years. Most likely more rents should be added to the calculation as rents also accrue to the private sector from domestic consumption of commodities. Also, OECD (2012) reports that one fourth of corporate taxes come from commodity related firms, indicating that these sectors earn relatively high profits.

Figure 12 – Estimates of rents to the private commodity sector from exports[32]
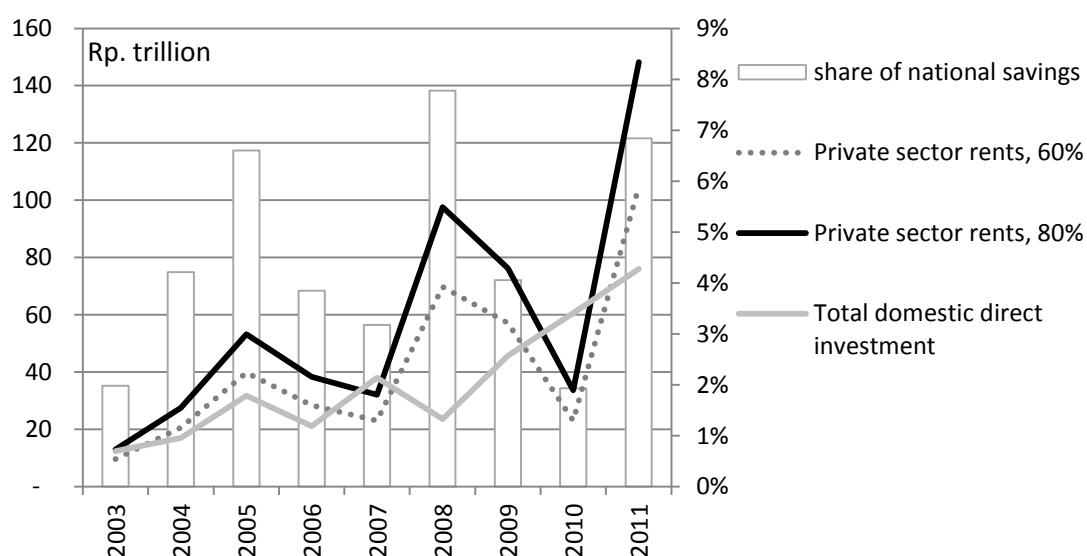
Source: BPS, 2008; BPS, 2012a; World Bank, 2012b; BPKM, 2012; authors' calculations.

Similar to the public revenues and expenditure, the commodity price boom influences Indonesian economy through allocation of rents. With large rents, as argued in the previous paragraph, part of impact of the commodity price boom is likely generated from the private sector through increased pay, more jobs and domestic investments in other sectors.

So to what extent has this resource rent indirectly affected other sectors' growth performance? Theory suggests that a commodity boom is often reflected in investment in non-

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[31] The World Bank estimate that 82% of growth in commodity exports is due to price increases (Enrique et al., 2010). Commodity exports included are: mining sectors, crude oil, gas and palm oil (BPS, 2012a; BPS, 2008).
[32] We assume that 80% of the value increase in commodity exports (oil, gas and minerals) is due to price increases. The price increase minus export tax payments then equals the rent.

tradable capital: essentially a construction boom. This is a complex question, as we do not have information on the investment decisions taken by commodity firms.[33] Given this, we do not present a comprehensive analysis, but give an indication of the role of resource rents. We base our analysis on conglomerates with activities in commodity sectors. To identify these we use Globe Asia's yearly list of top 100 groups in Indonesia (Globe Asia, 2011; Globe Asia, 2012).[34]

A large number of conglomerates operate in commodities allowing commodity profits to be used for investment in, for example, construction activities. Out of the 50 largest conglomerates, 50% have activities in commodity sectors.[35] Commodity conglomerates are large; their revenues in 2011 amounted to US$62.5 billion, or 7.4% of GDP. It is not possible to separate out conglomerates activities in commodity sectors but this gives a clear indication to the economic importance of such companies. With activities in commodity sectors as well as services, infrastructure or construction sectors, all these companies are able to move around cash between sectors and industries. This is part of the explanation for the construction boom, in particular, in Jakarta.

The World Bank estimates that the Indonesian middle class has increased significantly. A larger middle class is crucial to the investment decisions made by private sectors. Currently the size of the middle class is at around 40 million. If Indonesia's economy continues to develop on its current trend, this number could more than triple in the next 20 years. The middle class's spending power, consumption and lifestyle choices are important for business groups who focus on the domestic economy. This spending power is also linked to the commodity boom. Incomes in resource rich provinces, especially in the resource rich areas of Sumatra and Kalimantan, were significantly boosted during the commodity price boom. Increase in consumption power was in fact created by the impact of *all* commodities on the economy – Enrique et al. (2010) find that is has most likely led to a reduction in poverty rates of 4.1% from 2005 until 2008. A development caused by real wage increases in the agricultural sector and real returns to capital owned by the poor which out-weighted the increase in stable food prices. Such developments – increasing purchasing power – have led to conglomerates' expansion into sales in durable goods.

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[33] The groups do not have obligation to publish names of all their companies, therefore even if a company/subsidiary, especially the ones on stock market, publish its information, we cannot directly attach it to a certain conglomerate group/its holding company. Due to the limited information (and data) available on private companies decisions, we base our analysis on the Globe Asia, and Google search of company websites and news sites.

[34] We acknowledge that the data might be limited and not reflect entire facts of each group however it gives us a sense of the current situation in Indonesia.

[35] Plantation, mining, oil and gas, pulp, paper, energy.

4   The 'Dutch disease' hypothesis: the Indonesian case

With real appreciation of the rupiah Indonesia risks 'Dutch disease' symptoms. Indonesia experienced an export boom from 2002-03 up to the 2008 global financial crisis driven largely by surging commodity exports. While it contributed partly to sustain economic growth during the period of the commodity boom, the consequent real appreciation of the rupiah raises concerns about its negative effect on manufacturing and tradable sectors, a phenomenon called 'Dutch disease'.

'Dutch disease' refers to a situation where a boom in the natural resources sector harms through large influx of foreign capital appreciates the exchange rate. This harms the competitiveness of tradable sectors that as a result contract. The term was first coined by *The Economist* to describe how vast natural gas discoveries in the North Sea in the 1960s eventually ended up harming the other sectors of Netherlands' economy. Since then, seminal work has been done by, for example, Corden and Neary (1982), Sachs (1999), and Sachs and Warner (2001) (see Box 2 for an overview of 'Dutch disease'). Empirically there are several examples of 'Dutch disease' in natural resource abundant countries.

