Eliminating the Fuel Subsidy in Indonesia: A Behavioral Approach

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February, 2015

ACKNOWLEDGEMENTS

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EXECUTIVE SUMMARY

The fuel subsidy in Indonesia presents the country's economy with huge opportunity costs. The subsidy is given to a consumer good (i.e., fuel) as opposed to being targeted at individual recipients, creating distortion in the efficient allocation of resources. Subsidized fuels are available at retail gasoline outlets where both the wealthy and the poor have equal access. Consequently, people who own large cars and motorcycles (i.e., mid- and high-income households) receive a greater proportion of the subsidy compared to people who use smaller cars and motorcycles or those who do not own cars and motorcycles at all (i.e., poor and low-income households).

No individual would choose to lose the fuel subsidy, given that it has been received for many years. On the other hand, the Government of Indonesia cannot maintain the current fuel subsidy policy without creating an extra budgetary burden. It is essential to understand households' perspectives on the fuel subsidy if the GoI plans to eliminate it.

This study uses behavioral insights and a computer-based survey to determine the most acceptable exit strategy for eliminating the fuel subsidy scheme in Indonesia. During the survey, subjects were given several pair-wise choices and were asked to choose which strategy they deemed to be more acceptable. The results of the survey show that a combination of gradual elimination and a scheme that reallocates money for vaccinations for children and investment in mass rapid transportation (MRT) were considered to be most desirable. Immediate elimination combined with a reallocation scheme that earmarked money made its presence felt in subjects' preferences. Unsurprisingly, immediate elimination and a broad reallocation scheme was the least favored choice among survey respondents. Cross-group comparison in sessions 1 and 2 suggested consistency of choice amongst groups regarding the two most and least desirable choices. The results suggest that subjects also prefer immediate elimination but only if it is paired with an earmarked (not a broad) reallocation scheme.

1.0   INTRODUCTION

1.1   Background

Subsidized fuels, which include Premium with RON 88[1] and automotive diesel oil, present one of the biggest quandaries for the Indonesian economy.[2] Fuel consumption is the most subsidized scheme in Indonesia. Figure 1 shows that the amount of fuel subsidy in Indonesia has increased throughout the last decade. The fuel subsidy in the 2010 budget plan accounted for IDR 58.9 trillion (USD 6.93 billion), roughly fifteen times the budget for natural resources conservation, four times the spending on health-related programs, and nearly twice the budget for the elementary education system (MoF 2010).

The fuel subsidy has been a burden to both the government and Indonesian households. For the Government of Indonesia (GoI), subsidizing fuel consumption has been a weak policy tool in terms of assisting the poor but a crowd-pleaser for the wealthy. The subsidy is implemented for a consumer good (i.e., fuels) as opposed to targeted recipients or households, creating distortion in resource allocation. These

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[1] RON refers to Research Octane Number. The higher the octane number, the more efficiently the engine operates. Therefore, a higher octane number corresponds to lower emissions.
[2] The government also subsidizes kerosene. However, the total subsidy for kerosene consumption is relatively small in recent years, owing to a successful kerosene-to-liquid gas conversion policy that was started in 2004.

subsidized fuels are available at gasoline outlets where everyone has equal opportunity to purchase them (IEA 2008). Consequently, those who own more cars and motorcycles (i.e., middle- and high-income households) receive a greater proportion of subsidy compared to those who own a limited number of cars and motorcycles or do not own vehicles at all (i.e., poor and low-income households).
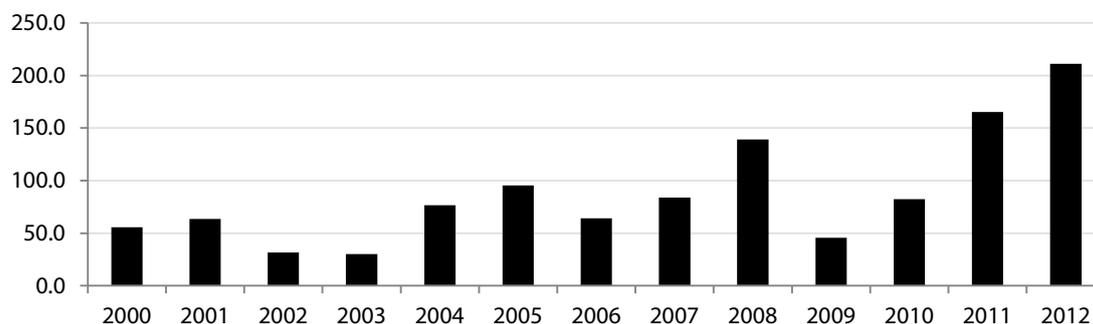
Figure 1. Fuel subsidy in Indonesia (in IDR trillion), 2000-2012
Source: Calculated from MEMR (2010) and MoF (2010, 2013a, 2013b)

The GoI has always met the demand for subsidized fuel, ever since the policy was implemented during President Suharto's era. The burden imposed by the fuel subsidy increases every year, triggered by the increasing demand for fuel consumption, an increase in the international crude oil price (ICP) or both. The increase in fuel consumption may be driven by economic growth but it may also be driven by an increase in smuggled fuel, which would explain why the price of subsidized fuel in Indonesia is the lowest in Southeast Asia.

The World Bank (2011) reported that 50% of the wealthiest households consumed the highest portion of subsidized fuel, with the top 10% enjoying 40% of the total subsidy. The bottom 10% of households consumed less than 1% of the total subsidy. Further analysis suggests that two-thirds of poor households do not consume fuel at all. Granado, Coady and Gillingham (2010) reported that, on average, the top income quintile receives about six times more in subsidies than the bottom quintile. Subsidy benefits to the top income groups are even more stark in the case of gasoline; the top income quintile receives, on average, 20 times that of the bottom quintile.

Retail gasoline outlets, especially those in the cities of Java, Bali, and Sumatera, already market non-subsidized fuels such as Pertamax with RON 92 and Pertamax Plus with RON 95. These fuels are intended for middle- and high-income households who own certain types of cars that require fuel with higher RON. These classes of households, however, still tend to buy subsidized fuel if their cars can use Premium with lower RON. There is a tendency for those who buy non-subsidized fuel to switch to subsidized fuel if the price of non-subsidized fuel exceeds a certain threshold (Figure 2). This is understandable given that subsidized fuel costs about half the price of non-subsidized fuel and there is no restriction on the amount of non-subsidized fuel that can be bought.
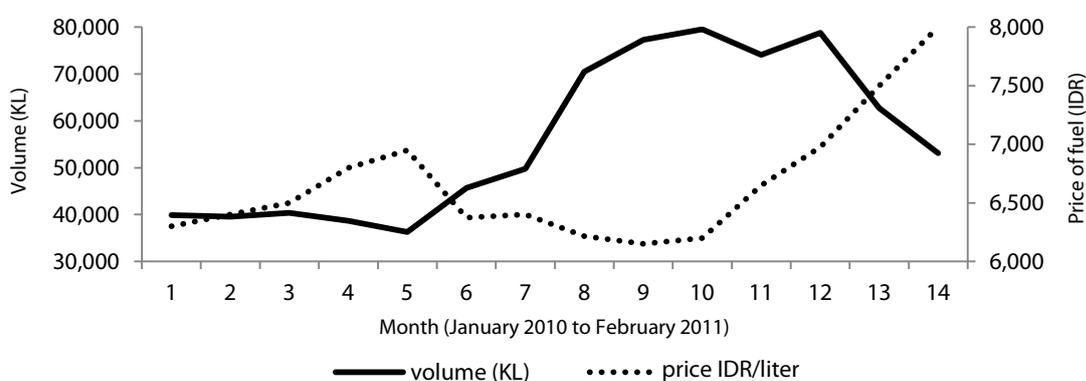
Figure 2. Sales volume of non-subsidized fuel and its retail price, 2010-2011
Source: Extended from ITB, UGM, and UI (2011).

The GoI has made several attempts to phase out the fuel subsidy and to bring in rationing instead. The GoI implemented two price adjustments for a weighted average increase of 160% in gasoline prices in 2005 as a response to increasing ICP. These adjuments brought the prices within reach of the international price level. Nevertheless, during 2008-09 the GoI decided to reduce the price of subsidized fuel three times so the price of subsidized fuel went back to its original price prior to 2005. This policy was driven primarily by the need of the ruling party to gain electoral support prior to the general election. The policy was financed at the time by the GoI's budget surplus owing to a decrease in subsidy and an increase in oil revenue. At the end of 2010, the ICP price increased sharply. The GoI responded to the situation by proposing to implement fuel rationing. The plan was to implement a closed distribution scheme in which only targeted individuals would be allowed to purchase subsidized fuels, starting in 2011.

The ever-increasing fuel subsidy and setbacks in measures to ration fuel consumption has led to budgetary pressures. The government's ability to finance other programs, for instance PNPM (*Program Nasional Pemberdayaan Mandiri* or National Program for Community Empowerment), PIN (*Pekan Imunisasi Nasional* or National Immunization Week), KUR (*Kredit Usaha Rakyat* or Credit Program for Small Enterprises), Askeskin (*Asuransi Kesehatan untuk Keluarga Miskin* or Health Insurance for the Poor), and BOS (*Bantuan Operasional Sekolah* or School Operational Assistance Program)[3], has been hampered by the demands of the fuel subsidy. The fuel subsidy could have been reallocated to non-energy subsidies (e.g., food, vaccines, fertilizers, and public service obligation) or to improve DAK (*Dana Alokasi Khusus* or Specific Allocation Fund), which is a transfer of funds from central to regional governments to supplement the provision of physical facilities and infrastructure. These provisions aim to reduce imbalances between regions.[4]

The fuel subsidy also imposes problems on households. Middle- and high-income households tend to use personal vehicles excessively because their operating cost, thanks to the subsidy, is relatively low. There is also a concern that the fuel consumption pattern of these classes of households has become an illusion, as they are not sufficiently aware that they are being subsidized. As for low income and poor households, they benefit less from the subsidy because it is not a targeted policy. These households could be included in various welfare initiatives, ranging from health to education programs, if the GoI were to reallocate the finance currently reserved to subsidize fuel.

