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The Regional Impact of Indonesia's Fiscal Policy on Oil and Gas

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Abstract

This paper analyzes the regional impact of Indonesia's fuel policy. It discusses how the sharing of oil and gas revenue and taxes on oil and gas between the center and the regions affect sub-national fiscal position and what the regional incidence of the fuel subsidies is. It also analyzes the regional impact of president's recent proposal to discontinue subsidizing vehicle fuel as well as the proposal to eliminate the fuel subsidies altogether and shows how the regions are affected by these suggestions.

Key words

Oil policy, fuel subsidies, regional transfers, regional incidence of intergovernmental fiscal transfers

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Introduction

Indonesia is a rich country in terms of its natural resources endowment particularly from the oil and gas production. Income from oil and gas is strongly reflected in the structure of the government budget. About one-fifth of consolidated revenues are derived from oil and gas income through taxes, revenue sharing contracts, and profits of the state-owned oil company *Pertamina*; making oil and gas production a major source of government income. The implementation of decentralization in 2001 has made Indonesia a strongly decentralized country with currently 33 provinces and 491 districts, which are very diverse in their socio-economic and ethnical profiles. The regions have authority over about a third of the consolidated public budget, thereby making Indonesia into one of the most decentralized resource-rich countries in the world.

The decentralization framework raises the question on how Indonesia's oil and gas policy affects the regions. On the revenue side, income from oil and gas is shared by the center and the regions through revenue sharing agreements which allow resource-rich regions to retain a substantial share of the income. Papua and Aceh enjoy a special autonomy status and are allowed an even larger share of the oil and gas revenue. The regions also receive block grants from the central government which accounts of 26 % of net domestic revenue after the deduction of revenue sharing and major subsidies including fuel subsidy. The block grants are allocated to the individual regions according to a formula that takes into account fiscal capacities and fiscal needs as well as salaries of civil servants. As a consequence income from oil and gas are very unequally distributed to the regions. On the expenditure side, oil related expenses take the form of fuel subsidies (on vehicle gasoline, diesel and kerosene). They account for more than 12 % of the 2010 consolidated budget (comparable to overall capital expenditures at 15.5 %) and thus tie up a substantial part of government resources. Regions profit from the subsidies very differently as subsidization is linked to consumption which differs with income. While fuel subsidies favor the wealthier regions, the resource rich regions enjoy profit from revenue sharing scheme and regions with large fiscal gaps tend to enjoy larger shares of the oil and gas income through higher block grants. The overall regional effect is a priori unclear and thus an empirical issue. This becomes the first concern of the paper, which is to determine the regional distributional effect of the existing oil related policies, separately for the revenue and the expenditure side as well as the combined effect.

Obviously, income from oil and gas as well as overall subsidies varies positively with the world oil price. The effect of a rising oil price on the central government's budget has been negative – while the increased subsidies had been born previously entirely by the center, the increased revenues had to be shared with the regions leaving the center at the receiving end. This has led the government to reform its policy by deducting the subsidies from the national budget on which the block grant was based, thereby making the regions take a share in the fuel subsidies. While this measure reduces the burden for the central government, it does not solve the equity and the efficiency problems implied

by the fuel subsidization. The subsidy predominantly benefits the wealthier part of the population. It compromises incentives to save energy and to develop alternative sources of energy and it does not internalize the externalities produced by CO_2 emissions but rather rewards them. That has led to the government proposal to reduce subsidies by exempting vehicle fuel from the subsidy and to a more far reaching proposal to eliminate the subsidization of fuel completely (Law 25/2000, Ministrial Energy Decree 31/2005, Budget Law 10/2010). Both proposals have strong regional effects and become the second concern of the paper. This paper will analyze the geographical incidence of the oil and gas policy, both for the fuel subsidies and the oil and gas-related transfers under different scenarios and show which regions would profit from the reforms suggested.

The remainder of this paper is organized as follows. In Section 1, it will discuss how the government derives income from oil and gas and how this revenue is shared between the tiers of government. Section 2 introduces the fuel subsidy mechanism and analyzes the regional incidence of the subsidy along with its distributional impact. Section 3 provides a picture of the regional impact of oil and gas revenues and fuel subsidies combined. Section 4 discusses the change in regional incidence of the government's policy related to oil and gas if the reform proposal by the government was implemented or if the fuel subsidies were reduced and abolished altogether. Section 5 will provide a conclusion.

1. Regional Distribution of Oil and Gas Revenue

Government income from oil and gas

The Indonesian government income from oil and gas comes mainly from the tax revenue of oil and gas and a share of revenue that has been extracted from contracts with private oil and gas investors. Private investors share their revenues with the government through the government revenue-sharing agreement, which varies according to the type of contract. The most common type of joint cooperation contracts used in Indonesia's oil and gas upstream sector is the Production Sharing Contract (PSC). Under this contract, the government and private investors agree to take the split of the production measure based on PSC-agreed percentage (PWC 2010). Apart from PSC, the other types of contracts include Enhanced Oil Recovery (EOR), Technical Assistance Contract (TAC), and Joint Operation. The EOR is a contract agreement between the state-owned oil company *Pertamina* and private contractors, which is used on established production fields with the intent of applying advanced technology to increase the recovery of hydrocarbons in the reservoirs. The TAC is a type of PSC that is usually limited to exploitation activities. And finally Joint Operation Agreements (JOA) and Joint Operation Bodies (JOB) are separate agreements that regulate the relations of the participating interest-holders and manage the operation on behalf of participating interest-holders, accordingly (US Embassy Petroleum Report, 2008). In 2006, PSC accounts for 87 % of production, followed by *Pertamina* with 9 %. The remaining 4 % are distributed among the other contract types. Under the PSC arrangement for oil, the government usually receives 85 % of the shares through revenue sharing and taxation with the remainder accruing to the private

contractor (Appendix 1), whereas for gas the share is typically divided into 70 % for the government and 30 % for the contractor.

In the 2010 government budget, oil and gas revenues from taxes and non-tax incomes account for one-fifth of total revenue. Compared to 2008, there has been a decline in the contribution of oil and gas revenue to total government revenue, particularly due to the decrease in oil price from an average of US$ 96 per barrel in 2008 to an average of US$ 62 and US$ 80 per barrel in 2009 and 2010, respectively. As a result, overall revenue from tax and non-tax oil and gas has fallen by 31 % between 2008 and 2010. The effect of the movement in oil price is particularly observed at the non-tax oil and gas revenue component, which has become the prominent contributor to the total natural resources revenue over the years. In 2010, around 5 % of overall revenues came from income taxation of oil and gas, and another 14 % from oil and gas non-tax revenue (Table 1). The profit from *Pertamina* only contributes slightly (0.9 %) to the total revenue, hence in total 20 % of revenues stems from oil and gas production.[1]

Table 1: *Consolidated national revenue 2008-2010 (billion rupiah)*

	2008	% Total Revenue	2009	% Total Revenue	2010	% Total Revenue
Revenue and Grants	1,042,608	100.0	944,960	100.0	1,106,032	100.0
A. Domestic Revenue	1,039,643	99.7	943,293	99.8	1,103,009	99.7
I. Tax Revenues	687,800	66.0	682,627	72.2	795,159	71.9
a. Domestic Tax	653,142	62.6	663,957	70.3	766,244	69.3
i. Income Tax	318,028	30.5	317,583	33.6	357,046	32.3
- Non Oil and Gas	255,927	24.5	267,540	28.3	298,173	27.0
- Oil and gas	62,101	6.0	50,044	5.3	58,873	5.3
ii. Sales Tax	199,785	19.2	193,068	20.4	230,605	20.8
iii. Land and Building Tax	25,526	2.4	24,270	2.6	28,581	2.6
iv. Duties on Land and Building Transfer	5,529	0.5	6,465	0.7	8,026	0.7
v. Excises and other Taxes	104,274	10.0	122,571	13.0	141,987	12.8
b. International Trade Tax	34,658	3.3	18,670	2.0	28,915	2.6
i. Import Duties	19,800	1.9	18,105	1.9	20,017	1.8
ii. Export Tax	14,858	1.4	565	0.1	8,898	0.8
II. Non Tax Receipts	351,843	33.7	260,666	27.6	307,850	27.8
a. Natural Resources	228,961	22.0	138,559	14.7	168,82	15.3

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[1] Obviously the contribution of oil and gas to overall revenue depends on production, which has been steadily declining, and the oil price, which rose significantly in the last few years making the net effect positive, cf. Agustina et al. 2008. In July 2008 the price of crude oil (OECD basket price) reached a peak at 140 US$, plunged to around 40 US$ in February 2009 and has rebounded in 2010 and 2011 to reach a level of around 110 US$ (http://www.opec.org).