The symptoms of 'Dutch disease' are normally associated with (i) real currency appreciation of the domestic currency, (ii) a slowdown in manufacturing exports, output and employment, and (iii) an increase in wages. The underlying mechanisms which result in these symptoms are explained in Box 2.

Box 2 – 'Dutch disease' mechanisms: movement effect and spending effects

To understand the mechanisms and processes underlying 'Dutch disease', let us assume that an economy produces two tradable goods the prices of which are determined exogenously in the international market. Let us also assume that there is a third non-tradable good whose price is determined by the domestic market through the interaction between supply and domestic demand. Let us also assume that capital is a fixed factor of production, whereas labour can be varied. According to the mechanisms governing 'Dutch disease', **a positive shock to the natural resources sector will produce two effects: movement effect and spending effect.**

The movement effect considers changes in supply. When a natural resource boom occurs, marginal productivity of labour in the concerned sector increases, the marginal cost of the sector reduces, and there is an outward shift in the supply curve of the goods in the sector. This causes the surging sector to demand more labour, thus initiating a transfer from the non-tradable and manufacturing sectors to the natural resources sector. This shift also puts upward wage pressures on the entire economy, and increases production costs for all types of goods including non-tradable goods, thus appreciating the real exchange rate.

The spending effect considers changes in demand. The natural resource boom generates increased revenues and demand for all goods in the economy. Since we have assumed that the price of tradable goods is determined on the international market, an increase in demand for goods only affects the price of non-tradable goods (increase). This further leads to a real exchange rate appreciation.

Source: IMF, 2010.

4.1   Why is Indonesia at risk of 'Dutch disease'?

We identify two key patterns in Indonesia's trade and exchange rate that could indicate 'Dutch disease'. First, as mentioned above, in the five years preceding the global financial crisis, Indonesia experienced an impressive period of export growth in commodities. Following a disappointing export performance in the very early 2000s, this acceleration in exports increased the dollar value of exports by more than 100% from 2003 to 2008 (IMF, 2010). Exports (as an average share of GDP) during 2002-11 stood at 30% while the average annual growth rate of exports during this period was 8% (World Bank, 2012b).

Most export performance reflected a booming commodity sector. Figure 13 shows the sharp rise in commodity exports during the period of 2003-08. The value of commodity exports grew by 194% during this period while manufacturing exports grew by 68% (World Bank, 2012b).

During the same period, manufacturing export's share of total exports decreased with 20 percentage points in 10 years to 34% in 2011 (see Figure 13). On the other hand, commodity exports, such as raw materials, mining, and oil and gas, have all shown increasing shares of exports. Figure 13 plots the composition of exports from 1997 to 2010. It is interesting to notice that exports of ores and metals sub-class of natural resources increased steadily from 2003 before 'crashing' around 2008 during the GFC. It is indeed possible 'Dutch disease' effects during this period of rapid export growth that from 2003 up to the GFC in 2007-08 that we are interested in studying.

Figure 13 – Booming commodity export in the composition and value of merchandise exports (1997-2010)
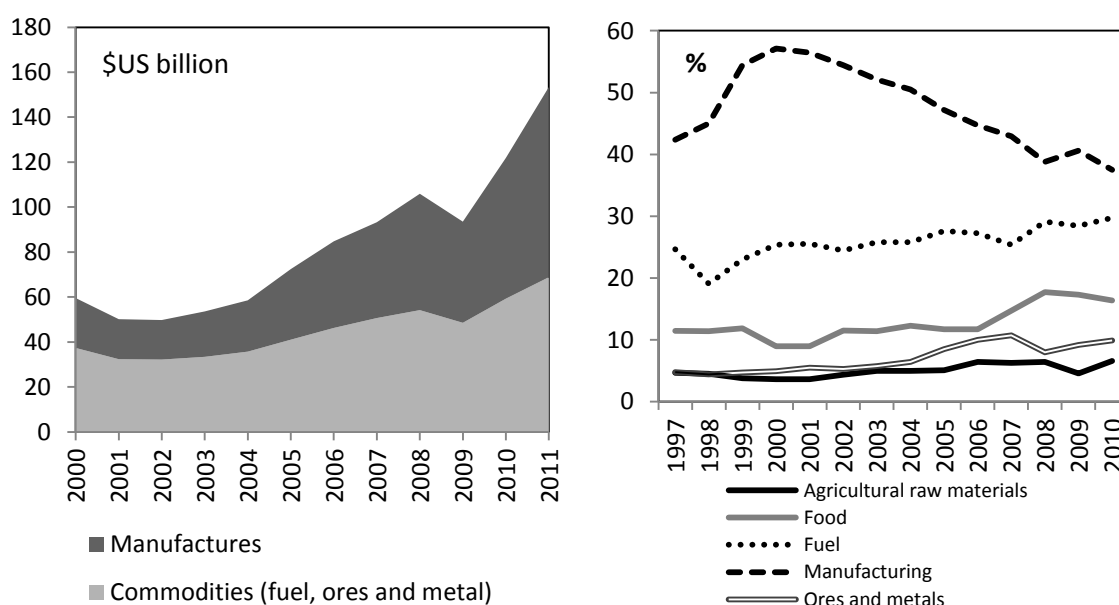
Source: World Bank, 2012b.

This was generated in part by the surge of demand from China and India. During the period from 2003 to 2008 Indonesia's exports to India and China grew by multiples of four and three respectively. By the close of the last decade, the value of these exports stood at US$6 billion and US$5.7 billion respectively (MGI, 2012). The annual growth trend between 2000 and 2010 of exports (mainly consisting of palm oil and coal) to China and India has been 15% and 20% respectively.

Second, 'Dutch disease' concerns emanates from an appreciating real exchange rate. Upward pressures on the rupiah have triggered a real exchange rate appreciation by 14% from 2003 to 2008 (IMF, 2010; see Figure 14). This is particular concerning if the commodity boom leads to contraction of the manufacturing sector.