1.2   Research Problems

Attempts were made in 2005 and 2008 to increase the price of subsidized fuel – this was owing to a sharp increase in the international oil price. In 2008, the GoI increased the subsidy for fuel from IDR 4,500 per liter to IDR 6,000 per liter; the price of non-subsidized fuel was about IDR 10,000 per liter. The price of international crude oil dropped quite drastically after May 2008. This circumstance, along with political pressures, prompted the GoI to reduce the price of subsidized fuel three times between December 2008 and January 2009. The price of subsidized fuel returned to IDR 4,500 on 15 January 2009.

From the end of 2010 until April 2011, the oil price increased sharply and, although at time of writing the international oil price is not as high as it was from March to April 2011, the price for non-subsidized fuel is about IDR 8,500 per liter. This means that non-subsidized fuel is about twice as expensive as subsidized fuel. It should be noted that in February 2011, for instance, when the price difference between subsidized and non-subsidized fuel exceeded IDR 3,000 per liter, about 10% of non-subsidized fuel users switched to using subsidized fuel.

In spite of facing an extra budgetary burden due to sharp increases in the price of oil, the GoI is still reluctant to increase the price of subsidized fuel. There have been many arguments for and against plans to increase the price of subsidized fuel and to eventually eliminate the scheme. Arguments in favor of eventual elimination are based on the fact that the GoI has been facing tremendous budgetary pressure due to fluctuations in the international oil price. Arguments against eventual elimination are based on the adverse impact of the plan on household welfare, particularly that of low-income households.[5] Unfortunately, little

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[3] These programs are strategic since they do indeed target poor people.
[4] Non-energy subsidy and DAK accounted for IDR 44.9 trillion (USD 5.2 billion) and IDR 20.5 trillion (USD 2.4 billion) in 2010, respectively (MoF 2010).
[5] Indonesia has experience regarding the formulation of exit strategies from particular subsidies. Indonesia gradually eliminated the subsidy on kerosene from 2008. Kerosene was widely used and had become an essential part of low-income household budgets. Nowadays, households use gas rather than kerosene.

attempt has been made to ask low-income households about their preferences for alternative policies to tackle the budgetary burden imposed by sharp increases in international oil prices.

Indeed, no individuals or households would be happy to lose the indirect subsidy they have received for many years. On the other hand, Indonesia cannot sustain its current fuel price policy without creating an extra budgetary burden. Therefore, several exit strategies that could lead to the elimination of the fuel subsidy scheme should be formulated based on acceptability rather than on the basis of popularity.

1.3   Research Question and Objectives

The objective of this study is to seek the most acceptable exit strategy for eliminating the fuel subsidy scheme in Indonesia from the perspective of households. It is hoped that the results of this study can be used to develop a larger-scale research project on the elimination of the fuel subsidy scheme. The results will also be useful for policymakers working to choose the best policy for eliminating the fuel subsidy. Hence, the study tackles the research question: What are the preferences of the subjects regarding the most acceptable exit strategy for eliminating the fuel subsidy scheme?

2.0 REVIEW OF LITERATURE

2.1   The Concept of Subsidy

A subsidy, theoretically, acts as an incentive for individuals to perform activities that increase the value added to the economy. Subsidies, such as those given to education and health care, can also be regarded as an investment by the government in the welfare of all people. A subsidy can be implemented via two methods, a subsidy on the price of a particular good or a cash subsidy (the lump sum principle). Using the model of individual choice in basic microeconomics, we can examine the effect of both types of subsidies (Figure 3).
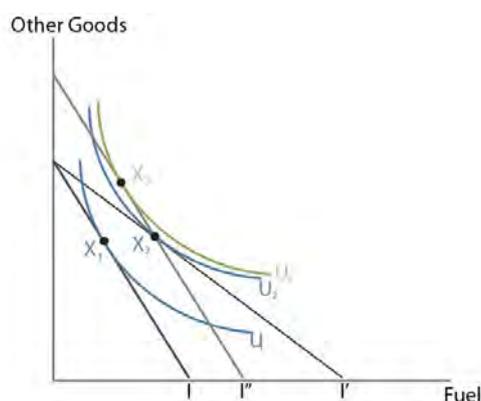
Figure 3. The lump-sum principle in the incidence of subsidy

Initially, the individual optimizes his consumption given his income, I, with bundle X_1, yielding utility level U_1. A subsidy on the price of fuel decreases the price of fuel and causes the budget constraint to become flatter, I'. The individual would increase his consumption, particularly of fuel, and optimize at bundle X_2. The individual would obtain a higher utility level from consuming bundle X_2 that is U_2. Suppose the government decides to introduce a cash subsidy for each individual, which would be equivalent to the exact amount of price subsidy. The individual's budget constraint would shift to the northeast and he would obtain a higher utility level, U_3.

A price subsidy affects individuals in two ways: it increases the individual's purchasing power (income effect) and directs consumption away to the subsidized good (substitution effect). A cash subsidy affects the overall amount of an individual's income; therefore it does not distort consumption choices. In

the context of a consumer's welfare, a subsidy on private goods creates inefficiency. A subsidy drives consumers to purchase a good cheaper than the cost of producing it, and this behavior creates a deadweight loss.[6]

2.2   Fuel Subsidy in Indonesia

There are two types of fuel in Indonesia: non-subsidized and subsidized. Non-subsidized fuels include Pertamax with RON 92 and Pertamax *Plus* with RON 95. These types of fuel are intended for new generations of cars, which require fuel with a higher octane count. Pertamina, as well as multinational firms such as Shell, Petronas, Total, and British Petroleum, retail non-subsidized fuel in Indonesia. The price of this type of fuel is determined by Mean of Platts Singapore (MOPS) plus tax, the retail margin, and the distribution cost.

Subsidized fuels in Indonesia include Premium with RON 88 and Solar (automotive diesel oil). Premium and Solar account for two-thirds of the total daily sales of fuel in Indonesia. Subsidized fuel in Indonesia is one of the cheapest fuels in the world, at approximately 30% of the world market price. The GoI always meets its obligations to subsidize fuel, even if the consumption of fuel and the international crude price (ICP) increases substantially. This obligation is due to Article 8 Verse 1 in Law Number 22, 2001, which states that the GoI must guarantee the provision and the distribution of gasoline. The implications of this obligation can be analyzed via the fuel subsidy calculation given below (MEMR 2010).

Fuel subsidy = quantity × (reference price - selling price)   (Equation 1)

Quantity refers to the amount of subsidized fuel that is distributed by Pertamina, Indonesia's state-owned oil company. The selling price for both subsidized fuels is pegged at IDR 4,500 per liter. The formula for determining the reference price is

$$\textit{Reference price} = [Y \times \textit{price index of gasoline} + (1\textit{-}Y) \times \textit{price index of biofuel}] + \alpha \qquad \text{(Equation 2)}$$

where Y indicates the fraction of gasoline volume and α indicates the cost of distribution plus margin. The reference price reflects the market price for every liter of gasoline and it varies according to MOPS. Assuming constant α, the fuel subsidy will continue to increase with the quantity of fuel distributed by Pertamina as a response to increases in consumption and the ICP, reflected by MOPS. In practice, information regarding pricing of oil as set by MOPS is not available to the general public. Therefore, we have used the price of non-subsidized fuel or Pertamax as the reference price to estimate the amount of subsidy per liter. Hence, the price of non-subsidized fuel or Pertamax is commonly used as the reference price to determine the subsidy per liter (Figure 4).
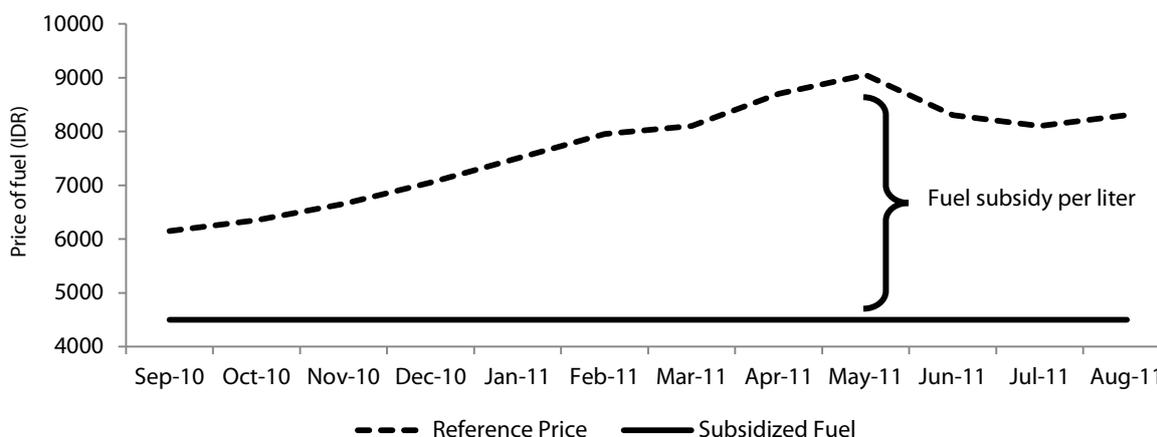
Figure 4. Illustration of fuel subsidy per liter, 2010-2011
Source: Calculated from MEMR (2011a, 2011b).
Note: Reference price refers to price of non-subsidized fuel in UPMS III.