					6	
i. Oil and Gas	219,084	21.0	125,752	13.3	152,733	13.8
ii. Non-Oil and Gas	9,877	0.9	12,807	1.4	16,092	1.5
b. Profits of Public Enterprises	**35,044**	**3.4**	**26,050**	**2.8**	**30,097**	**2.7**
i. Pertamina	12,400	1.2	10,472	1.1	9,509	0.9
ii. State Gas Company	300	0.0	703	0.1	4,000	0.4
iii. Other Public Enterprises	22,344	2.1	14,874	1.6	16,588	1.5
c. Other Non-Tax Revenues	**87,838**	**8.4**	**96,058**	**10.2**	**108,92 7**	**9.8**
B. Grants	**2,965**	**0.3**	**1,667**	**0.2**	**3,023**	**0.3**
Oil price (US$/brl)	96		62		79	

Note 2008-2009 consolidated budget data are based on APBN and APBD realization 2008-2009, while 2010 data is based on APBN 2010 and APBD planned 2010.
Source: Ministry of Finance

Regional distribution of oil and gas revenue and the overall pattern of sub-national revenue

The decentralization and intergovernmental transfer framework in Indonesia requires the government income from oil and gas revenue to be shared between the center and the regions. The intergovernmental revenue sharing is based on net oil and gas revenue, which is largely equivalent to profit after cost recovery and deduction of PSC's share but without tax. Law 33/2004, the primary legal document governing central and regional fiscal balance, provides the sharing arrangement between central and regional governments. In general, 80 % of the revenue from natural resources is given to the regions where it is originated and 20 % to the central government. The sharing mechanism is, however, different for the oil and gas revenue.[2] For these resources, the regions receive a share of 15 and 30 % for oil and gas, respectively, and the remainder belongs to the central government. The exception is applied to Aceh and provinces in Papua, which receive an additional income of 55 % of oil and 40 % of gas revenues in accordance with their status as special autonomy regions. Thus, these provinces receive a total share of 70 % of oil and gas revenues.

The revenue allocated to the regions is further divided among the province, producing, and non-producing districts. Of the amount given to the regions, 20 % is retained by the province, 40 % goes to the producing districts, and the remainder is for the non-producing districts. The non-producing districts have to split their share equally. The non-producing districts have to split their share equally. The revenue sharing framework is shown in Figure 1.

In addition to the shared revenues from natural resources, regions also receive transfers

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[2] Natural resources in addition to oil and gas include forestry, mining, fishery and geothermal energy production which are shared with 80 % going to the regions and 20 % to the center.

from the center in the form of tax revenue sharing,[3] block grant (*Dana Alokasi Umum*, DAU), and conditional grant (*Dana Alokasi Khusus*, DAK). DAU is a discretionary transfer that is intended to equalize the fiscal capacity of the regional government, while DAK is an earmarked grant that reflects the national priorities provided to finance region's specific needs that are not covered by the DAU formula. DAU in particular has become the main source of revenue for sub-national governments, accounting on average for 52 % of total sub-national revenue.[4] The block grant is allocated based on national formula that consists of a "basic allocation" and allocations in proportion to the region's fiscal gap. The fiscal gap is the difference between fiscal needs and fiscal capacity of each region. Fiscal needs take into account variables such as population, area, GDP per capita, and human development index of the region while fiscal capacity is measured by own source revenue and income from revenue sharing. The basic allocation is calculated based on the budget spending on civil servants' salaries in the related region and covers 72.3% thereof. The block grant is distributed 10 % and 90 % respectively to province and districts (cf. Appendix 2).[5]

Figure 1: *Oil and gas revenue sharing arrangement between central, province, and local government*
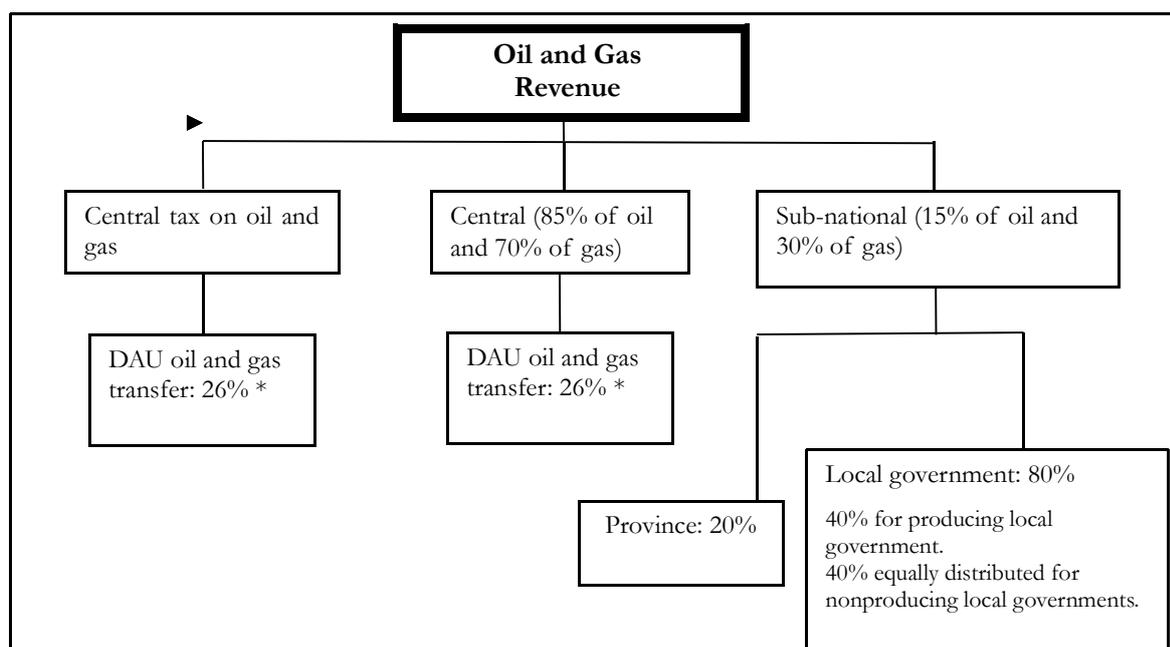
*Source: Authors' illustration based on Law 34/2004 and Government Regulation 55/2005. * 26 % of total net revenue after deducting the revenue sharing and the costs of the fuel subsidy.*

Since the DAU pool is estimated as a proportion of 26 % of net central government domestic revenue, DAU transfer to the regions includes a fraction of central government

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[3] Center and regions share also the revenue from income tax (80 % center, 20 % regions), property tax (10% center, 90% regions), and tax on transfer of ownership of land and buildings (20 % center, 80% regions).
[4] The figure is the average of 2001 to 2009 of realized APBD data for provinces and districts.
[5] For a recent analysis of fiscal transfer system to regional governments cf. Fadliya and McLeod (2011).

income from oil and gas revenue as well as a fraction of central government income tax from oil and gas. Starting in 2009, net domestic revenue is defined as domestic revenue minus revenue sharing and major subsidies including energy subsidies, food subsidy, and fertilizer subsidy. The allocation of DAU to regions is determined in the beginning of the fiscal year based on the oil price assumption at that time and will not be adjusted to the oil price movement. In contrast, the transfer of revenue sharing to the regions will be based on the actual revenue which largely depends on the movement in oil production and price. The difference between allocation and actual revenue due to the fluctuation in oil price normally will be transferred to the regions by the end quarter of fiscal year or in some cases in the first quarter of the subsequent fiscal year.[6] Unlike revenue sharing and DAU, DAK is the only component of the transfer that does not have an oil and gas component in it; on average it contributes 7 % to the total local government revenue.[7]

The size of revenue sharing – as the main intergovernmental transfer affected by oil price movement – has been increasing over the years, reached its highest in 2005 and has become more stable afterwards. As a fraction of intergovernmental transfers, the share has been fluctuating between 22 % and 33 % with a declining pattern starting in 2006. This downward trend of revenue sharing relative to total transfers in 2006 is largely due to the increased size of transfers from DAU as a result of adjustment in the assumption of oil price in the central government budget (Figure 2).

Figure 2: Revenue sharing and intergovernmental transfers, 2001-2010
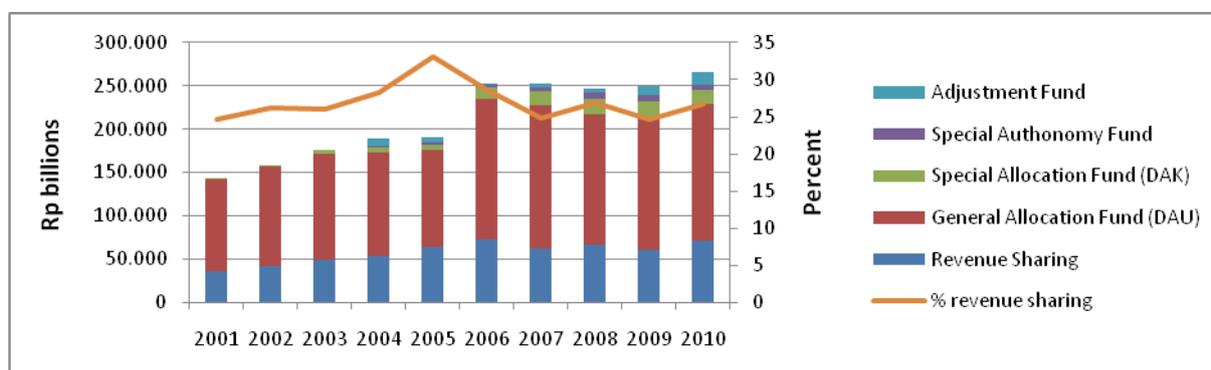
Source: Authors' estimation based on Ministry of Finance data. Data is in 2007 constant prices.