Figure 14 – The real effective exchange rate (2000-2012)
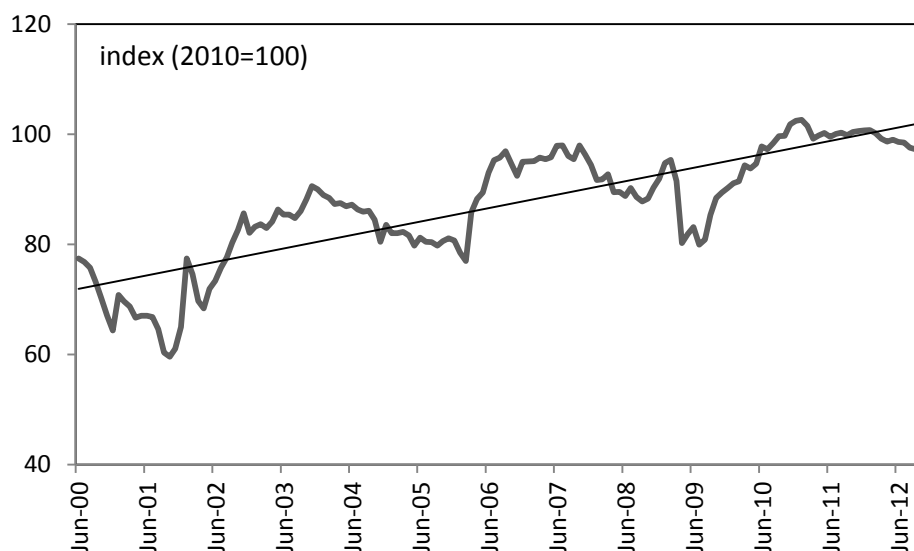
Source: BIS, 2012.

4.2   Is Indonesia actually experiencing 'Dutch disease'?

Indonesia's commodity price boom in recent years has been accompanied by significant real exchange rate appreciation. This leads to concerns that possible 'Dutch disease' effects may prove disadvantageous for other sectors in the economy. Keeping in view the facts reviewed above, we ask whether Indonesia is actually experiencing 'Dutch disease' effects.

Evidence on whether manufacturing exports have been affected by the real exchange rate appreciations is inconclusive. Moreover, there are significant differences within the manufacturing sector to draw any conclusion. As mentioned above, manufacturing exports' share of total exports decreased significantly during the last decade while commodity exports, such as raw materials, mining and oil and gas, have all showed increasing shares of exports (IMF, 2010). Yet, it cannot be denied that manufacturing growth and productivity have been robust at an aggregate level and there is absence of clear evidence of 'Dutch disease' debilitating Indonesia's manufacturing[36].

Further, source of poor performance of sectors such agriculture are hard to pin down to 'Dutch disease' effects alone. This is because their poor performance did not begin in 2003 with the commodity boom. In other words, we cannot attribute poor sectoral performance, of say the agricultural sector, to the export boom in natural resources because agriculture was already in the decline when the export boom kicked in. Since 1999 agricultural GDP (as a percentage of total GDP) has shown a declining trend (World Bank, 2012b).

Further, the authors of IMF (2010) argue that only recently, wage pressures have started to appear in the manufacturing sector. Until 2008, wage pressures on the manufacturing sector

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[36] We have also discussed the resilient and positive total factor productivity (TFP) of Indonesia's manufacturing sector in the *Drivers of Indonesia's Growth* paper.

had not materialised and wages, in fact, in this sector decreased by about 15% in real terms during 2003−08. As we have discussed above, economy-wide upward wage pressures originating from wage increases in the natural resources sector is seen as a symptom of 'Dutch disease'.

In sum, we investigated existing literature and recent macroeconomic data from Indonesia to assess the validity of these concerns. We find no strong evidence of 'Dutch disease' in Indonesia as arising out of the commodity export boom. Further, weak performance in some sectors of the economy cannot conclusively be linked to the commodity boom.

4.3 Did the Indonesian firm benefit from the global commodity price boom?

Indonesia is a net importer of oil but a net exporter of several minerals, gas and coal. The global commodity price boom is anticipated to have several countervailing impacts for the Indonesian economy. Recent research has shown wide heterogeneity in productivity across firms, especially between commodity and non-commodity based production due to fluctuations in global commodities prices.

We now seek to understand the impact of the global commodity price boom from the point-of-view of the Indonesian firm. We use firm-level longitudinal data to investigate the relationship between exports, firm dynamics, and productivity, in order to throw light on the productivity differentials that exist between exporting and non-exporting firms. We test the following two hypotheses:[37]

- Exporting firms are among the most productive firms; and
- The commodity price boom had a 'Dutch disease' effect on manufacturing.

Our measure for firm-level productivity is value-added per worker. The reason for this measure instead of gross output per worker is to avoid the impact of variation in intermediate inputs and to capture variation in the workday, as is done for instance in Jensen et al. (2001).[38]

A one year lag of the real effective exchange rate (REER) is positively associated with movements in real value-added per worker when looking at all firms.[39] This suggests that during the commodity boom, there is no evidence of the 'Dutch disease', at least at the aggregate manufacturing level. Figure 15 shows the evolution of real value-added per worker and a one year lag of the REER. Looking at all firms surveyed, real productivity remains flat, but upward trending, during the commodity boom, a period where the REER appreciates due to upward pressure in international market. This does not support the argument of 'Dutch disease' in Indonesia.

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[37] This hypothesis has been supported by both anecdotal (Nishimizu and Page, 1982; Krugman, 1987; Rodrik, 1988, 1991; Grossman and Helpman, 1991; Haddad, 1993; Harrison, 1994; Aw and Hwang, 1995) and empirical evidence (Bernard and Jensen, 1995, 1999; Bigsten, Collier, Dercon, et al. (2000); Bergoeing, Micco and Andrea (2011)). However, the corresponding evidence of Indonesia's export-orientation on firm-level efficiency is resoundingly scarce, and this is a knowledge gap our study seeks to address.

[38] BPS Survey includes a variable on value-added, which is calculated as the difference between the cumulative value of all income and the cumulative value of all expenses. This variable is then divided by the average number total workers per working day, which is also available in the Survey.

[39] The REER measures the value of rupiah: a rise in the index indicates appreciation in rupiah against a basket of selected currencies adjusted for inflation.