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[6] See Rosen (2002) for a discussion about the burden of subsidy.

The fuel subsidy policy has consequences for the GoI's budgetary burden. Table 1 shows that fuel subsidy expenditure has been continuously increasing and, in 2011, it passed the IDR 100 trillion mark. Fuel subsidy expenditure has dominated all subsidy expenditures; it accounted for at least 54% of total subsidies in 2011, which is much higher than strategic non-energy subsidies such as food, fertilizer, plant seeds, and credit assistance. The fuel subsidy has exceeded its allocated figure within the GoI annual budget for at least the last two years (2010 and 2011). For example, the fuel subsidy bill in 2011 was IDR 160 trillion, which was 23.4% higher than the approved figure of IDR 129.7 trillion. Fuel subsidy expenditure is also prone to increases in ICP, such as those experienced in 2005 and 2008.

Table 1. Subsidy expenditure in Indonesia (in IDR trillion), 2005-2012

Subsidy Expenditure	2005	2006	2007	2008	2009	2010	2011	2012
Energy								
Fuel subsidy (A)	95.6	64.2	83.8	139.1	45	82.4	129.7	123.6
Electricity	8.9	30.4	33.1	83.9	49.5	57.6	65.6	45
Total Energy (1)	**104.5**	**94.6**	**116.9**	**223**	**94.5**	**140**	**195.3**	**168.6**
Non-energy								
Food	6.4	5.3	6.6	12.1	13	15.2	15.3	15.6
Fertilizer	2.5	3.2	6.3	15.2	18.3	18.4	18.8	16.9
Plant seed	0.1	0.1	0.5	1	1.6	2.2	0.1	0.3
Other subsidy	7.2	4	18.4	23.6	10.6	17	7.2	7.4
Total Non-Energy (2)	**16.2**	**12.9**	**33.3**	**52.2**	**43.5**	**52.8**	**41.9**	**40.2**
Total Subsidy Expenditure (3=1+2)	**120.7**	**107.5**	**150.2**	**275.2**	**138**	**192.8**	**237.2**	**208.8**
Ratio (%) Fuel Subsidy/Total Subsidy (=A/3)	**79.2**	**59.7**	**55.8**	**50.5**	**32.6**	**42.7**	**54.7**	**59.2**

Source: Cited from Widodo *et al.* (2012).

2.3   Roadmap for Phasing Out the Fuel Subsidy in Indonesia

Continuous increases in ICP since 2003 prompted the GoI, under Susilo Bambang Yudhoyono, to decrease the fuel subsidy twice in 2005. This policy increased the price of subsidized fuel by 29% in March 2005 from IDR 1,810 per liter to IDR 2,400 per liter. In the following October, the GoI adjusted the price by 114% to IDR 4,500 per liter.

Peak ICP was seen in 2008, when it reached USD 147.3 a barrel. GoI fuel subsidy expenditure shot up to USD 17.6 billion, from an estimated USD 5 billion, because the government had set the budget based on an assumed price of USD 95 per barrel (Dillon, Laan and Dillon 2008). Consequently, the GoI opted to increase the price of subsidized fuel to IDR 6,000 per liter in May 2008. Shortly after this policy ICP started to decrease rather rapidly. This was deemed to be the perfect moment to phase out, if not completely eliminate, the fuel subsidy. The GoI, however, decided to decrease the price of subsidized fuel to IDR 5,500 per liter on 1 December 2008 and to IDR 5,000 per liter on 15 December 2008.

The Ministry of Energy and Mineral Resources (MEMR) established a roadmap to phase out the fuel subsidy in 2008 in an attempt to reduce the GoI's budgetary burden. A research consortium comprising of three state universities also suggested a strategy to phase out the subsidy. Their research proposed three scenarios: a gradual decrease of the subsidy by IDR 500; a restriction on the retail of fuel at subsidized price only to public transport; and increasing the price of subsidized fuel by IDR 1,000 per liter for personal vehicles and volume rationing for public transport using Radio Frequency Identification. The study recommended that one of the scenarios be implemented in April 2009 because, historically, inflation is at its lowest point in April every year so the inflationary effect of the increase would be minimized. The GoI opted to keep the price of subsidized fuel at its current level, mostly due to political pressure.

The fuel subsidy in Nigeria is similar to that in Indonesia, judging by the characteristics of the country as well as the policy. Nigeria is an oil-exporting country with over 160 million people, which makes it by far the most populous nation in Africa. The country is endowed with significant energy resources, which include oil reserves of 36 billion barrels. The abundance of oil contributes significantly to the nation's revenue. Nigeria, however, has been facing the dilemma of fuel subsidy. Fuel subsidy is no longer just an economic policy issue but has spilled over into the realms of socio-economic policy (Adenikinju 2008).

Pricing of fuel in Nigeria is set by the Petroleum Products Pricing Regulatory Agency (PPPRA). The price of fuel is a based on parity pricing adjusted for the cost of transportation, distribution and marketing (Adenikinju 2008). Subsidy per liter of fuel is the difference between the PPPRA determined prices and the government-regulated price. Fuel subsidy in 2006 accounted for USD 2.03 billion or 1.4% of GDP and it tripled to USD 5.37 billion in 2008 due to increases in the ICP and a depreciating exchange rate (Adenikinju 2008).

The fuel subsidy in Nigeria also imposes costs on the economy. It has been responsible for significant growth in domestic oil consumption and the shutdown of local refineries. Both occurrences are due to the fact that the price of fuel does not reflect the real cost of consumption and supply. Adenikinju (2008) also reveals other costs of the subsidy in Nigeria.

An empirical study regarding this issue attempted to analyze the relationship between the demand for fuel and the subsidy factor, i.e. the amount of subsidy for each unit of fuel. The study showed that increases in the amount of subsidy increased the demand for fuel (Nwachukwu and Chike 2011). These results suggest that the presence of a fuel subsidy significantly affects the behavior of consumers.

There has been heated public debate in Nigeria concerning the impact of the fuel subsidy policy. Those who do not support the policy suggest that it is a blunder, while those who do support the policy argue that the fuel subsidy is a necessity. A recent government decision to reduce the fuel subsidy met with strong opposition from the people. There is a lack of evidence regarding household preferences regarding the removal of the fuel subsidy.

3.0 METHODOLOGY

3.1   Survey Design and Sampling

This study used the computer survey method to answer the question stated in the first section: *What are the preferences of the subjects regarding the most acceptable exit strategy for eliminating the fuel subsidy scheme?* Pair-wise choices drawn from various alternative exit strategies were presented to the subjects in order to determine which ones were most acceptable. Each pair-wise choice included hypothetical policy schemes that would be implemented by the government to eliminate the fuel subsidy. Hypothetical policy schemes were formulated based on interview reports with the relevant stakeholders. It should be noted that each pair-wise choice contained different information. The policy options are illustrated in Figure 5.

The policy options for elimination strategies were divided into two groups: those with a straight elimination plan and those with a gradual elimination method. Individuals tend to smooth their consumption path and the phenomena were modelled on the permanent-income hypothesis of Modigliani and Brumberg (1954) and Friedman (1957). From the perspective of households, the elimination of the fuel subsidy would be considered a loss that decreases current income by Z, although it decreases permanent income by only Z/T (Romer 2006). The impact of the loss depends on the width of the consumption horizon and the proportion of the loss to total income. Consequently, households would not regard this loss as much if Z is only a small proportion of their income or if their horizon is relatively wide.
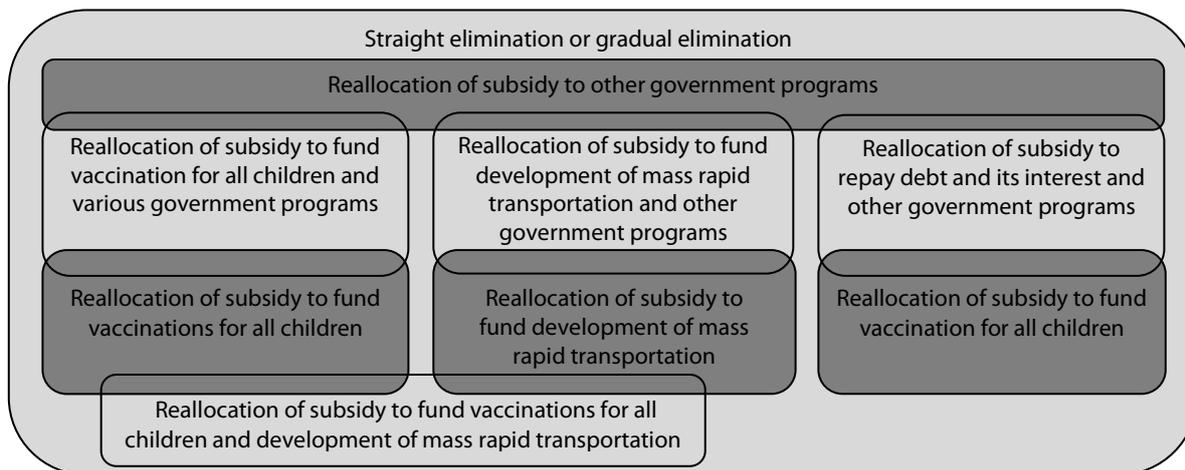
Figure 5. Policy choices

In some households, straight elimination would be regarded as a bigger decrease in current income relative to gradual elimination. This is relevant to households who have a relatively high consumption of subsidized fuel and have a higher proportion of fuel consumption in their expenditure plan. This type of household may carefully calculate the effect of both proposals on their consumption. In contrast, households that do not consume subsidized fuels may feel indifferent towards the two fuel subsidy elimination options.