With a fraction of oil and gas in revenue sharing and DAU, transfers to the regions can be

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[6] The government estimation (NK APBN-P 2009) on the increase of oil price by US$ 1/barrel suggests a corresponding increase of total Rp 2.8 trillion on oil gas revenue with Rp 0.7 trillion coming from oil and gas tax and Rp 2.1 trillion from oil and gas non-tax revenue. This will trickle down to the increase in revenue sharing particularly for the producing districts and provinces. The government estimation in 2009 suggests that an increase of oil price by US$ 1 per barrel will increase the oil and gas revenue sharing transfer to the regions by Rp. 400 – 500 billion.

[7] In addition to the above transfers (DAU, revenue sharing, and DAK), regions also receive transfers in the form of adjustment funds and special autonomy funds. Adjustment funds consists of incentives funds for regions, development acceleration funds for infrastructure, development acceleration funds for education infrastructure, and additional funds for teachers in the region. Meanwhile special autonomy funds is provided specifically only for Aceh, Papua, and West Papua province.

grouped into 'oil and gas' and 'non-oil and gas' transfers.[8] The geographical distribution of the non-oil and gas transfers shows that Papua and West Papua are the two provinces that have the highest per capita transfer of non-oil and gas with Rp 4.7 million and Rp 6.1 million, respectively. In contrast, provinces in Java are among those with the lowest transfers, many of whom receive only 20 % or less of Papua's non-oil and gas transfer per capita. The distribution changes quite significantly when oil and gas transfers are included, which is particularly observed for the oil and gas producing provinces. East Kalimantan, Kep Riau, Riau, and Aceh move into the top recipients of transfers from the center and have particularly profited from high oil prices (Figure 3).[9] With an implicit oil and gas revenue component in DAU, each province also shows a component of oil and gas revenue in the transfer, even though the production sharing is concentrated only on few provinces. Overall, the mechanism through which oil and gas revenues are shared between the center and the regions largely affects the distribution of total sub-national revenues.

Figure 3: Oil and gas vs. non-oil and gas transfer per capita 2010
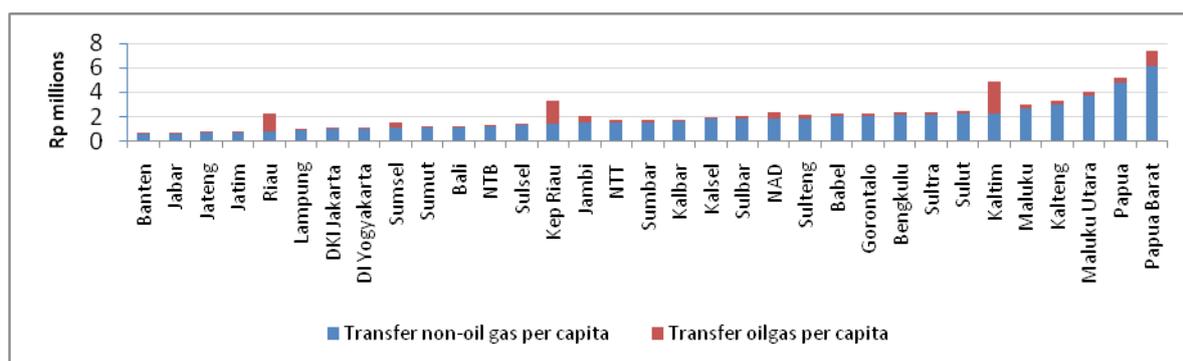
Source: Authors' estimation based on MoF and BPS data 2008.

The concentration of oil and gas revenues has created geographic inequities. However, with the substantial increase of regular transfers in 2006 following the adjustment of oil price, particularly through the General Allocation Fund (DAU), Indonesia's geographical inequities have been substantially reduced. Most poor provinces, particularly in Eastern Indonesia, have been the main beneficiary of this expansion of transfers. The main challenge for those provinces is currently to spend their resources effectively (see also Lewis and Oosterman 2008, World Bank 2008).

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[8] Oil and gas transfers consists of oil and gas revenue sharing plus 26 % of net domestic revenue from oil and gas component (tax revenue of oil and gas and non-tax revenue of oil and gas minus revenue sharing of oil and gas and fuel subsidies). The non-oil and gas transfer consists of non-oil and gas revenue sharing, 26 % of net domestic revenue from non-oil and gas, and DAK.

[9] The transfers in absolute terms are shown in Appendix 3.

2. The Regional Impact of Fuel Subsidies

The mechanism

Indonesia, like other oil-producing developing countries, has been subsidizing fuel since the 1970ies when the world experienced its first "oil price shock". The government has fixed the price at a very low level – below US$ 20 cents per liter until 2005 – and subsidized the difference to the international prices through government expenditures. When oil prices started to rise again substantially in 2004, fuel subsidies became the main expenditure item in Indonesia's budget in 2004 and 2005, consuming annually some US$ 15 billion or more than 20 % of total expenditures.

Confronted with mounting fuel subsides and concerns of the financial markets regarding the impact of fuel subsidies on the budget, the government more than doubled fuel prices in 2005 but kept the prices fixed at about US$ 50 cents. This radical measure has reduced fuel subsidies substantially but other subsidies, particularly on electricity, have increased because the government has kept low tariffs while input costs have increased with rising oil prices. Overall, energy subsidies declined until global oil prices started to increase again in 2007. When oil prices reached record highs by mid 2008, Indonesia faced the same subsidy challenge as in 2005, only at higher levels. In May 2008, the government increased fuel prices by another 30 %. Despite this move and declining oil prices at the end of 2008, Indonesia spent a record US$ 23 billion on fuel and electricity subsidies in 2008.

However, with declining oil prices, subsidies returned to be manageable in 2009. When oil prices reach US$ 70 per barrel, then a "break even" point is reached where subsidies on gasoline are eliminated. For diesel, fuel prices need to reach US$ 60; while kerosene, which has largely been replaced by subsidized LPG, would still remain subsidized until oil prices reach an unrealistically low level of US$ 21 or below. With the economic recovery and the return of growth to its long term trend, oil price is expected to pick up again (the average of Indonesia's crude price oil January-October has reached US$ 111.5/barrel) and subsidization will return to very significant levels – unless the policy is changed.

The fuel subsidy is estimated by the difference between the market price p^m that would prevail in the absence of the subsidy and the administered price p^{ad} that the government stipulates, multiplied by the quantity consumed. This subsidy is different for each of the major products consists of regular gasoline (at 89 octane and known as premium), diesel, kerosene, and LPG. Total fuel subsidy is given by:

$$\sum_i S_i = \sum_i (p_i^m - p_i^{ad}) \, q_i \tag{1}$$

with subscript *i* denotes the different products (*i*= gas, kerosene, diesel, diesel). The free market price is calculated as the Mid Oil Platts Singapore (MOPS) price for the relevant type of fuel, plus a margin (referred to in Indonesian policy discussions as the 'α-factor') for transportation, storage, distribution and an economic profit which is set at Rp

556/litre in 2010 (Financial Note APBN 2010).[10] The value added and fuel taxes also included in the estimation, thus make the market price as:

$$p_i^m = (MOPS_i + \alpha)(1 + \tau) \tag{2}$$

with τ denoting the effective ad valorem tax rate (consists of VAT and fuel tax) on the product. Eq. (1) describes the subsidy that the individuals receive when consuming quantity q_i. It consists of two components, the lower pre-tax price and the smaller tax payment.[11] Table 2 provides the magnitudes as of 2010. In May 24, 2008, the administered price for gasoline was raised to Rp 6,000 per liter, whereas the prices for diesel and kerosene have been raised to Rp 5,500 and Rp 2,500 per liter, respectively. Since January 15, 2009, due to the decline in the oil price, the price for gasoline was reduced to Rp 4,500 per liter and the price of diesel was reduced to Rp 4,500. The price of kerosene has remained unchanged.

Table 2: *Fuel subsidy per fuel product, 2010*

	Gasoline	Kerosene	Diesel	LPG
Economic price (Rp/liter) $[p^m]$	6,389	6,203	6,193	7,919
Sales price (Rp/liter) $[p^{ad}]$	4,500	2,500	4,500	4,250
Tax (Rp)	587	227	587	386
Net sale price (Rp/liter) $[p^{ad}/(1+\tau)]$	3,913	2,273	3,913	3,864
Fuel subsidy (Rp/liter) $[p^m - p^{ad}]$	1,889	3,703	1,693	3,669

Source: Authors' estimation based on data from Ministry of Energy and Mineral Resources and Ministry of Finance.