Figure 15 – Real value-added per worker vs. lagged REER index
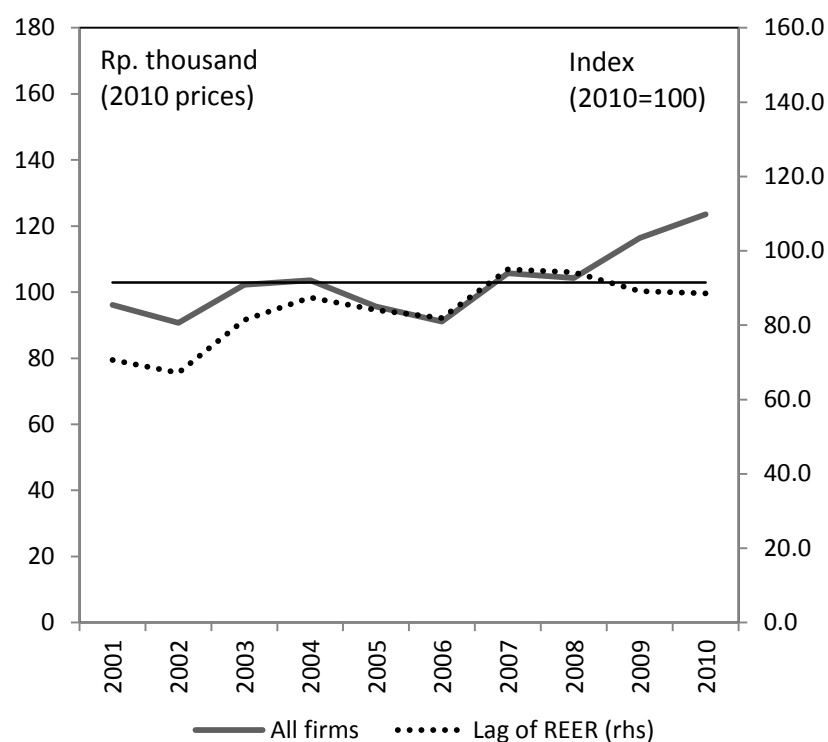
Source: BPS, 2012c; World Bank, 2012b; BIS, 2012.

'Dutch disease' is typically associated with a squeeze of the manufacturing sector, in particular the exporting part. A decline in the share of exporting firms, as well as higher productivity for exporters could indicate that the appreciation of the REER results in exit for less productive firms. At the onset of the commodity boom, the proportion of firms exporting increased to a peak of 24% in 2004, since then the share has declined; in 2010 it was only 14%. This suggests that there could possibly have been some impact of 'Dutch disease' by squeezing out the least productive firms.

Comparing exporting and non-exporting firms, exporters are both more productive and have increased their productivity over the period. This increase in average productivity for exporters correlates with the lower proportion of firms exporting and also with the change in the exchange rate. This could be an indication that 'Dutch disease' has led to this firm exit, however without more information about the firms that have exited we cannot extend this argument (see Figure 16).

Figure 16 – Trend in share of exporting firms and the correlation between productivity and the REER
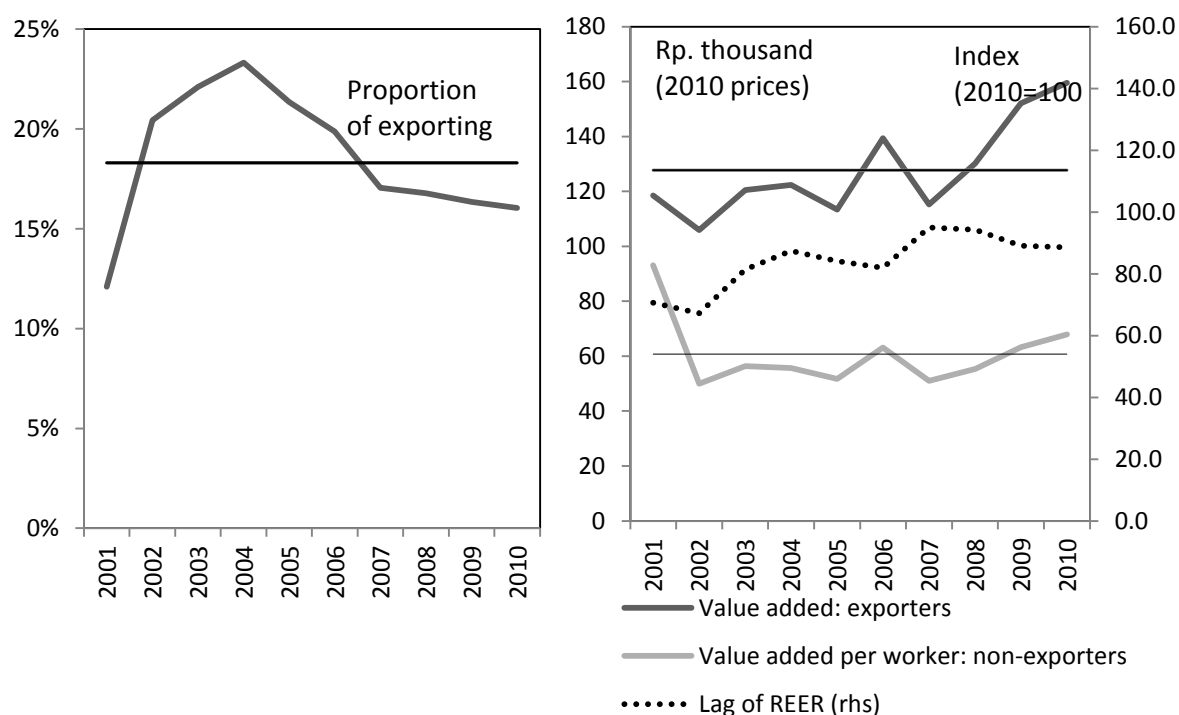
Source: BPS, 2012c; World Bank, 2012b; BIS, 2012.

'Dutch disease' might still be present. It should be noted that the analysis does not focus only on non-commodity exporting firms due to data constraints, which are considered to be the ones with highest risk of 'Dutch disease'. We also do not have any information on the characteristics of exiting firms. Furthermore, annual data restricts us from testing REER effects on productivity shorter than one year.

These findings are also supported by econometric results, which confirm our first hypothesis, but reject the second, presented in Box 3.

Box 3 – What does firm-specific analysis tell us about the determinants of productivity?

The following functional form is proposed in order to examine the evolution of productivity among Indonesian manufacturing firms during 2001-10:

$$\ln VA_{it} = \alpha + \beta_1 D(X)_{it} + \beta_2 \ln CG_{it} + \beta_3\, CF_{it} + \beta_4 \ln L_{it} + \beta_5 PC_{it} + \beta_6 REER_{t-1} + \beta_7 D(Java)_i + \delta\, t + \epsilon_{it}$$

where VA_{it} represents real value-added per worker of firm i in year t, $D(x)_{it}$ is a dummy equal to 1 if the firm exports in that year and zero otherwise. CG_{it} is the estimated real total value of capital goods at market price, CF_{it} is the % of capital by foreign ownership. PC_{it} is the production capacity of the firm in% of total, and $REER_{t-1}$ is the first lag of real effective exchange rate and L_{it} is the firm's average total workers per day to account for the size of the firm. $D(Java)_i$ is a dummy denoting whether the firm is located on Java and finally $trend_t$ is the time trend that accounts for non-stationary trends such as advances in technology.