The policy options were also determined with respect to the reallocation of resources saved from the elimination of the fuel subsidy. This reallocation was either to some earmarked programs (i.e., vaccines, mass rapid transportation, etc.) or to unspecified (various) government programs. The different schemes reflect two different agents; the GoI and households. These agents may have different utility functions and sometimes their utility functions conflict. What the GoI perceive as the first best option for reallocating the fuel subsidy fund may not necessarily be perceived as the best option by households. This is mainly due to different utility functions between the parties. The GoI may seek to maximize the welfare of society given certain budget constraints. It will allocate its budget to wide-ranging government programs, which, ideally, are supported by evidence-based policy. On the other hand, households seek to maximize their utility by consuming observable goods or cash. The downside of various government programs is that households cannot directly observe the benefit they will receive.[7]

Individuals tend to be inconsistent when making intertemporal choices (Laibson 1997; Frederick, Loewenstein and O'Donoghue 2002). There is a sense of present-biasedness in households when facing options for fuel subsidy reallocation. Households may prefer immediate disbursement through goods or cash, rather than future benefit from various government programs. It is also interesting to see how individuals respond to a policy which is a combination of two proposals – this policy involves the reallocation of the fuel subsidy fund to various government programs and a child vaccination program, or the development of MRT, in equal measure.

The fuel subsidy would be reallocated to child vaccination in several policy choices. There are several reasons for choosing this program for the survey. Firstly, child vaccination is a straightforward example of a direct reallocation program for households: every household with children needs a vaccination program. Secondly, a child vaccination program has widespread coverage: every household, regardless of income, is able to benefit from a vaccination program. Furthermore, poor and low-income households have the same opportunity to receive the benefit of a child vaccination program as high-income households. Thirdly, even though child vaccination is a direct allocation program, households cannot experience this benefit immediately. The benefit of vaccination – the prevention of disease, mortality, or disability for a single child – cannot be valued directly as a monetary unit.

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[7] Subjects will be given pair-wise choices regarding two monetary prospects in the third session. This session will determine the amount of money that subjects can earn from this survey. It is interesting to see whether there is a systematic link between particular expected utility function and the choices that households make in the survey.

BOX 2. Child Vaccination Program in Indonesia

Immunization brings about various benefits. Immunization allows a family to save 20-25 times the cost of treatments of preventable diseases for a single child. Other benefits of immunization include the prevention of disability and mortality, opportunity forgone treating sick children, and declining quality of life due to disability caused by disease. These benefits induce global awareness of the implementation of immunization programs, particularly for children. The World Health Organization (WHO) recommends ten vaccines for children, which include hepatitis B, DTP, polio, BCG, mumps, measles and rubella (MMR), varicella, hib, pneumococcal conjugation, influenza, and hepatitis A.

The Indonesian Ministry of Health provides free vaccines for children through *Program Imunisasi Nasional* (National Immunization Program). There are, however, only five vaccines provided by the program, which are BCG, DTP, MMR, polio, and hepatitis B. These vaccines can be easily obtained in *Posyandu* (Integrated Health Service Center) and *Puskesmas* (Community Health Center). They are produced domestically and pass quality control via the *Badan Pengawasan Obat dan Makanan* (Drug and Food Surveillance Body). Any other vaccines needed to complete the list recommended by WHO must be obtained privately by households.

A household in Indonesia must incur a cost of about IDR 1.8 million (about USD 211) to obtain the other five vaccines needed to immunize a single child (Table 2). The cost for each vaccine might be higher than shown in Table 2 because these vaccines are not produced domestically. The cost of obtaining these vaccines is relatively high, particularly for low income and poor households. Furthermore, the availability of these vaccines in rural areas is unreliable; conditions may not be suitable for private institutions to provide these vaccines to rural areas.

Table 2. Recommended pediatric immunization

Vaccines	Preventable diseases	Cost per dose
pneumococcal	pneumonia and meningitis	IDR 826,285
hib	influenza	IDR 98,940
hepatitis A	hepatitis A	IDR 121,125
varicella	chicken pox	IDR 592,739
MMR	mumps, measles, and rubella	IDR 161,406

Source: Calculated from CDCP (2011), assuming 1 USD = 8,500 IDR

The other policy choice proposes the reallocation of the fuel subsidy saved to the development of mass rapid transportation (MRT). This reallocation alternative is similar to the vaccination option in the sense that it is earmarked. MRT would also benefit households irrespective of their income background. MRT establishment would serve as the optimum alternative to private vehicle usage. The most obvious difference is that MRT coverage is not as comprehensive as private vehicle use because the MRT can only be built in particular cities and districts. Each household would also value the MRT differently. For example, households who commute on workdays would value the project more than those whose activities are home-based, such as a home industry owner. Additionally, MRT development would not be as swift as that of a vaccination program, so households would be unable to experience its benefits immediately.

BOX 3. Mass Rapid Transportation in Indonesia

Big cities in Indonesia face significant transportation problems. Jakarta residents are used to hours of expected and unexpected gridlocks during almost every hour of the day. They must also cope with floods in the rainy season, which can cause bottlenecks, even in the capital's main avenue. The current transportation system also faces potential problems in the future as more and more personal vehicles take to the roads thanks to the increasing population, resulting in escalating air and sound pollution.

The land transportation sector is responsible for 47.5% of total fuel consumption, which is higher than the industry and electricity sectors. Most of this fuel (88%) is consumed by road transport. The growth in the number of vehicles has caused traffic congestion such as physical bottlenecks, capacity reduction at

intersections, loading and unloading of buses on the road, and bad driving practices. The quality of public transport is still low, e.g. low punctuality, long waiting times, and insecurity once on board. Public transportation still utilizes old vehicles.

Residents of Jakarta and those of other big cities, such as Surabaya, Bandung and Medan, are in desperate need of a MRT system. The GoI and the local government of Jakarta proposed the MRT development before the millennia; the plan entered the execution phase in 2003 but failed to continue due to problems in acquiring land.

The President's Decree Number 5, 2010, mandated six priorities for the urban transportation infrastructure. The mandate calls for improvement in the transportation system in four metropolitan areas: Jakarta, Bandung, Surabaya and Medan. The mandate also demands the completion of the MRT and monorail in Jakarta by the end of 2014. The coordinating Ministry of the Economy has been promoting megaprojects for development including the establishment of an MRT system in six metropolitan areas and their peripheries. These major metropolitan areas include Jakarta, Bandung, Surabaya, Medan, Denpasar, and Makassar. The master plan also includes improvement in the current transportation system so that it can accommodate the development of trains, a subway, and feeder buses.

One of the policy choices offered in this survey was an earmarked reallocation towards the repayment of foreign debt, including its interest. Unlike the vaccination and MRT development programs, repayment of foreign debt is an indirect reallocation program; households would not receive an immediate benefit. Therefore, the decision to choose this alternative would be considered an intergenerational decision making process.

BOX 4. Government Foreign Debt

Government debt is an integral part of fiscal policy. Debt, both foreign and domestic, is utilized to finance the government's budget deficit and debt refinancing. Debt ratio to GDP has declined from 40.4% in 2006 to 25.2% in 2011; however, the outstanding debt still accounts for a very large amount of money.

The total debt that the GoI owes is an accumulation of legacy debts, debts from the 1997/98 economic crises, and budget deficit financing for the last decade. Foreign debts, which include debt from the World Bank, the Asian Development Bank, the Islamic Development Bank, and bilateral debt, are mostly earmarked debt. The debt is used to finance strategic projects such as poverty alleviation and infrastructure programs. Foreign debts also include past debts, particularly those obtained to ease the economy during the 1997/98 crises.

Outstanding foreign debt accounted for USD 67.8 billion in December 2011 or 34% of total government debt. The debt has decreased by about USD 5.8 billion from that in 2006. The GoI had to disburse IDR 29.9 trillion in 2011 to pay the interest on foreign debt. This payment accounted for 28% of the total government debt repayment. Foreign debt interest payments ranged from IDR 25.7 trillion to IDR 30.3 trillion from 2007 to 2011 (DMO 2011).

The last policy option is the reallocation of the fuel subsidy fund to various (unspecified) government programs. In this scheme households would not be able to observe the types of benefit they would receive. This implies that households would not observe the timing of the disbursement of the program. Unlike the other three alternatives, households would find this policy option difficult to internalize into their utility function. Furthermore, a household decision to vote for this alternative depends on their trust in the government as the institution that would formulate and execute the reallocation program.

In this survey, five policy options were used in the first session to formulate 10 pair-wise choices. The policy options in the first session were included and randomly listed for policy options in the second session. There were also additional policy options included in the second session to make a total of 10 policy options. The 10 policy options were presented in the second session in terms of 45 pair-wise choices.

This study involved 335 subjects from households with different characteristics. The classification of the subjects is as follows:

1. Households that do not possess a motorcycle or a car representing those with very low income.
2. Households that only possess a motorcycle representing those with low income.
3. Households that possess a low-budget MPV (e.g., Toyota Avanza or Nissan Livina) representing those with medium income.
4. Households that possess cars that cost twice the amount of those in the third sample group representing those with a high income.

This classification aims to represent different types of households with regard to the subsidy policy. Several demographic variables such as income, gender, age, occupation, educational attainment, and marital status were observed from these subjects.

It is interesting to observe the responses from two very different types of households, particularly the responses to loss. Loss aversion, which is the valuation of losses greater than gains, suggests that a loss of X is greater than a gain of X (Kahneman and Tversky 1979). Kahneman, Knetsch, and Thaler (2008) stated that people value losses greater than gains, as shown in many experiments such as Knetsch and Sinden (1984) and Kahneman, Knetsch and Thaler (1990).