The total subsidy is obtained by multiplying the unit subsidy for each fuel product with the consumption of each product. In 2010, the economic price is Rp. 6,389 for gasoline, Rp. 6,203 for kerosene, and Rp. 6,193 for diesel. The unit subsidy for gasoline, kerosene, and diesel is Rp. 1,889, Rp. 3,703 and Rp. 1,693, respectively. This unit subsidy includes the tax component; thus it accounts for the fact that a lower pre-tax price implies also lower tax revenues. For budgetary purposes, however, the subsidy is calculated on a net-of-tax basis, i.e. as the difference between the market price net of taxes and the administered price net of taxes times the quantity consumed.

The fuel subsidy component in the budget is strongly influenced by the fluctuation in the oil price. Since the fuel subsidy refers to the difference in the market price, which is used

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[10] This formula is used by the central government to calculate the amount of fuel subsidies. Obviously the alpha factor depends on economic conditions. Moreover, it should be regionally different as transportation costs are higher for the outer islands than for Java. The imputed market price is referred to in the Indonesian policy debates as "economic price".

[11] Eq. (1) does not describe the government's loss from subsidizing fuel consumption as it does not take into account the rise in consumption due to the price reduction. While the lower price reduces tax payments the higher consumption increases it. Total government's loss consists of the pre-tax price subsidy and the change in tax revenues and is given by:

$$L = (p^m - p^{ad})\ q(p^{ad}) - \frac{\tau}{(1+\tau)}\ p^m\ [q(p^{ad}) - q(p^m)].$$

as a selling price by the fuel operator, and a subsidized price regulated by the government, every increase in the oil price will cause an increase in the fuel subsidy cost. The fuel subsidy has become a major item in 2008 when oil price reached one of its highest levels (Table 3). In 2008, 20 % of the consolidated expenditure was allocated to energy subsidies, similar to the amount allocated to capital expenditures. With falling oil prices due to the economic crisis in 2008/9 the subsidy's budget share declined sharply to only eight % in 2009, before started to increase again in 2010 to 12 %. [12]

Table 3: *Consolidated national expenditure 2008-2010 (billion rupiah)*

	2008	% total expenditure	2009	% total expenditure	2010	% total expenditure
Personnel Expenditures	275,471	24.3	316,681	27.9	346,656	30.4
Material Expenditures	123,679	10.9	159,649	14.1	179,602	15.7
Interest Payments	88,430	7.8	93,782	8.3	88,383	7.7
Subsidy	275,292	24.3	138,082	12.2	192,707	16.9
Energy	223,013	19.7	94,586	8.3	139,953	12.3
- Fuel	139,107	12.3	45,039	4.0	82,351	7.2
- Electricity	83,907	7.4	49,546	4.4	57,602	5.0
Non Energy	52,278	4.6	43,496	3.8	52,754	4.6
Social Assistance	57,741	5.1	73,814	6.5	68,611	6.0
Others Routine	84,651	7.5	109,838	9.7	88,554	7.8
Capital	226,327	20.0	241,307	21.3	176,457	15.5
Total Expenditures	1,131,590	100.0	1,133,152	100.0	1,140,972	100.0
Oil price (US$/brl)	**97**		**62**		**79**	

Source: Ministry of Finance

In addition, the change in oil price also affected the cost of electricity subsidy as fuel is used as an input for electricity generator by PLN (the state-owned electricity company), which purchases the fuel at the non-subsidized price. The movement in oil price has a direct effect on the production cost. Thus, if the basic electricity tariff regulated by the government (the consumer tariff) remains unchanged, the burden in electricity subsidy will move in the same direction as the oil price, with the electricity subsidy being the difference between the basic electricity tariff and the production cost.

The distributional impact

The subsidy has a substantial distributional impact as fuel consumption is very unequally distributed across households and regions. The subsidy tends to benefit high income households as they are more likely to consume more fuel. The impact of the oil subsidy on the income distribution is analyzed by looking at the households' fuel consumption

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[12] In the state budget 2009, with other factors hold constant, the increase in oil price by US$ 1 per barrel will increase the spending on fuel subsidy by Rp 2.5 to 2.6 trillion. As for 2010, the financial note indicates the increase in budget deficit to Rp 0.0 trillion - 0.3 trillion

for gas, diesel, and kerosene.[13] Around 28 % of the subsidy goes to the highest decile, more than half of the subsidy benefits the richest 30 % of the people. This distributional incidence is a consequence of the high income elasticity of diesel and gasoline consumption where automobiles in particular are owned by the better off people. This finding suggests that subsidies tend to increase income inequality.[14] This finding coincides with earlier findings by Pitt (1985) and Olivia and Gibson (2008) who show that fuel subsidization benefits mainly wealthier people and that its reduction or elimination would increase welfare.

Figure 4: *Distributional effect of the fuel subsidy 2010*
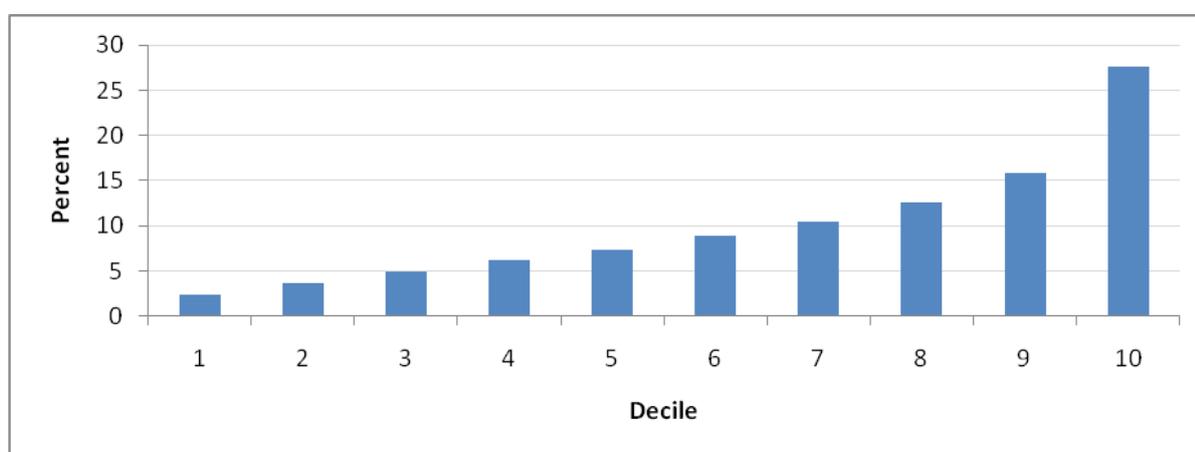
Source: Authors' estimation based on Susenas data 2010

The effect of the subsidy on the income distribution has a regional dimension which tends to favor regions that have a larger share of high income households and more economic activity. Richer regions in terms of GDP size receive a larger share of subsidy through fuel consumption. The positive correlation between province with large income (GDP non oil and gas) and fuel consumption within the relevant region is clearly shown in figure 5.

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[13] The estimation is done using SUSENAS consumption panel data (annual national socio-economic survey that covers basic information of households' welfare and the characteristics of its member). The survey provides information on the fuel consumption of 66,000 representative households, separately for gasoline, diesel, kerosene, and LPG.

[14] This is true for the subsidization of gas and diesel, but less so for kerosene as this is mainly used for cooking and thus demand is relatively income inelastic.

Figure 5: *GRDP non-oil and gas and fuel subsidy per capita*
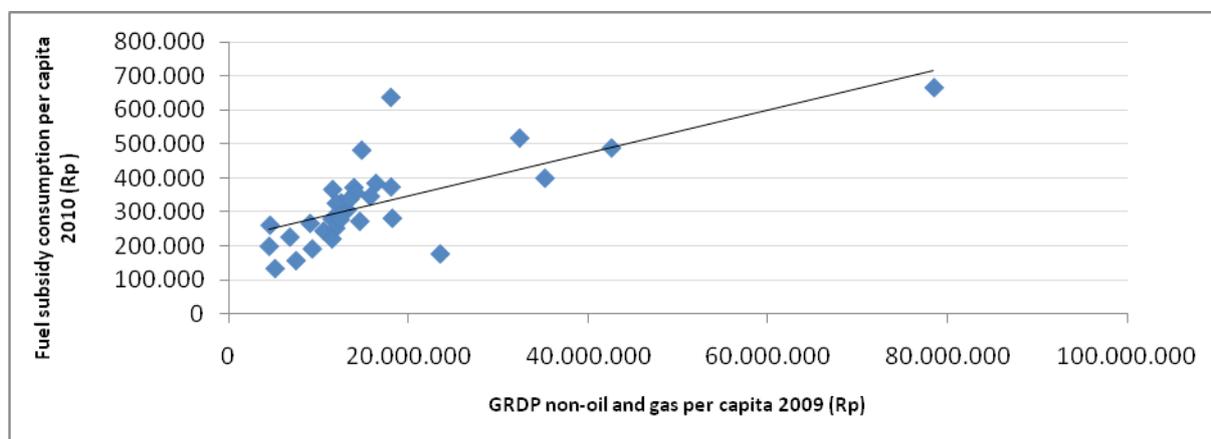
Source: Authors' estimation based on data from BPS and BPH-Migas.