The stylised facts suggests that the coefficients on $D(x)_{it}$, CG_{it} and CF_{it}, should be positive. Both Bigsten et al. (2000) and Bergoeing et al. (2011) indicate that exporting firms are more productive. Moreover, Arnold and Javorcik (2009) find that foreign ownership has a positive effect on the productivity of the firm. L_{it} is a proxy for the size of the firm, for which the coefficient sign is unknown but could also capture the effects of larger firms' easier access to foreign markets. PC_{it} measures capacity utilisation, which should have a positive impact on value-added per worker. $REER_{t-1}$ sheds some evidence to what extent the 'Dutch disease' is hampering productivity; it should have a negative impact on productivity. As rupiah appreciates, the price of exports rises, so the exporting firms become less productive as the demand for their products decreases.

To test the validity of our hypotheses, we estimate the equation above using a longitudinal panel regression. A fixed-effects[1] model with robust standard errors is estimated. Its regression output is presented in the table below. There are 120,627 observations for 35,738 firms in the estimation sample which implies that a firm remains in the sample for an average of 3.4 years

Table 1 – Firm level fixed-effects (within) regression

Dependent variable: $\ln VA_{it}$					
		Coefficient estimate	Robust standard error	t-statistic	p-value
$D(X)_{it}$	β_1	0.11338***	0.012729	8.91	<0.001
$\ln CG_{it}$	β_2	0.12016***	0.004328	27.76	<0.001
CF_{it}	β_3	0.00341***	0.000369	9.24	<0.001
$\ln L_{it}$	β_4	-0.03035**	0.012142	-2.5	0.012
PC_{it}	β_5	0.00073***	0.000122	5.97	<0.001
$REER_{t-1}$	β_6	0.00124***	0.000427	2.91	0.004
$D(Java)_i$	β_7	-0.37598***	0.101666	-3.7	<0.001
$t\ (trend)$	δ	-0.00496	0.003834	-1.295	0.195
α		9.03577			

R^2: within = 0.0335 between = 0.2634 overall = 0.2445	*** significant at 1% ** significant at 5%	$n = 35,738$ $\sigma_v = 1.10$ $\sigma_\epsilon = 0.69$

The coefficient estimates confirm our hypothesis that more productive firms export as evident in the sign on the export dummy. However, there is no evidence of the 'Dutch disease'. The coefficient on the real effective exchange rate has a small but positive effect on productivity with a one year delay. This is consistent with the finding in the section above. One limitation of the annual data is that we cannot study exchange rate effects shorter than one year on productivity. Nevertheless, the REER does not have any contemporaneous effect on productivity, which is what we observe if we include $REER_t$ instead of $REER_{t-1}$ in the regression.

A percentage change in the amount of capital goods per worker increases productivity of the worker by about 0.12%. **Similar as in Arnold and Javorcik (2009), the firms are more productive when the share of foreign ownership is higher, although this effect is small and the relationship may not be linear.** This finding is based on the coefficient on CF_{it}. This may be a result of knowledge spill-overs associated with FDI. Larger firms are also slightly less productive, with a one% increase in the number of workers corresponding to a 0.03% decrease in the value-added per worker. The percentage of production capacity utilisation of the firm has a small but positive effect on the productivity. Finally, the time trend does not show to have any additional systematic effect on productivity over the selected period.

5   Conclusion

We started out by posing the question: what have been the results of Indonesia's commodity price boom? Through this analysis we have analysed the response by commodity sectors, looked at windfall gains and rents accruing to government and private firms as well as analysed the existence of 'Dutch disease' at both national and firm level. A mixed picture reveals from this analysis.

The impact of the boom has been positive in terms of export revenues, but this has been driven almost entirely higher global prices with little supply response, implying a fragile performance. We only identify two key commodity sectors which have experienced strong supply responses and thereby affected the real economy. In particular, the oil industry has experienced a decline that has affected both export performance and government revenues.

Revenues have been driven by domestic income tax, however, the share of resource revenues remain important. We estimate that the governments' windfall gains between 2002 and 2011 amounts to 3.6% of GDP in 2011. Weak supply response affected these gains; the oil sector, which continues to generate the most revenues, decreased production during the boom.

So how has government spent these windfall gains? With prioritisation of fiscal consolidation after the AFC and unsuccessful attempts to remove energy subsidies, the majority of public expenditure has been allocated to relatively unproductive expenditure. Fuel subsidies, due to volatile fuel prices, have crowded out overall public investment. One part of public investment in particular that has suffered from underinvestment is infrastructure. Indonesia has a large backlog in infrastructure, which affects the economy's growth potential especially in power generation and inter-island connectivity.

Spending on fuel subsidies almost equals total resource revenues. In effect, the positive impact of resource revenues is largely eliminated, especially as energy subsidies are regressive and have a negative impact on Indonesian firms' competitiveness.

The lack of efficiency in public spending is linked to poorly managed decentralisation. With lack of capacity in procurement and public finance management at subnational levels, funds allocated from the central government do not result in improved service delivery or infrastructure investment. The latter is affected by lack of regulation and weak institutions at the national level.

Overall the impact from the commodity boom on public finances has been limited; when we turn to private sector rents, our analysis indicates large indirect impacts especially on other sectors. Our analysis points towards significant rents, accounting for 4.5% of gross national savings each year between 2003 and 2011. This is significant, and with large commodity conglomerates operating in Indonesia, such rents are potentially transferred from the commodity sector to other more domestically orientated sectors including construction. It is difficult to come to any well-founded conclusion given the lack of information but this does give a hint to the impact generated by the boom through the private sector.

Another channel for indirect impacts of the commodity boom is the possibility of 'Dutch disease', or a contraction of the manufacturing sector. Increase in commodity prices and exports combined with an appreciation of the REER raises concerns about 'Dutch disease'. We investigate this at both macro and firm level, and do not find substantial evidence that 'Dutch disease' has occurred during the recent commodity boom. At macro level, weak performance in some sectors of the economy cannot conclusively be linked to the commodity boom. Our own analysis of firm-level manufacturing data does not offer any evidence of 'Dutch disease' in the manufacturing sector at the aggregate level. In short, we cannot attribute the negative development of manufacturing

industry and export performance to a real exchange rate appreciation. However, 'Dutch disease' might still be present, as we observe that less productive exporters exit – potentially a result of an appreciated REER.