Households with a very low income background may not necessary perceive the elimination of the fuel subsidy as a loss since they do not actually consume fuel. On the other hand, medium-income households are going to experience loss because they routinely consume subsidized fuel. This group of households may already have internalized the subsidy into their daily expenditure plan. Hence, there is a possibility that this group will give a greater response to this loss relative to other groups of households.

We developed a computer application for the survey. This application includes questions on subjects' basic information details, an explanation of the computer survey and the respondent's tasks, and the pair-wise choices for the first, second, and third sessions of the survey. Subjects were asked to fill in the answers on the computer for each pair-wise question using a mouse. The computer application went through two pre-tests to validate the software and its content.

Although the computer application was designed and developed to be as simple as possible for users (they only need to click using the mouse), some complexities still surfaced. Some subjects in group 1 (from very low income backgrounds) were illiterate and had difficulty understanding the instructions, which were writen in Indonesian (their mother tongue being Javanese). Others from this group had difficulty operating a computer. Fortunately these problems were identified four days prior to the real survey taking place. In order to tackle these problems, 15 students from the Department of Javanese Literature, who are fluent in the Javanese language (called Kromo), were recruited as helpers in the survey. Their tasks included providing assistance to subjects who had difficulties reading the instructions, understanding the instructions, and operating the computer.

The third session of the survey was designed to provide compensation for the time spent by subjects. In this session 32 pair-wise choices were presented and subjects were told to indicate their preferences. The questions were designed to explore the subjects' attitudes toward risky prospects. The first eight questions were designed to explore the subjects' risk attitude in positive domains. The other 24 questions were designed to identify the subjects' risk attitude in negative domains.

For questions with negative prospects, three types of endowment schemes were used. For questions 9-16, each subject was given an endowment of IDR 205,000. Each subject was given an endowment of IDR 5,000 more than the maximum negative payoff when they answered questions 17-24. Lastly, for questions 25-32, subjects were told that they will be given a voucher and a souvenir. No further information was given to the subjects either on the value of the voucher or the type of souvenir they would receive. The voucher stated that the subjects did not have any debt to the experiments even if they won negative payoffs.

The questions in session 3 were designed to explore whether the risk attitude of individuals in negative domains are influenced by the methods of providing endowment to them. If this is the case, then questions should be raised on various experimental results, which focus on the risk attitude of individuals in negative domains.

3.2   Analytical Tools

The dataset from this survey corresponds to household preferences regarding the acceptability of various exit strategies for eliminating the fuel subsidy scheme. These valuations are subjective in their nature but they can be formulated into objective data using Analytical Hierarchial Process or AHP (Saaty 2008). Pair-wise choices are aggregated, taking account of the relative degree of importance of each alternative in a given pair-wise (Sato 2009).

Saaty (2009) argued that this analytical tool is capable of expressing household preferences quantitatively. These preferences are ordered in a common absolute scale, so the most prefered option can be derived. The outcome of AHP is a priority scale of household preferences. Priorities in this scale are similar to probabilities, e.g., a priority of 0.50 is twice a priority of 0.25. This scale, however, is unique in the sense that it is valid for given policy attributes and factors. The scale reflects the importance of attributes in the alternatives (Saaty 2009).

4.0 RESULTS

4.1   Sampling and Survey Procedure

Sampling subjects was the most challenging aspect of survey preparation. It took about three weeks to distribute brochures and registration forms, both directly or via the internet, to collect a pool of subjects. Subjects were defined as anyone who lives or works within a 5 km radius of the Faculty of Economics and Business, Universitas Gadjah Mada. Calls for participation were communicated via flyers, emails, and the internet through the research team's website. Individuals could either sign up to be included in the pool of subjects on paper or electronically, via a web form. Individuals read the informed consent text at registration and they signed the form as confirmation of being included in the pool of subjects. Individuals also chose the desired session from the available sessions set by the research team.

Figure 6 shows how the pool of subjects were managed. Subjects were collected from direct registration and internet registration and were grouped according to their motor vehicle ownership. Each individual in each group was given an identification number, which was used for randomization. Individuals who were selected from the randomization process were notified via text message. The drawback with this process was that a lot of the selected individuals did not come to the actual survey. In response to this situation, the research team called all the individuals in the pool of subjects and asked them to participate in the survey.
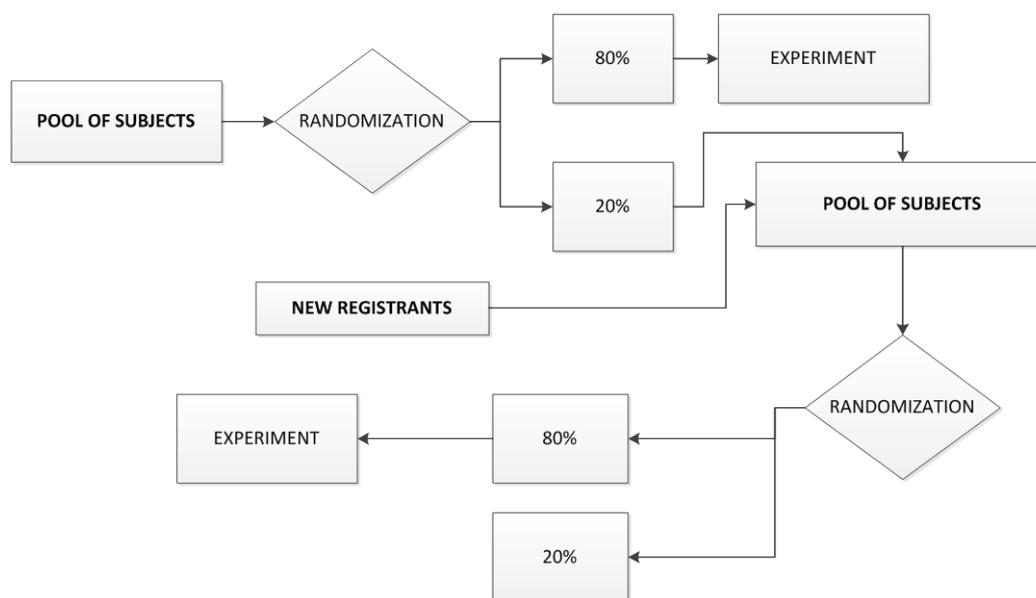
Figure 6. Management of the subject pool

The survey was conducted via 10 survey groups, with each group completing a three-session survey. Each session ran for about 60-75 minutes. The survey procedure is shown in Figure 7.
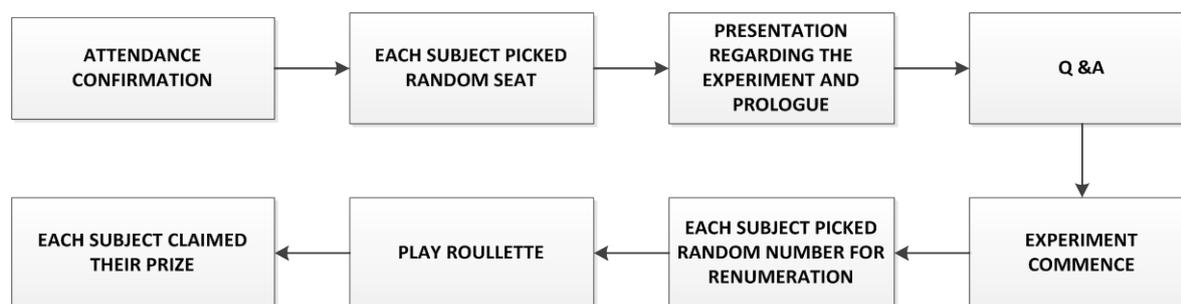
Figure 7. Survey procedure

The survey was conducted in the computer laboratory in the Faculty of Economics and Business, Universitas Gadjah Mada. The laboratory consists of three rooms comprising a total of 125 computers, although during the survey only two rooms could be used. The research team played an audio Powerpoint presentation explaining the details of the survey, including an explanation of each session. The Powerpoint included an explanation of the computer survey and of the respondent's tasks as well as explanations of the program for vaccinations for children, for MRT, and for the repayment of foreign debt. The research team answered questions regarding the survey before it commenced.

After finishing all three sessions of the survey, subjects reported to a research team member to select a random number. The number selected was part of a game the subject played in the third session. The subject's choice of randomly selected number determined the respective prospect that they would be given in a game of roulette. The subject then played roulette and claimed their prize. Subjects who randomly selected a prospect without endowment and earned a negative payoff received a voucher, indicating that they did not owe any money to the survey and would be rewarded with a souvenir.

4.2   Profile of Survey Subjects

The average age of the survey subjects was 38 years old, indicating that the average subject was of working age. Majority (48%) possessed a motorcycle only. The average income for this group was IDR 1,835,038 (USD 201.7) a month, which is lower than the total average income. Most were male (60.6%) (Table 3). Note that the subjects with car(s) were combined into one group because there were not many subjects who possessed more than one car. Individuals in this group earn an average of IDR 6,397,491 (USD 710.8) a month, an income almost ten times that of individuals in group one.

Table 3. Profile of survey subjects

| Group | Age (average) | Gender | | | | Total | Income (average)[8] |
| | | Male | | Female | | | |
		N	%	N	%		
No motor vehicle	42.17	34	36.2	60	63.8	94	IDR 677,431
Motorcycle only	31.97	115	71.4	46	28.6	161	IDR 1,835,038
Car	39.13	54	67.5	26	32.5	80	IDR 6,397,491
Total	**38.10**	**203**	**60.6%**	**132**	**39.4%**	**335**	**IDR 2,517,399**

Source: Calculated from survey data.

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[8] IDR 2,517,399 is equivalent to USD 276.6, assuming 1 USD equals 9,100 IDR

Most of the subjects had between 9 and 12 years of schooling or reached high school (41%), with some obtaining more than 12 years of schooling or higher education (27%). Table 4 shows that subjects with lower levels of education tended to have no vehicle or owned only a motorcycle. On the other hand, subjects who went to high school and had access to higher education tended to have car(s).