The fuel subsidy per capita has largely benefited the provinces such as DKI Jakarta, Kep Bangka Belitung, Riau, East Kalimatan, and Bali. In terms of the share of fuel subsidy consumption to the overall consumption, provinces located in Java, East, West Java, Central Java, and DKI Jakarta, have consumed around 50 % of total fuel subsidy consumption in Indonesia (Figure 7). In contrast, the oil and gas rich provinces East Kalimantan, Riau, and Aceh consumed together less than two-third of the fuel subsidy of West Java, which consumes the largest fuel subsidy in Indonesia.

Figure 6: *Fuel subsidy per capita province, 2010*   **Figure 7:** *Share of fuel subsidy consumption*
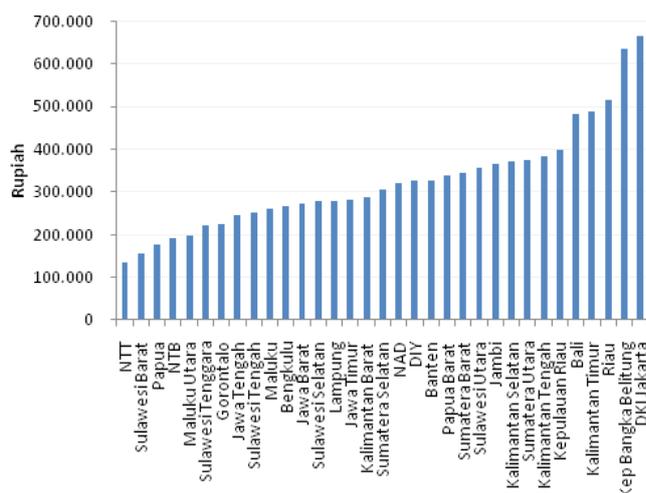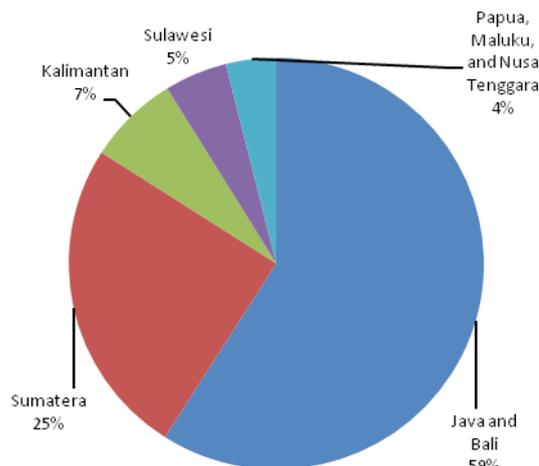
Source: Authors' estimation based on data from BPH Migas and Ministry of Energy and Mineral Resources

3. The Regional Incidence of Energy Policy Consolidated

Both dimensions of Indonesia's oil and gas policy – the fuel subsidization and the sharing of oil and gas revenue with the regions – have strong regional impacts. While the oil and gas related transfer per capita are strongly concentrated with the oil and gas producing provinces, namely East Kalimantan, West Papua, Kep. Riau, and Riau and to a lesser extent Aceh, South Sumatera, the fuel subsidies per capita are more evenly distributed but tend to favor the richer provinces in terms of GRDP per capita non-oil and gas such as Jakarta, Bali, Riau, and Bangka Belitung (Figure 8).

Figure 8: The Regional Incidence of Indonesia's Oil and Gas Policy, 2010
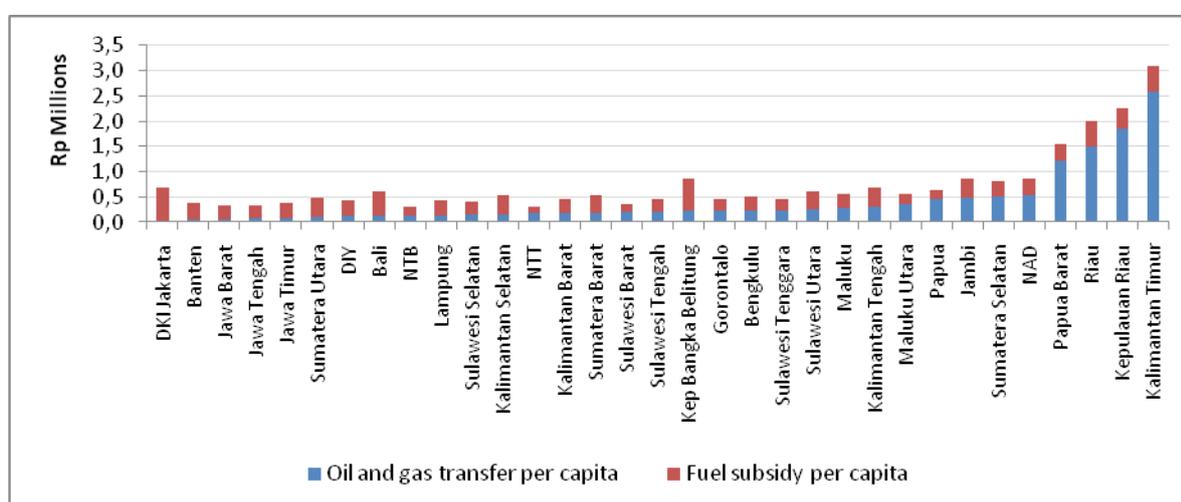
Source: Authors' estimation based on Ministry of Finance, BPS, and BPH-Migas data.

The fuel subsidy tends to make the oil-related transfers per capita slightly less skewed across regions compared to the revenue sharing distribution. Yet the recipients of the two types of transfers are different – while the fiscal transfer goes mainly to the regional governments, the fuel subsidy goes to both the consumers of fuel and regional governments in the form of taxes, particularly due to the fact that provincial government is entitled to collect a 5 % tax from motor vehicle fuel. This revenue component is accounted under the regional government own-source revenue.

The overall picture of oil and gas transfer and fuel subsidy to the regions suggests that oil and gas producing provinces such as Kalimantan Timur, Papua Barat, Riau and Kep. Riau remain the mostly benefited group. Meanwhile, provinces in Nusa Tenggara and Java, excluding DKI Jakarta, is under the group that benefited the least from the current mechanism such as NTT, NTB, West Java, and Central Java.[15]

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[15] The absolute figure of total oil and gas transfers as well as fuel subsidy consumption can be seen in Appendix 4.

4. Options for Reform

The Need for Reform

There is an obvious need to reform the current oil policy in Indonesia. The fuel subsidies are highly inefficient and have a detrimental impact on the income distribution (cf. Hartonoa and Resosudarmo 2008, IMF 2008, Olivia and Gibson 2008). First, they distort individual decisions and create a welfare loss as such. Second, since they increase fuel consumption and thus carbon-dioxide and sulfur emissions, they additionally exacerbate the negative externality produced by burning fossil fuels. This is why many countries tax gasoline and diesel rather than subsidizing it. Third, the subsidization of fuel provides disincentives to invest in fuel-saving strategies such as more fuel-efficient cars, air conditions, and insulation. This misguided policy creates strong long-term detrimental effects. Fourth, their distributional impact is dubious at best as they essentially subsidize the rich (see section 2). Fifth, they are a major budget item (see Table 3) and thus consume government resources that could be used much more efficiently for pro-poor and pro-growth programs such as infrastructure investment, education and the like. They also pose a major budget risk as their magnitude fluctuates with the oil price (cf. Agustina et al. 2008).[16] Lastly, they provide incentives for smuggling and corruption as they can be used for unauthorized purposes or shipped to abroad.

The first reform step

Previously the DAU had been 26 % of central government net revenue after revenue sharing had been deducted; (fuel) subsidies were borne by the center alone. That had led to a rising central budget deficit with increasing oil price as fuel subsidies rose more strongly than the center's revenue from oil and gas. To reduce the risk in the central government budget stemming from change in oil price, the government has implemented a new policy in 2009. It now deducts fuel and major other subsidies in addition to the revenue sharing from the amount on which the DAU is based. In other words, 26 % of fuel subsidies will be shared with the sub-national governments. This scheme has been implemented in anticipation of an increasing oil price in order to create stability in the central budget. This implies a significant reduction of the total fiscal transfers to the regions particularly in respect of DAU. Obviously the effect of that policy change increases with the oil price.[17] To show the difference in outcome we compare the 2009 budget with the budget without the 'burden sharing' policy. The DAU overall pool reduces by 20 %.