It appears that Indonesia has missed the opportunity to place itself on a higher, more sustainable growth trajectory. Export revenues have been driven almost entirely by higher global prices, with little supply response. So, the boom did not change the structures of the economy. In public finances, resource revenues have been a declining share of government revenue. In 2011 resource revenues were about the same magnitude as the fuel subsidy. At the same time, fiscal consolidation, including holding back on infrastructure investment, has achieved an impressive macro-economic position – as witnessed by the transformation of the external debt position. However, Indonesia's opportunity presented by the extra resource revenue to achieve fiscal consolidation and sustain infrastructure investment has not materialised – in effect, the extra money has sustained the fuel subsidy. In the private sector, there has been an indirect boost to domestic consumption driving GDP growth as private exporters invest in shopping malls and re-cycle the rents from high commodity prices, leading to less focus on tradable sectors. Although, we find inconclusive evidence of 'Dutch disease', manufacturing sector performance and job creation have still been poor.

Should commodity prices drop; the Indonesian economy will most likely come to suffer. There would be a decline in commodity export value. Public finances might decline, it would depend on whether decreased revenues come from oil and gas, which has already declined, becomes smaller or larger than fuel subsidy savings. In the private sector, rents would decline most likely affecting domestic consumption and investment.

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Annex A   Supply response illustrations

Figure A.1 – Key commodity exports (actual values)
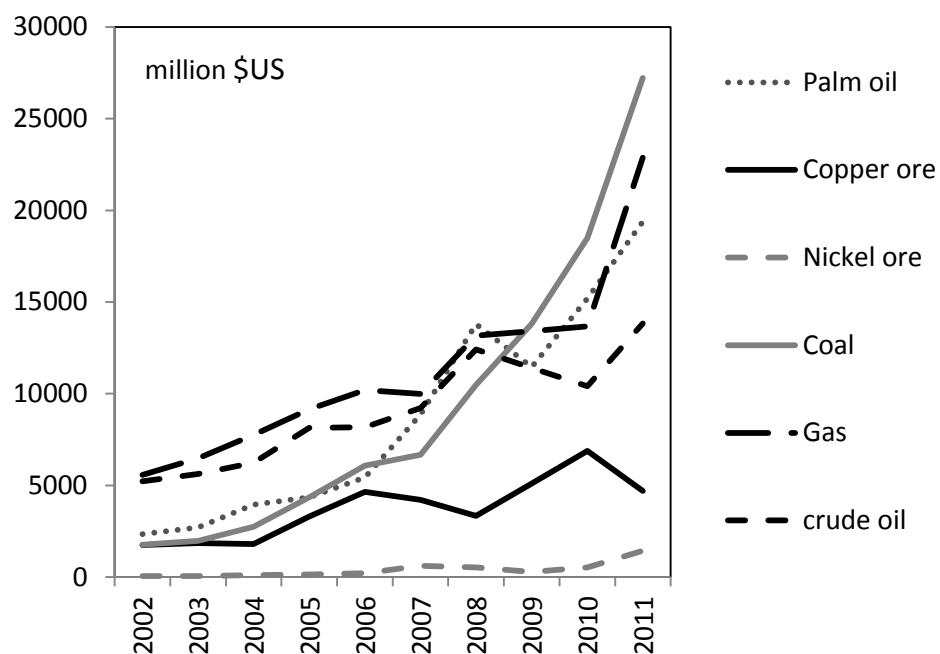
Source: BPS, 2008; BPS, 2012a.
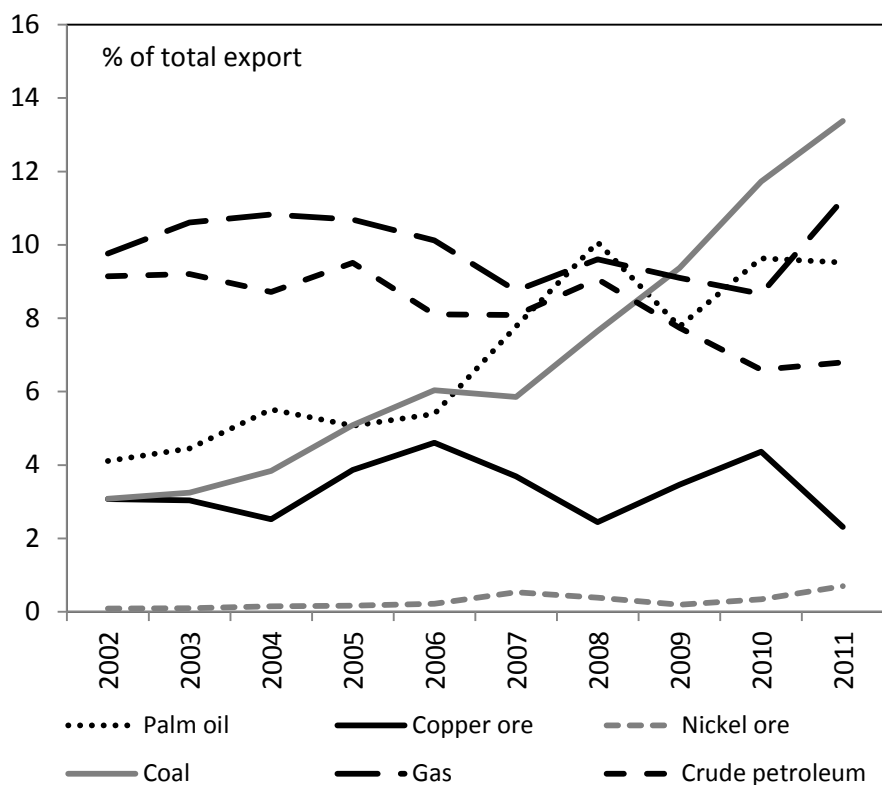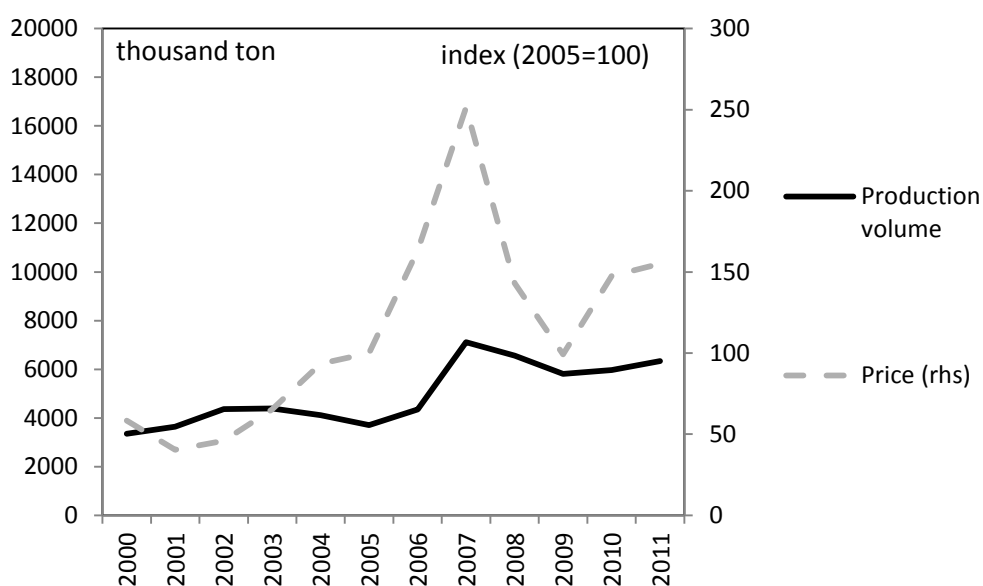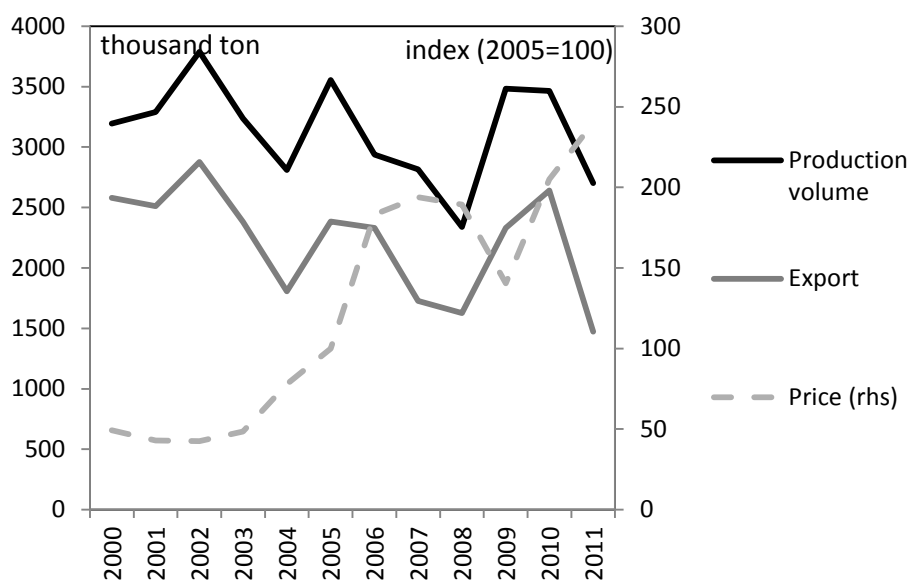
Figure A.1 – Key commodity exports (share)