Table 4. Education profile of survey subjects

Group	Education level									
	No formal education		Elementary		Junior high		High school		Higher education	
	N	%	N	%	N	%	N	%	N	%
No motor vehicle	11	11.7	31	33.0	28	29.8	23	24.5	1	1.1
Motorcycle only	1	0.6	7	4.3	27	16.8	93	57.8	33	20.5
Car	0	0.0	1	1.3	3	3.8	21	26.3	55	68.8
Total	**12**	**3.6**	**39**	**11.6**	**58**	**17.3**	**137**	**40.9**	**89**	**26.6**

Note: Elementary school indicates up to six years of schooling; junior high indicates up to nine years of schooling; high school indicates up to 12 years of schooling; diploma and higher indicates more than 12 years of schooling.
Source: Calculated from survey data.

4.3 Results of the Survey

Table 5 shows the overall results of the survey in session 1. The result, in general, suggests that subjects focused more on the reallocation schemes rather than the elimination methods, i.e., gradual or immediate. Some subjects chose the gradual elimination scheme but the first two choices suggest that earmarked reallocation schemes were an important feature in the policy. The direct reallocation scheme to children's vaccination was the most desirable amongst the schemes. Reallocation of the subsidy fund to repay foreign debt and for investment in wide-ranging government programs were not preferable for majority of subjects.

Table 6 shows the overall results of the 45 pair-wise choices in session 2. The results show that subjects, in general, tended to be consistent between sessions 1 and 2, particularly regarding their choices of top five priorities. The combination of gradual elimination and earmarked reallocation schemes, particularly for vaccination and the development of MRT, were the most desirable. Subjects chose reallocation to vaccinations for all children, which offers immediate implementation. Immediate elimination with earmarked reallocation scheme somewhat made its mark in subjects' preferences. Not surprisingly, immediate elimination and a broad reallocation scheme was the least popular choice amongst survey subjects.

Table 5. Overall results for session 1

Rank	Policy Choices	Vector of Priority (%)
1	Gradual reduction of fuel subsidy; subsidy saved is reallocated to finance vaccines for all children and the development of mass rapid transportation.	30.9
2	Immediate elimination of fuel subsidy; subsidy saved is reallocated to finance vaccines for all children and other government programs	22.6
3	Gradual reduction of fuel subsidy; subsidy saved is reallocated to finance other government programs	17.6
4	Gradual reduction of fuel subsidy; subsidy saved is reallocated to repay foreign debt and finance other government programs	17.6
5	Immediate elimination of fuel subsidy; subsidy saved is reallocated to finance other government programs	11.2

Source: Calculated from survey data.

Table 6. Overall results for session 2

Rank 1st session	Rank 2nd session	Policy Choices	Vector of Priority (%)
	1	Gradual reduction of fuel subsidy; subsidy saved is reallocated to finance vaccines for all children and other government programs	17.4
1	2	Gradual reduction of fuel subsidy; subsidy saved is reallocated to finance vaccines for children and development of mass rapid transportation	16.6
	3	Gradual reduction of fuel subsidy, subsidy saved is reallocated to finance the development of mass rapid transportation and other government programs.	12.2
2	4	Immediate elimination of the subsidy; subsidy saved is reallocated to finance vaccines for all children and other government programs	10
	5	Immediate elimination of the subsidy; subsidy saved is reallocated to finance vaccines for all children and mass transportation system	9.1
4	6	Gradual reduction of the subsidy; subsidy saved is reallocated to repay foreign debt and to finance other government programs	8.9
3	7	Gradual reduction of the subsidy; subsidy saved is reallocated to finance government programs	8.4
	8	Immediate elimination of the subsidy; subsidy saved is reallocated to finance development of mass rapid transportation and other government programs	6.9
	9	Immediate elimination of the subsidy; subsidy saved is reallocated to repay foreign debt and to finance other government programs	5.6
5	10	Immediate elimination of the subsidy; subsidy saved is reallocated to finance other government programs	5

Source: Calculated from survey data.

Table 7 displays the results of the survey in session 1 for the three groups of subjects. The computation shows consistency of choices among the three groups, particularly regarding the top two priorities and the least preferable. Each group chose earmarked reallocation schemes, especially vaccinations for children and the development of the MRT system, and gradual elimination was the top priority. It should be noted that, given the other three choices, immediate elimination with earmarked programs were preferable by a considerable margin. Each group also deemed immediate elimination with reallocation to broad-ranging government programs as the least preferable policy options. These results were consistent across genders as well as across educational attainment.[9]

Table 7. Comparison of policy choices across groups, session 1

Policy choices	Group 1 Rank	Group 1 VP (%)	Group 2 Rank	Group 2 VP (%)	Group 3 Rank	Group 3 VP (%)
Gradual; vaccines and mass transportation system	1	31.1	1	30	1	31.9
Immediate; vaccines and other government programs	2	24.6	2	21.8	2	22
Gradual; foreign debt and other government programs	3	16.8	4	18.3	4	17.2
Gradual; other government programs	4	14.9	3	19	3	18.6
Immediate; other government programs	5	12.6	5	10.9	5	10.3

Note: The rank for group 1 serves as a reference point. VP = Vector of priority.
Source: Calculated from survey data.

Cross-group comparison in session 2 suggests consistency of choice among groups regarding the two most and least desirable choices (see Table 8). These groups were also consistent in terms of choices made between sessions 1 and 2. Subjects who did not own a vehicle, or who only owned a motorcycle, i.e., subjects in groups 1 and 2, reallocated funds to children's vaccination and the development of MRT (via both gradual and immediate elimination schemes), giving these options top-five priority. Subjects who owned cars, on the other hand, favored options that included the gradual elimination scheme in their top five

[9] See Appendix 1 and Appendix 2.

priorities. There are two possible explanations for this bias: subjects with cars would experience the greatest impact if fuel prices increase; and this group consists of educated people who may have opted for gradual elimination out of consideration to others, in the knowledge that the effect of the withdrawal of the fuel subsidy scheme on society would not be without impact. Interestingly, these results are consistent across educational attainment, with subjects with diploma degrees and higher opting for gradual elimination.[10]

Table 8. Comparison of policy choices across groups, session 2

Policy choices	Group 1		Group 2		Group 3	
	Rank	VP (%)	Rank	VP (%)	Rank	VP (%)
Gradual; vaccines and other government programs	1	16.8	1	17.2	1	18.4
Gradual; vaccines and mass rapid transportation	2	16	2	15.9	2	18.3
Gradual; mass rapid transportation and other government programs	3	11.3	3	11.9	3	13.8
Immediate; vaccines and other government programs	4	10.9	4	10.5	6	8.3
Immediate; vaccines and mass transportation system	5	10.7	6	8.8	7	7.9
Gradual; foreign debt and other government programs	6	8.6	5	9.1	5	8.9
Immediate; mass rapid transportation and other government programs	7	7.4	8	6.8	8	6.5
Gradual; other government programs	8	7.3	7	8.7	4	9
Immediate; foreign debt and other government programs	9	6.1	9	5.7	9	4.5
Immediate; other government programs	10	5	10	5.3	10	4.3

Note: The rank for group 1 serves as a reference point. VP = Vector of priority.
Source: Calculated from survey data.

The survey in session 3, established for subjects' remuneration, showed interesting results (Table 9). The results of problem 1 show that households did not have any difficulty finding the dominant prospect, both the probability and the payoff. The corresponding negative prospect, problem 9, shows a striking finding: households in this problem chose the least dominant strategy. The results from the other corresponding negative prospects (problem 25), where subjects were not given an initial endowment, show that subjects chose the dominant strategy. The possible explanation for this finding is that households overweigh the small probability of obtaining a non-negative payoff. Another possible explanation is that subjects tend to be careless if they are given a higher initial endowment.

Table 9. Summary of choices regarding prospects, session 3

Positive Prospects				Negative Prospects			
					Varying initial endowment		
Problem 1:	(200,000;0.33) (175,000;0.66)	>	(175,000)	Problem 9:	(-200,000;0.33) (-175,000;0.66)	>	(-175,000)
N = 303	164*		139	N = 291	158*		133
Problem 2:	(200,000;0.33)	>	(175,000;0.34)	Problem 10:	(-200,000;0.33)	<	(-175,000;0.34)
N = 265	184***		81	N = 275	109		166***
Problem 3:	(200,000;0.33) (175,000;0.33)	>	(175,000;0.67)	Problem 11:	(-200,000;0.33) (-175,000;0.33)	<	(-175,000;0.67)
N = 310	205***		105	N = 297	124		173***
Problem 4:	(80,000;0.001)	<	(80)	Problem 12:	(-80,000;0.001)	<	(-80)
N = 285	134		151	N = 292	134		158*
Problem 5:	(100,000;0.80)	<	(80,000)	Problem 13:	(-100,000;0.80)	>	(-80,000)
N = 311	128		183***	N = 298	155		143
Problem 6:	(100,000;0.20)	>	(80,000;0.25)	Problem 14:	(-100,000;0.20)	<	(-80,000;0.25)
N = 270	157***		113	N = 263	110		153***
Problem 7:	(120,000;0.45)	<	(60,000;0.90)	Problem 15:	(-120,000;0.45)	<	(-60,000;0.90)
N = 308	143		165	N = 307	142		165
Problem 8:	(120,000;0.01)	>	(60,000;0.02)	Problem 16:	(-120,000;0.01)	<	(-60,000;0.02)
N = 256	161***		95	N = 265	101		164***

Source: Calculated from survey data.
Note: (1) The amount of endowment for each problem is the maximum negative payoff plus IDR 5,000.
(2) Inference using one-tailed binomial test; ***, **, * indicate the difference is significant at 1%, 5%, and 10%, respectively.