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[16] For instance with the current administered price levels an oil price of US$ 79 per barrel implies a subsidy of 2.5 % of GDP, an oil price of US$ 100 (US$ 120) implies a subsidy of 5.0 % (6.6 %) of GDP.

[17] The DAU depends on the *projected* oil price, not the ex post actual oil price. This establishes an incentive for the central government to underestimate the oil price. If the fuel subsidies are deducted from the DAU pool this incentive will become smaller and run in the opposite direction as the central budget (net domestic revenue) decreases with rising oil prices given the current level of administered fuel prices.

Table 4: *Change in Transfers to the Regions under the 'burden sharing' reform (Rp billion)*

2009	Actual	Without burden sharing
DAU	186,420	224,472
Total regional transfer revenue (DAU+DAK+ revenue sharing + special autonomy fund)	320,690	358,742
Central government revenue	984,786	984,786
Central budget deficit	(51,342)	(89,393)

Source: Authors' calculation based on Ministry of Finance data.

This 'burden sharing' formula reallocates significant resources from the center to the center: It shifts 3.8 % of overall revenue back to the center and thus cuts the central budget deficit by 42.6% (2009 data, cf. Table 4). It also impacts on the revenue distribution between the regions. The burden sharing has reduced the overall DAU pool, which affects the DAU allocation to the regions. Regions receive smaller allocations compared to the non-burden sharing policy. The regions with the largest fiscal gap suffer the most. As the basic allocation of DAU (i.e. the salary component) remains untouched, the decline in DAU reduces the fiscal gap part of the DAU. The current arrangement of DAU formula gives 72.3 % of the regional civil servants' wage bill as 'basic allocation', making the wage component the most important part of the scheme. The wage payment component is 45 % of DAU under burden sharing and 37 % without burden sharing. The fiscal gap component, in contrast, is smaller under the burden sharing than without burden sharing.

In other words, the poorer regions suffer overproportionally from DAU reductions while the richer regions – tending to consume more subsidized fuel – still benefit from the fuel subsidy that remains in place. Provinces such as Gorontalo, Papua, NTT suffer significantly from DAU reductions while the Javanese provinces are only mildly affected.

Figure 9: *Change in DAU per capita (with and without burden sharing) and fuel consumption per capita, 2009*
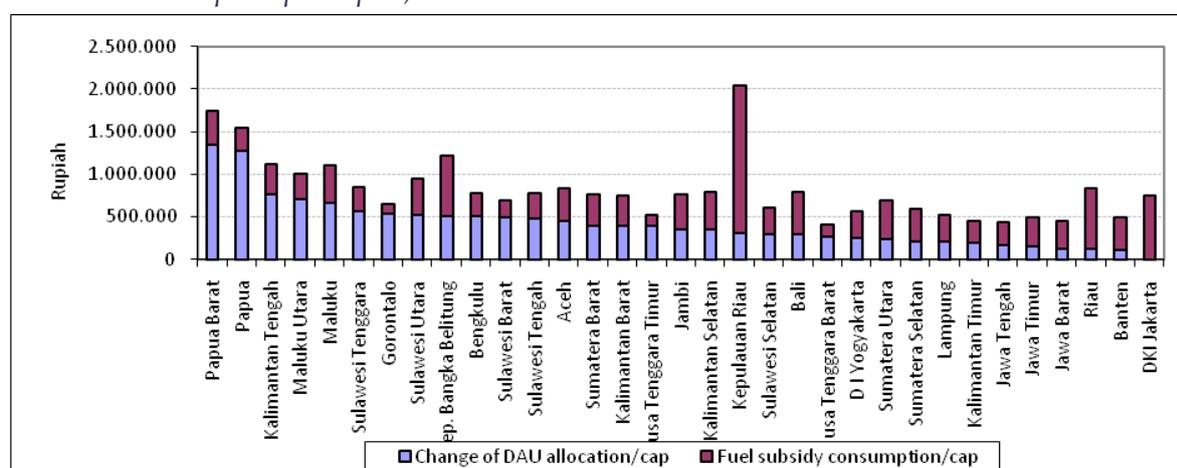
Source: Authors' calculation based on Ministry of Finance data.

Table 5: *DAU formula and burden sharing*

	Burden sharing	% total DAU	Without burden sharing	% total DAU
Total DAU	167,772,690,000,000	100	202,025,198,882,146	100
Basic allocation	75,477,744,693,610	45	75,477,744,693,610	37
Formula	92,294,945,306,390	55	126,547,454,188,535	63

Source: Authors' estimation based on Ministry of Finance data.

Thus the first reform step has reduced the budgetary risk for the central government stemming from oil price fluctuations and has shifted resources back to the center, but it has not made the regional distribution more equitable. Quite contrary, it has affected poorer districts disproportionally.

To mitigate this effect, the 'burden sharing' framework could be implemented in a different approach that made the reduction of DAU to the individual region dependent on the fuel consumption in that region. Instead of taking subsidies from the pool of DAU, a proportional weight of fuel subsidies consumption could be included as part of the DAU formula.

Yet, these negative distributional effects could be addressed more fundamentally by reducing the fuel subsidy. This would not only limit the reduction in DAU through the burden sharing scheme and thus the detrimental effect especially to the poorer regions, it would also curb the overconsumption of fuel and thus the distortionary effect of the subsidy. If subsidies on fuel consumption of private vehicles would be eliminated it would also significantly reduce the adverse redistribution effect of a subsidy for the rich. This is heart of the President's current proposal, which we discuss below.

The President's proposal

The Government of Indonesia has advanced a further reform step on the fuel subsidy, in particular in the context of the recent increase in the oil price that has exceeded US$ 100/barrel since February 2011. The reform plan has been on the government agenda for several years and was written in the National Development Program (2000-2004), the Ministry of Energy decree 31/2005, and in the most recent budget law 10/2010 that mandated the government to regulate the allocation and improve the targeting of fuel subsidy consumption in phases. Several options have already been discussed within the government and in the public such as restricting the fuel subsidy consumption for car purchased in 2005 and beyond, increasing the subsidized gasoline price and providing cash back to public transportation, and excluding private cars from using subsidized gasoline. The latter option is currently the most considered option by the government; initially it had been scheduled to be implemented starting in Java-Bali regions in mid 2011.

This government reform proposal will have a clear and unequal regional incidence apart from the relief of the overall budget. The exclusion of private cars from subsidized gasoline nationwide will reduce the overall fuel subsidy by approximately Rp. 13.5

trillion (cf. Appendix 5). The saving will be contributed mostly by consumers in the Javanese provinces such as DKI Jakarta, West Java, and East Java, which have the most private cars. This will increase the pool available for DAU by 26 % of that amount, i.e. by 3.5 trillion Rp., which will increase the fiscal gap component of the DAU for reasons explained above.

Thus the redistributive effects of this reform are from relatively well-off consumers to the public coffers with three quarters going to the central government and the remainder to the regional governments. The poorer regions benefit disproportionally as the increase in DAU raises only the fiscal gap component. The regional incidence is depicted in Figure 10 which shows the disproportional reduction in fuel subsidies (in blue), the disproportional increase in transfers (in red) and the net effect (in green).[18] Comparing the reform plan and the baseline (current situation), the regions that receive most additional transfers per capita are provinces in eastern Indonesia such as Papua, Papua Barat, and Maluku Utara. The regions that are hurt most by the reduction in fuel subsidies are DKI Jakarta, followed by the high consuming provinces such as Riau and Bali. The net effect of both the net transfers and net subsidies shows a positive relationship with poverty rate, indicating those that benefited the most of the reform proposal are those provinces with higher poverty rates as shown in figure 11. Again that excludes possible central government spending out of its increased budget.