Figure A.2 – Nickel[40]

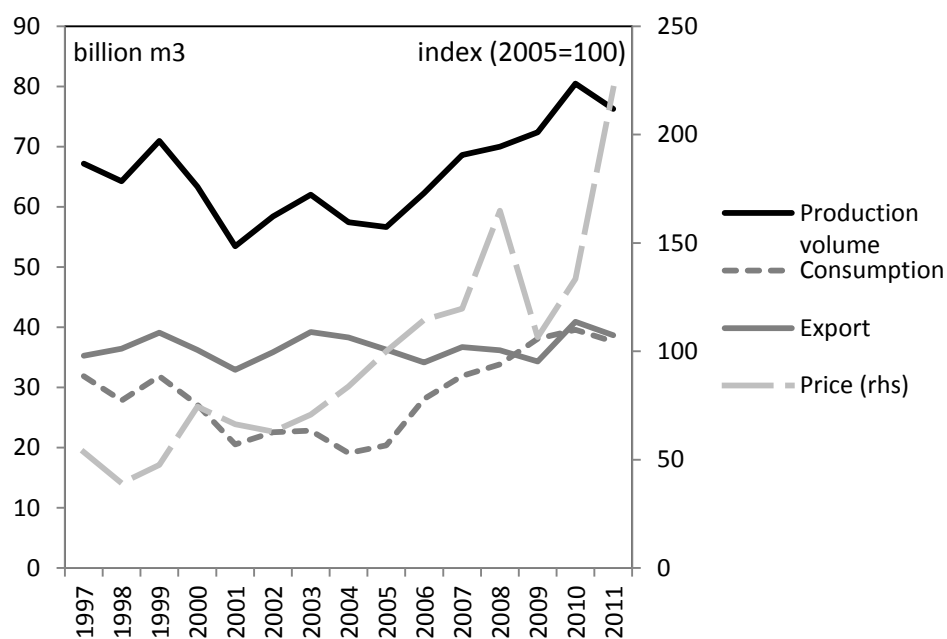Source: BPS, 2008; BPS, 2012a; IMF, 2012a.

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[40] NICKEL CANADA CAN/PORTS (Units: Index Number) 15676PTDZF (Source: Canada) (IMF, 2012a).

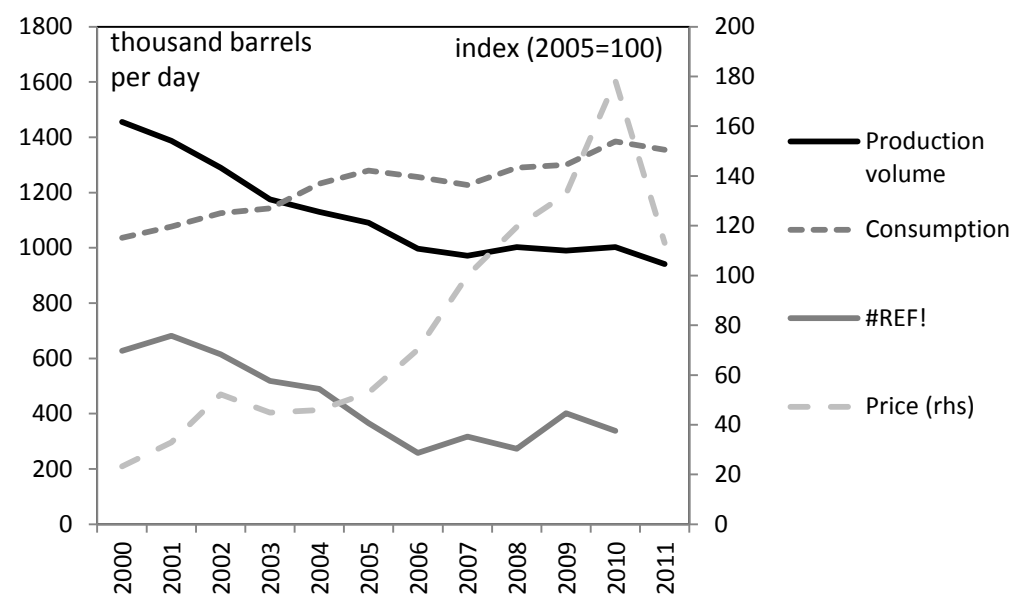## Figure A.3 – Copper[41]

Source: BPS, 2008; BPS, 2012a; IMF, 2012a.