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[10] This result is due to a correlation between diploma degree holders and car ownership.

The result of problem 4 shows that most subjects do not significantly overweigh very low probabilities. The majority of people, though insignificant, chose the certain prospect, contrary to the example given in Kahneman and Tversky (1979). The result of problem 9, on the other hand, confirms the sub-additive property of the weighting function for small values of probabilities. The results of problems 5 and 6 as well as problems 29 and 30 show that the sub-proportionality of the weighting function is confirmed both on positive and negative prospects, respectively. These results confirm the violation of substitution axiom of utility theory. Reflection effect is also not verified between problems 1 and 9 as well as problems 4 and 12. The latter results are interesting in that they show that subjects tend to choose a prospect that offers a smaller loss with certainty rather than a prospect that offers a higher loss with a very small probability (Table 10).

Table 10. Summary of choices regarding negative prospects, session 3

Negative Prospects			Negative Prospects		
Initial endowment: IDR 125,000			No initial endowment		
Problem 17:	(-20,000;0.33) (-17,500;0.66)	<	(-17,5000)	Problem 25:	(-200,000;0.33) (-175,000;0.66)	<	(-175,000)
N = 293	135		158*	N = 285	129		156*
Problem 18:	(-20,000;0.33)	<	(-17,500;0.34)	Problem 26:	(-200,000;0.33)	<	(-175,000;0.34)
N = 264	106		158***	N = 269	95		174***
Problem 19:	(-20,000;0.33) (-17,5000;0.33)	<	(-17,500;0.67)	Problem 27:	(-200,000;0.33) (-175,000;0.33)	<	(-175,000;0.67)
N = 286	121		165***	N = 289	115		174***
Problem 20:	(-80,000;0.001)	<	(-80)	Problem 28:	(-80,000;0.001)	>	(-80)
N = 292	139		153	N = 286	148		138
Problem 21:	(-100,000;0.80)	>	(-80,000)	Problem 29:	(-100,000;0.80)	>	(-80,000)
N = 293	153		140	N = 296	170***		126
Problem 22:	(-100,000;0.20)	<	(-80,000;0.25)	Problem 30:	(-100,000;0.20)	<	(-80,000;0.25)
N = 277	108		169***	N = 275	122		153**
Problem 23:	(-120,000;0.45)	<	(-60,000;0.90)	Problem 31:	(-120,000;0.45)	<	(-60,000;0.90)
N = 308	145		163	N = 300	142		158
Problem 24:	(-120,000;0.01)	<	(-60,000;0.02)	Problem 32:	(-120,000;0.01)	<	(-60,000;0.02)
N = 269	107		162***	N = 270	108		162***

Source: Calculated from survey data.
Note: (1) The amount of endowment for each problem from 9-16 is the maximum negative payoff plus IDR 5,000.
(2) Inference using one-tailed binomial test; ***, **, * indicate the difference is significant at 1%, 5%, and 10% respectively.

Table 11 shows some interesting decision making results across groups in session 3. Individuals in the first group chose prospects with a certain payoff while individuals in the second group chose prospects that offer a higher payoff with certain probability. This result indicates that an individual's income bracket may affect their decisions. Individuals in group 1 also prefer a prospect that offers very low negative payoff with certainty as opposed to prospect that offers a non-negative payoff with a small probability of high loss (problem 12). These results offer an interesting insight, specifically that individuals with a low income seek a certain payoff. Individuals in group 2 chose a prospect with the probability of getting a high negative payoff as opposed to a certain negative payoff (problem 9). Again, this is a very interesting result as individuals overweigh the small probability of obtaining a non-negative payoff.

Table 11. Decision making across groups, session 3

Positive Prospects			Negative Prospects			
Group 1						
Problem 1:	(200,000;0.33) (175,000;0.66)		(175,000)	Problem 9:	Varying initial endowment (-200,000;0.33) (-175,000;0.66)		(-175,000)
N = 86	36	<	50*	N= 88	43	<	45
Problem 4:	(80,000;0.001)		(80)	Problem 12:	(-80,000;0.001)		(-80)
N = 87	44	>	43	N= 89	33	<	56***
Problem 5:	(100,000;0.80)		(80,000)	Problem 13:	(-100,000;0.80)		(-80,000)
N = 88	29	<	59***	N= 87	43	<	44
Group 2						
Problem 1:	(200,000;0.33) (175,000;0.66)		(175,000)	Problem 9:	Varying initial endowment (-200,000;0.33) (-175,000;0.66)		(-175,000)
N = 144	86**	>	58	N= 138	80**	>	58
Problem 4:	(80,000;0.001)		(80)	Problem 12:	(-80,000;0.001)		(-80)
N = 134	66	<	68	N= 134	70	>	64
Problem 5:	(100,000;0.80)		(80,000)	Problem 13:	(-100,000;0.80)		(-80,000)
N = 148	74	=	74	N= 141	79*	>	62
Group 3						
Problem 1:	(200,000;0.33) (175,000;0.66)		(175,000)	Problem 9:	Varying initial endowment (-200,000;0.33) (-175,000;0.66)		(-175,000)
N = 73	42	>	31	N= 65	35	>	30
Problem 4:	(80,000;0.001)		(80)	Problem 12:	(-80,000;0.001)		(-80)
N = 64	24	<	40**	N= 69	31	<	38
Problem 5:	(100,000;0.80)		(80,000)	Problem 13:	(-100,000;0.80)		(-80,000)
N = 75	25	<	50***	N= 70	33	<	37

Source: Calculated from survey data.
Note: (1) The amount of endowment for each problem from 9-16 is the maximum negative payoff plus IDR 5,000.
(2) Inference using one-tailed binomial test; ***, **, * indicate the difference is significant at 1%, 5%, and 10% respectively.

5.0 CONCLUSIONS

This research report serves as a practical guide to designing policies regarding the elimination of the fuel subsidy scheme. This report offers: a) a concrete research question, b) valid survey questions, and c) representative samples. We hope that the results will be of interest to both the Executive and the Legislative branches of the GoI. Principally, this report provides evidence regarding household responses to the elimination of the fuel subsidy scheme. Our hope is that our findings will end speculation regarding the views of households on the elimination of the fuel subsidy scheme and will influence the government to formulate evidence-based policies.

The irrationality of the fuel subsidy scheme in Indonesia has received little attention, perhaps because of the inappropriate formulation of the scheme and the government's indecisiveness. The subsidy scheme is a weak policy for assisting poor households. Every stratum of household, particularly the wealthy, have equal access to subsidized fuels. People who own vehicles receive more subsidy than those who own only a motorcycle or someone who does not own any kind of motor vehicle. As a consequnce, the fuel subsidy has created a distortion in efficient allocation since wealthy consumers benefit the most: the World Bank (2011) reported that wealthy households enjoy most of the subsidized fuel, while the bottom 10% consume less than 1% of the total subsidy.

The fuel subsidy imposes a heavy burden on the government's budget, with expenditure on the subsidy continuously increasing in the last decade, passing the IDR 100 trillion mark in 2011. Expenditure on this scheme undermines spending on strategic poverty alleviation programs. The government increased the price of subsidized fuel in 2005 and 2008 but then reversed these decisions for political reasons. The government has maintained the status quo regarding the fuel subsidy despite the fact that its budgetary burden has reached an all-time high.

Indeed, no household would prefer to lose the fuel subsidy, which they have received for many years. Therefore, this report implemented a survey approach to seek the most acceptable exit strategy for the elimination of the fuel subsidy scheme based on household perspective. Several exit strategies, including an elimination method and a reallocation scheme, were formulated.

The results of the survey show that the most acceptable exit strategies were those using a combination of a gradual elimination method and an earmarked reallocation scheme, particularly for vaccinations for children and the development of MRT. The least acceptable exit strategies were those that combined immediate elimination of the fuel subsidy and an undetermined reallocation scheme. These results were consistent across survey sessions and across groups of subjects.

6.0 POLICY RECOMMENDATIONS

We conclude this study by proposing recommendations regarding the elimination of the fuel subsidy scheme in Indonesia.

1. **Reformulate, if not eliminate, the fuel subsidy scheme in Indonesia.** Reforming the fuel subsidy should not be considered a dilemma any longer. The fuel subsidy has created a distortion in the efficient allocation of resources. Wealthy households enjoy the benefits of the fuel subsidy to a greater degree than poor households, who deserve the most benefit from any government subsidy scheme. The Government of Indonesia has also been carrying a heavy burden on its budget due to the ever-increasing expenditure on fuel subsidy. This burden has imposed restraints on the formulation of strategic development programs.

2. **Implement gradual elimination of the fuel subsidy scheme.** Representative households suggest that gradual elimination is the most acceptable elimination method; households would have a better chance of adjusting their fuel consumption if the subsidy were phased out slowly. From the government's point of view, withdrawing the fuel subsidy in small increments would result in a relatively lower impact on inflation compared to immediate elimination.

3. **Reallocate the fuel subsidy to earmarked programs.** Reallocation of the fuel subsidy must be earmarked for poor households with immediate effect to compensate for an increase in prices in general. Possible earmarking includes the development of mass rapid transportation. This is viewed as a feasible alternative to the use of personal vehicles, particularly when their operation costs increase due to increases in the price of fuel.