Figure 10: *Net transfer per capita and net fuel subsidy per capita*
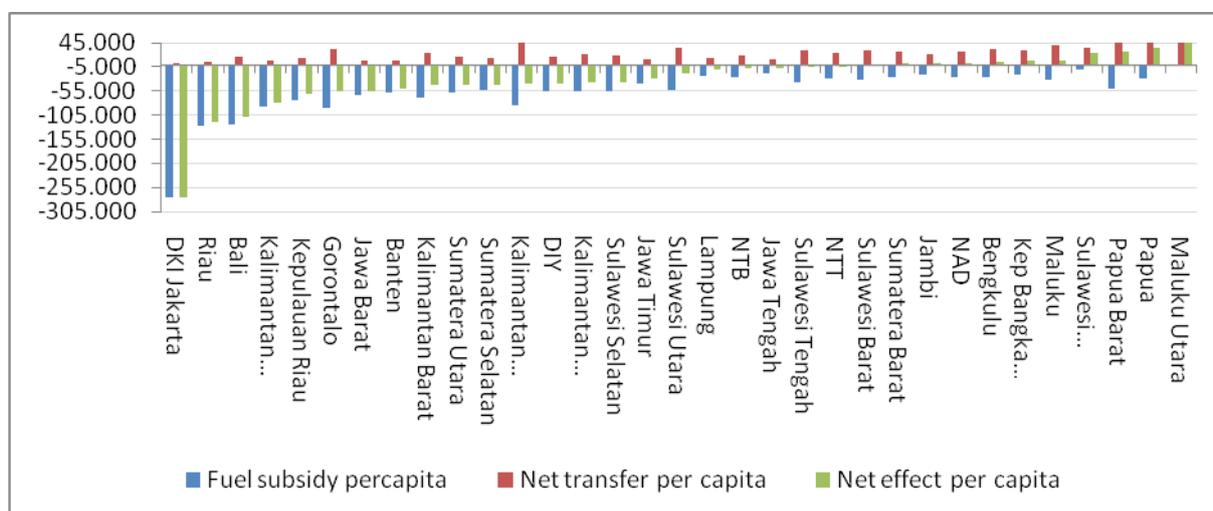
Source: Authors' estimation based on the Ministry of Finance and BPH Migas data.

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[18] Note that the net effect for the region entails different gross payers (fuel consumers) and gross recipients (regional governments). In Figure 10 we also need to disregard any possible regional incidence of increased central government spending out of the net savings of 10 tr Rp. for the central government.

Figure 11: *The net effect of transfers and subsidies with poverty rate, 2010*
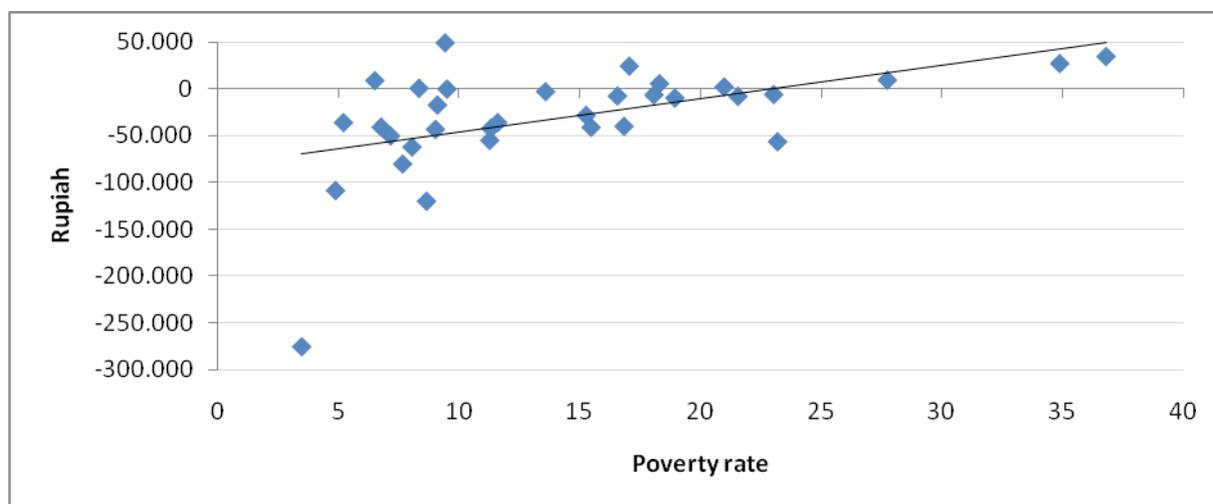
Source: Authors' estimation based on the Ministry of Finance, BPH Migas data, and BPS.

A more far reaching proposal is the elimination of the fuel subsidies altogether. The results would be similar to the results presented above. The DAU transfers to the regions would increase even more as fuel subsidies would no longer be deducted from the DAU pool; the regions would suffer from discontinuing the fuel subsidy more broadly as also the owners of motorcycles and users of public transport and all households cooking with kerosene or LPG would be affected. Yet it would free even more resources and give especially the central government more scope to pursue targeted pro-poor and pro-growth policies.

Conclusion

In this paper we have analyzed the regional impact of Indonesia's policy on oil and gas. This policy has three components which affect the regions: First, income from oil and gas (through taxes and through revenue sharing with the producers) is shared between regions and the center. This component redistributes revenues to the natural resource rich regions, in particular to East Kalimantan, Kep. Riau, and Riau. Second, through the DAU around a quarter of the central share from oil and gas is reallocated to the regions based on their wage bill – the so called basic allocation – and based on their fiscal gap, i.e. the difference of fiscal capacity and fiscal needs. The latter tends to favor the poorer regions. Third, the subsidization of fuel, i.e. gasoline ('premium'), diesel, kerosene, and LPG affects regions disproportionally according to their consumption levels. This component thus favors richer regions as they consume more. The recipients of the first and second component are mainly the regional governments and only indirectly the people of the regions through the local government spending, the recipients of the third component are the consumers of fuel.

We have analyzed the regional impact of both components of Indonesia's oil and gas

policy under three different scenarios: First, we have analyzed the status quo ante with the previous DAU allocation and the regional subsidization pattern; second, we have analyzed the impact of the government reform implemented in 2009, which deducts the fuel subsidies (along with other subsidies) from the pool that the block grants to the regions are based on. This makes the regional governments take a part of 26 % in financing the fuel subsidies and thereby reduces the center's budgetary risks but worsens the regional incidence of the consolidated energy policy.

Third, we analyze the recent government proposal to reduce fuel subsidies by exempting gasoline consumption of private cars from the subsidization scheme. We have argued that this reform enhances both efficiency and equity. It effectively reallocates funds mostly from wealthy consumers to the central government and to the regional governments and gives them more scope to pursue pro-poor and pro-growth policies. It reduces the incentive to overconsume gasoline and thus reduces the distortion of the subsidy created by the deadweight loss and the environmental degradation. The reform further reduces the vulnerability of the central government created by fluctuations of the oil price. The regional incidence of the increase in DAU benefits the poorer regions disproportionally while the richer regions' consumers suffer more from being eliminated from the subsidization scheme. Thus such a reform leads to a more equitable distribution from both ends and it significantly reduces the efficiency losses of a nonsensical policy to subsidize fuel consumption.

APPENDIX

Appendix 1: Tax and non-tax revenue sharing for oil under a typical production sharing contract