Figure A.4 – Gas (Dry Gas)

Source: IMF, 2012a; EIA, 2013.

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[41] COPPER UK (LONDON) (Units: Index Number) 11276C.DZF (Source: United Kingdom) (IMF, 2012a).
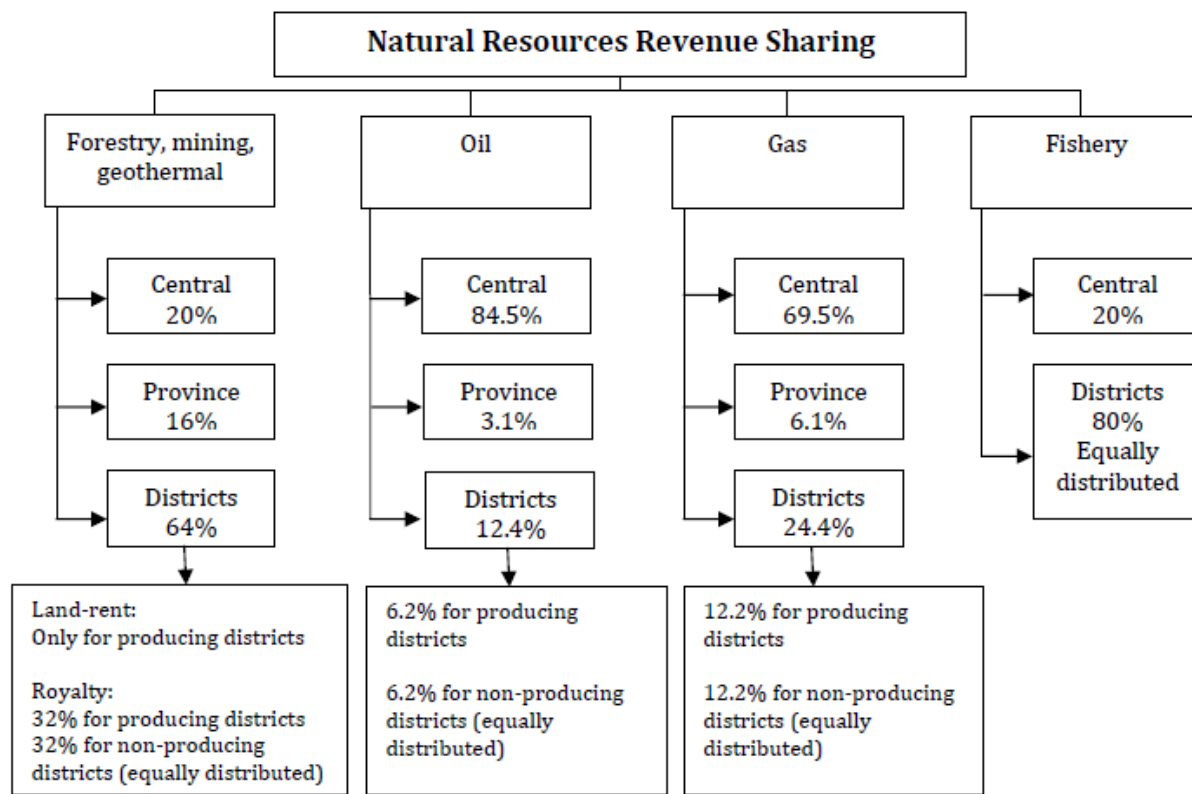
Figure A.5 – Oil

Source: EIA, 2013; BP, 2012.

Annex B   Resource Revenue sharing arrangement

Figure B.1 – Natural resources revenue sharing overview

Source: Law UU33/2004 (accessed in Agustina et al. 2012).

Annex C   Transfer mechanisms

The general purpose unconditional transfers – DAU, constitute the dominant sources of revenues for provincial and local governments in Indonesia. As part of the DAU transfers, the central government of Indonesia provides a basic allocation for wages and salaries and a fiscal gap transfer if a jurisdiction's revenues fall short of calculated expenditure needs using macro indicators (Shah, 2012).

The special allocation grant – DAK, has the primary objective is to finance, in selected regions, the infrastructure needs of basic public services that are of high national priority but are regional government responsibilities. Other stated objectives include providing special assistance to certain regions and accelerating regional development and the achievement of national priorities. Local governments with lower than average fiscal capacity are expected to receive higher priority in financing their infrastructure deficiencies. DAK funds are earmarked to finance capital expenditures only and operating costs are ineligible to receive grant financing. DAK is a closed-ended matching grant program requiring that a minimum of 10% of total costs of the project must be met from recipient's own resources. Matching is considered necessary to ensure local ownership of the project. For 2011, the central government established 19 national priority areas for DAK assistance. These include: education, health, road infrastructure, drinking water infrastructure, Sanitation infrastructure, government infrastructure, maritime affairs and fisheries, agriculture, environment, family planning, forestry, infrastructure in less developed regions, trade facilities, rural electrification, housing and settlement, land transport safety, rural transport, and border area infrastructure. All districts can receive DAK assistance if they have below average net fiscal positions (Shah, 2012).

Annex D   Survey data

The Badan Pusat Statistik (BPS) Annual Manufacturing Survey covers over 23,000 firms in 2010 and has been conducted since 1975. This longitudinal survey records detailed information on input and output flows. Among other variables, the survey asks every firm to report its capital ownership structure by private, public or foreign owners, whether the firm exports, estimate its capacity utilisation, and the average number of workers per day. The current analysis is based on the years from 2001 to 2010 of the Survey. For this sub-period, the average spell a plant remains in our sample is 3.6 years.

In order to convert the nominal values from the survey into real, we use the GDP deflator for Indonesia from the World Bank's World Development Indicators, indicator code NY.GDP.DEFL.ZS. The base year of the deflator is 2010. The real effective exchange rate is available from the Bank of International Settlements (BIS, 2012; World Bank, 2012b).