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APPENDIX

Appendix 1. Gender comparison, policy choices in sessions 1 and 2

Gender comparison of policy choices, session 1

Policy options	Male		Female	
	Rank	VP (%)	Rank	VP (%)
Gradual; vaccines and mass rapid transportation	1	31.3	1	29.9
Immediate; vaccines and other government programs	2	21.1	2	25.7
Gradual; other government programs	3	18.7	4	16
Gradual; foreign debt and other government programs	4	17.9	3	16.7
Immediate; other government programs	5	11	5	11.7

Note: The rank for group 1 serves as a reference point.
Source: Calculated from survey data.

Gender comparison of policy choices, session 2

Policy options	Male		Female	
	Rank	VP (%)	Rank	VP (%)
Gradual; vaccines and other government programs	1	17.4	1	17.1
Gradual; vaccines and mass rapid transportation	2	17.2	2	15.4
Gradual; mass rapid transportation and other government programs	3	12.6	3	11.4
Immediate; vaccines and other government programs	4	9.5	4	11
Gradual; foreign debt and other government programs	5	9	6	8.7
Gradual; other government programs	6	8.8	7	7.7
Immediate; vaccines and mass rapid transportation	7	8.8	5	9.6
Immediate; mass rapid transportation and other government programs	8	6.5	8	7.7
Immediate; foreign debt and other government programs	9	5.2	9	6.2
Immediate; other government programs	10	4.9	10	5.2

Note: The rank for group 1 serves as a reference point.
Source: Calculated from survey data.

Appendix 2. Comparison of policy choices across education level in sessions 1 and 2

Comparison of policy choices across education level, session 1

Policy options	Elementary School		Junior High School		Senior High School		Higher Education	
	Rank	VP (%)	Rank	VP (%)	Rank	VP (%)	Rank	VP (%)
Gradual; vaccines and mass rapid transportation	**1**	31.8	1	31.7	1	28.8	1	32.5
Immediate; vaccines and other government programs	**2**	23.5	2	24.3	2	23.5	2	20.4
Gradual; foreign debt and other government programs	**3**	17.3	3	16.6	4	16.7	3	19.2
Gradual; other government programs	**4**	15.7	4	15.7	3	18.8	4	18.3
Immediate; other government programs	**5**	11.6	5	11.8	5	12.2	5	9.6

Note: The rank for group 1 serves as a reference point. VP = Vector of priority.
Source: Calculated from survey data.

Comparison of policy choices across education level, session 2

Policy options	Elementary School		Junior High School		Senior High School		Higher Education	
	Rank	VP (%)	Rank	VP (%)	Rank	VP (%)	Rank	VP (%)
Gradual; vaccines and mass rapid transportation	**1**	18.6	2	16.4	2	14.6	1	18.4
Gradual; vaccines and other government programs	**2**	16.4	1	17.5	1	17.2	2	17.4
Gradual; mass rapid transportation and other government programs	**3**	11.5	3	11.1	4	11.2	3	14.5
Immediate; vaccines and mass rapid transportation	**4**	10.5	5	9.7	5	9.2	7	7.7
Immediate; vaccines and other government programs	**5**	10.5	4	10.6	3	11.6	6	7.8
Gradual; foreign debt and other government programs	**6**	7.8	6	9.1	7	8.7	4	9.6
Immediate; mass rapid transportation and other government programs	**7**	7.4	8	6.8	8	7.2	8	6.4
Gradual; other government programs	**8**	7.1	7	7.8	6	8.8	5	8.8
Immediate; foreign debt and other government programs	**9**	5.6	9	6	9	5.8	9	4.9
Immediate; other government programs	**10**	4.6	10	5	10	5.6	10	4.5

Note: The rank for group 1 serves as a reference point. VP = Vector of priority.
Source: Calculated from survey data.

Appendix 3. Decision making in session 3

Decision making in negative prospects with different endowment across groups

	Positive Prospects				Negative Prospects		
					Varying initial endowment		
Problem 1:	(200,000;0.33) (175,000;0.66)	>	(175,000)	Problem 9:	(-200,000;0.33) (-175,000;0.66)	>	(-175,000)
N = 303	164*		139	N = 291	158*		133
Problem 2:	(200,000;0.33)	>	(175,000;0.34)	Problem 10:	(-200,000;0.33)	<	(-175,000;0.34)
N = 265	184***		81	N = 275	109		166***
Problem 3:	(200,000;0.33) (175,000;0.33)	>	(175,000;0.67)	Problem 11:	(-200,000;0.33) (-175,000;0.33)	<	(-175,000;0.67)
N = 310	205***		105	N = 297	124		173***
Problem 4:	(80,000;0.001)	<	(80)	Problem 12:	(-80,000;0.001)	<	(-80)
N = 285	134		151	N = 292	134		158*
Problem 5:	(100,000;0.80)	<	(80,000)	Problem 13:	(-100,000;0.80)	>	(-80,000)
N = 311	128		183***	N = 298	155		143
Problem 6:	(100,000;0.20)	>	(80,000;0.25)	Problem 14:	(-100,000;0.20)	<	(-80,000;0.25)
N =270	157***		113	N = 263	110		153***
Problem 7:	(120,000;0.45)	<	(60,000;0.90)	Problem 15:	(-120,000;0.45)	<	(-60,000;0.90)
N = 308	143		165	N = 307	142		165
Problem 8:	(120,000;0.01)	>	(60,000;0.02)	Problem 16:	(-120,000;0.01)	<	(-60,000;0.02)
N = 256	161***		95	N = 265	101		164***

Source: Calculated from survey data.
Note: (1) The amount of endowment for each problem from 9–16 is the maximum negative payoff plus IDR 5,000.
(2) Inference using one-tailed binomial test; ***, **, * indicate the difference is significant at 1%, 5%, and 10% respectively.

Decision making in negative prospects

	Negative Prospects				Negative Prospects		
	Initial endowment: IDR125,000				No initial endowment		
Problem 17:	(-20,000;0.33) (-17,500;0.66)	<	(-17,5000)	Problem 25:	(-200,000;0.33) (-175,000;0.66)	<	(-175,000)
N = 293	135		158*	N = 285	129		156*
Problem 18:	(-20,000;0.33)	<	(-17,500;0.34)	Problem 26:	(-200,000;0.33)	<	(-175,000;0.34)
N = 264	106		158***	N = 269	95		174***
Problem 19:	(-20,000;0.33) (-17,5000;0.33)	<	(-17,500;0.67)	Problem 27:	(-200,000;0.33) (-175,000;0.33)	<	(-175,000;0.67)
N = 286	121		165***	N = 289	115		174***
Problem 20:	(-80,000;0.001)	<	(-80)	Problem 28:	(-80,000;0.001)	>	(-80)
N = 292	139		153	N = 286	148		138
Problem 21:	(-100,000;0.80)	>	(-80,000)	Problem 29:	(-100,000;0.80)	>	(-80,000)
N = 293	153		140	N = 296	170***		126
Problem 22:	(-100,000;0.20)	<	(-80,000;0.25)	Problem 30:	(-100,000;0.20)	<	(-80,000;0.25)
N = 277	108		169***	N = 275	122		153**
Problem 23:	(-120,000;0.45)	<	(-60,000;0.90)	Problem 31:	(-120,000;0.45)	<	(-60,000;0.90)
N = 308	145		163	N = 300	142		158
Problem 24:	(-120,000;0.01)	<	(-60,000;0.02)	Problem 32:	(-120,000;0.01)	<	(-60,000;0.02)
N = 269	107		162***	N = 270	108		162***

Source: Calculated from survey data.
Note: (1) The amount of endowment for each problem from 17–32 is the maximum negative payoff plus IDR 5,000.
(2) Inference using one-tailed binomial test; ***, **, * indicate the difference is significant at 1%, 5%, and 10% respectively.

Decision making in negative prospects with different endowment across groups

	Negative Prospects				Negative Prospects		
				Group 1			
Problem 25:	No initial endowment (-200,000;0.33) (-175,000;0.66)		(-175,000)	Problem 9:	Varying initial endowment (-200,000;0.33) (-175,000;0.66)		(-175,000)
N = 84	30	<	54***	N= 88	43	<	45
Problem 28: N = 85	(-80,000;0.001) 37	<	(-80) 48	Problem 12: N= 89	(-80,000;0.001) 33	<	(-80) 56***
Problem 29: N = 85	(-100,000;0.80) 42	<	(-80,000) 43	Problem 13: N= 87	(-100,000;0.80) 43	<	(-80,000) 44
				Group 2			
Problem 25:	No initial endowment (-200,000;0.33) (-175,000;0.66)		(-175,000)	Problem 9:	Varying initial endowment (-200,000;0.33) (-175,000;0.66)		(-175,000)
N = 133	67	>	66	N= 138	80**	>	58
Problem 28: N = 129	(-80,000;0.001) 71	>	(-80) 58	Problem 12: N= 134	(-80,000;0.001) 70	>	(-80) 64
Problem 29: N = 140	(-100,000;0.80) 86*	>	(-80,000) 54	Problem 13: N= 141	(-100,000;0.80) 79*	>	(-80,000) 62
				Group 3			
Problem 25:	No initial endowment (-200,000;0.33) (-175,000;0.66)		(-175,000)	Problem 9:	Varying initial endowment (-200,000;0.33) (-175,000;0.66)		(-175,000)
N = 68	32	<	36	N= 65	35	>	30
Problem 28: N = 72	(-80,000;0.001) 40	>	(-80) 32	Problem 12: N= 69	(-80,000;0.001) 31	<	(-80) 38
Problem 29: N = 71	(-100,000;0.80) 42*	>	(-80,000) 29	Problem 13: N= 70	(-100,000;0.80) 33	<	(-80,000) 37

Source: Calculated from survey data.
Note: (1) The amount of endowment for each problem from 9–16 is the maximum negative payoff plus IDR 5,000.
(2) Inference using one-tailed binomial test; ***, **, * indicate the difference is significant at 1%, 5%, and 10% respectively.

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