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                    ┌─────────────────────────┐
                    │   GROSS REVENUE (GR)     │
                    ├─────────────────────────┤
                    │     Volume x Price       │
                    └─────────────────────────┘
                              │
                              ▼
              ┌────────────────────────────────────┐
              │   First Tranche Petroleum (FTP)     │
              ├────────────────────────────────────┤
              │       20% x Gross Revenue           │
              └────────────────────────────────────┘
```

GROSS REVENUE (GR)
Volume x Price

First Tranche Petroleum (FTP)
20% x Gross Revenue

73.21% x FTP

Cost Recoverable (CR) =
cost + investment credit (IC)

26.79% x FTP

Equity to be Split (ETB)
GR –   – CR

Indonesia Share (IS)
(73.21% x ETB) +
(73.21 x FTP)

Contractor Share (CS)
(26.79% x ETB) +
(26.79% x FTP)

Domestic Market
Obligation (DMO)
25% x 26.79% x GR

DMO Fee
Depends on contract year (see footnote 18)

Government Tax
44% x (CS-DMO+DMO fee)

Net contractor share
CS-DMO+DMO fee – IC – gov't tax

Total Indonesia Share
IS + DMO – DMO fee + gov't tax

Total Contractor Share
Net contactor share + CR

Source: Agustina et al. (2008)

First, 20 % of the gross revenue in the form of First Tranche Petroleum is split between the contractor, who receives 26.79% and the government with a share of 73.21%. Then, from the remainder of the gross revenue, production costs and costs of investments are deducted. The resulting magnitude, the "equity-to-be-split" (a sort of net operating profit) is again shared by both parties in the above proportions (26.79% and 73.21 %). So the contractor receives 26.79 % of the profits (contractor's share, CS). From this share he has to give a quarter to the government to serve the domestic market (Domestic Market Obligation, DMO) and receives in return the DMO fee. This fee depends on the contract.[19] The proceed accruing to the contractor – the contractor's share of the profits minus DMO plus DMO fee – is subject to taxation. This income is taxed at 30 % by the corporate tax; the net of corporate tax income then is again subject to a 20 % dividend tax, making the effective tax rate 44%. So the effective part of the profit that the contractor gets, Π, is

$$\Pi = (1 - 0.44)[\alpha(R - C) + DMO - DMOfee] \qquad (1)$$

where α is the contractor's share (0.2679), R is the total revenue, C is total cost including investment credit. DMO is a quarter of $\alpha(R - C)$. If the DMO fee is a share β of the price of the oil surrendered under the DMO (e.g. β=0.2) then (1) simplifies to

$$\Pi = 0.56[\{0.75 + \beta 0.25\}\alpha(R - C)] \qquad (2)$$

$\beta = 0.1$ for contracts signed in 1989 and $\beta = 1$ for contracts signed thereafter. Thus for "new oil" the share of the gross profits (R-C) that the contractor receives is around 15 % (α=0.2679 and β=1).

Appendix 2: *The DAU formula*

The DAU amounts to 26 % of the net domestic revenue. Since 2009, net domestic revenue refers to central government domestic revenue minus revenue sharing and energy, food, and fertilizer subsidy. Ten per cent of the total DAU is allocated to the provinces with the remainder going to the districts. The formula for DAU has been constructed as follows[20]

$$DAU_i = BA_i + \gamma\ FG_i,$$

where BA describes the basic allocation, and i is the district index. The basic allocation makes up for almost half of the DAU; its most important variable is the district's wage bill, which covers 72.3 % of it. The fiscal gap, FG, is the difference between expenditure needs, EN, and fiscal capacity, FC, and will be covered partially by the DAU.

$$FG_i = EN_i - FC_i$$

The fiscal capacity is the sum of shared tax revenue (*STX*), shared natural resource

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[19] DMO fee for the contractor depends on the time when the contract was signed. If the contract was signed prior to 1989 the contractor receives 20 US cents per barrel. For contracts signed in 1989 the contractor receives 10 % of the current price; for contracts signed after 1989 the contractor receives the current price, making the DMO no longer a tax on lifting.

[20] The DAU formula is laid down in Law No. 33/2004; cf. also World Bank (2008, p.121); the change of the DAU formula over time has been analyzed by Hofman et al. (2006).

revenue (*SDA*), and own source revenue (*OSR*): $FC_i = OSR_i + STX_i + SDA_i$. The expenditure needs are calculated as follows:

$$EN_i = [0.3*Population\ Index_i + 0.1*1/HDI_i + 0.15*Area\ Index_i + 0.3*Cost\ Index_i +$$

$$0.15*\mathrm{Re}\,gional\ GDP\ per\ capita\ Index_i]\ *Avg\ Expenditure\ of\ subnat.\ Government$$

The area index gives the relative size of the district or province, the cost index refers to the relative cost of construction, the regional GDP per capita index gives the GDP per capita relative to the average of all districts or provinces. *HDI* denotes the Human Development Index. The weighted indexes are then multiplied by the average expenditures of the province (districts) for the DAU allocation for provinces (districts).

Appendix 3: The transfers from the center in absolute terms (Rp. millions), 2010
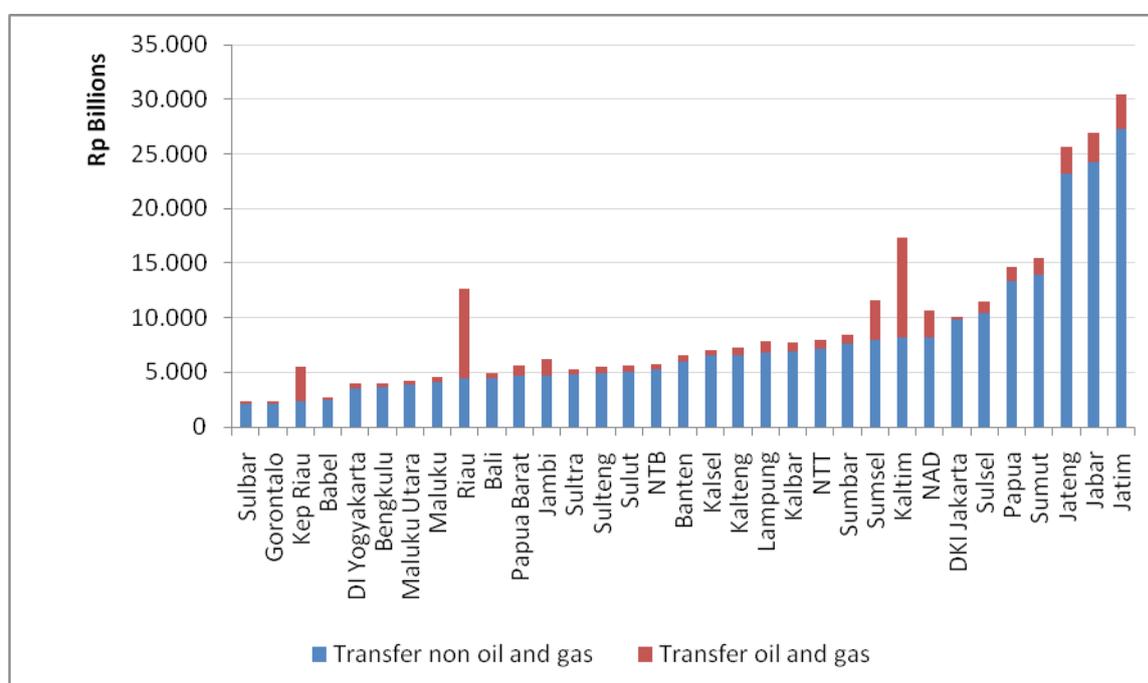
Source: Ministry of Finance

Appendix 4: Oil-gas transfers and fuel subsidy consumption, 2010 (billion rupiah)

	Revenue sharing oil and gas	DAU oil and gas	Fuel subsidy	Total transfer oil and gas and fuel subsidy
NAD	1,520	866	1,447	3,833
Sumatera Utara	7	1,446	4,845	6,298
Sumatera Barat	0	862	1,677	2,539
Riau	8,035	235	2,863	11,133
Kepulauan Riau	2,972	154	670	3,796
Jambi	1,031	464	1,132	2,627
Sumatera Selatan	3,052	663	2,275	5,991
Kep Bangka Belitung	26	248	779	1,053

Bengkulu	0	395	457	852
Lampung	311	739	2,128	3,178
DKI Jakarta	111	54	6,389	6,554
Jawa Barat	275	2,374	11,733	14,382
Banten	0	529	3,476	4,005
Jawa Tengah	4	2,524	7,913	10,441
DIY	0	395	1,126	1,521
Jawa Timur	404	2,832	10,551	13,786
Kalimantan Barat	0	755	1,271	2,026
Kalimantan Tengah	0	685	850	1,534
Kalimantan Selatan	19	520	1,348	1,887
Kalimantan Timur	9,029	182	1,734	10,945
Sulawesi Utara	0	549	808	1,357
Gorontalo	0	237	235	473
Sulawesi Tengah	7	558	665	1,230
Sulawesi Selatan	0	1,119	2,230	3,349
Sulawesi Barat	0	231	182	413
Sulawesi Tenggara	0	527	493	1,020
Bali	0	462	1,874	2,336
NTB	0	552	862	1,415
NTT	0	794	627	1,422
Maluku	1	442	401	843
Maluku Utara	0	376	207	583
Papua	0	1,273	501	1,774
Papua Barat	513	411	256	1,180
Total	27,316	24,455	74,007	125,778

Source: Own estimation based on Ministry of Finance and BPH-Migas data.

Appendix 5: *Estimation of fuel subsidy savings under the President's proposal*

As there is no data on fuel consumption of private cars using gasoline per province, we have to estimate the reduction in fuel subsidies by province if the President's plan is implemented. This reform would exempt private cars' gas consumption from the subsidy We employ assumptions used by the MoF.

Data:

Data on the numbers of passenger cars, motorcycles, busses, and trucks is based on Transportation Statistics, BPS. Data on fuel subsidy consumption realization by province is based on BPH Migas data.

Assumptions:

(1) Passenger cars consist of private and public cars with the ratio of 0.9:0.1.

(2) Private cars consist of gasoline and diesel users with the ratio of 0.8:0.2.

(3) The ratio of gasoline consumption between car and motorcycle is 0.8:0.2.

These assumptions are based on the analysis done by Ministry of Finance on fuel subsidy and fuel vehicle tax
(http://www.fiskal.depkeu.go.id/2010/adoku/2011/kajian/pkapbn/Penerapan_Pajak_Bahan_Bakar_Kendaraan_Bermotor_terkait_BBM_Bersubsidi.pdf).

Estimation:
We know the number of cars per province i, NC_i, the number of motorcycles per province, NM_i, as well as the total gasoline consumption per province, TGC_i.

Using assumptions 1 and 2 we calculate the total number of private cars using gasoline, $NPCG_i$, as

$$NPCG_i = 0.9 * 0.8\ NC_i$$

The total number of cars using gasoline is therefore $NC_i*0.8$ is.

The gasoline consumption of private cars per province, X_i, is therefore calculated (using assumptions 2 and 3) as:

$$X_i = \left(\frac{NPCG_i * 0.8}{NC_i * 0.8 * 0.8 + NM_i * 0.2}\right) * TGC_i.$$

Multiplying the private gasoline consumption per province in liters with the subsidy per liter s gives the reduction in subsidies RS_i per province: $RS_i = s * X_i$.

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