Energy Dividends in Bolivia: Are There Any Alternatives to Price Subsidies?

Roberto Laserna

Abstract

Bolivia, like many other fuel producers, subsidizes the domestic consumption of energy heavily, particularly oil and natural gas. The extent of these subsidies is not widely recognized; neither is their regressive nature or their long-term negative externalities. The paper estimates the magnitude of the subsidies and offers an approximate picture of their incidence by income decile. While the rich consume many times the level of energy-intensive products and services than the poor, household surveys indicate that, in relative terms, increasing energy prices would hit the poor more. The paper considers options for shifting from price subsidies towards more equitable and efficient direct transfers or "energy dividends." Particularly if provided on a universal basis, these would be compatible with the prevailing ideology in Bolivia that natural resources are the property of the people. The paper also notes that Bolivia has the capacity to implement such a compensation program efficiently and effectively—systems exist to identify its citizens accurately for transfers, as well as to pay them. Existing programs, such as Renta Dignidad, which is funded out of taxes on oil, have made substantial investments in such capacity, and provide models to build on. With few ideological or technical obstacles to reforming the subsidy system, the first step to raising the political profile of reform is to increase awareness of the problem and the possibilities. The paper makes some suggestions in this area.

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Preface

Despite the decline in world energy prices from their peak levels, fuels are still heavily subsidized in a number of countries, especially energy producers, which maintain inequitable and distortionary price subsidies. Some countries, such as Iran, and more recently, India with the reform of its LPG system, have shifted from price subsidies towards more equitable and efficient direct transfers to consumers. Such compensatory measures are essential if price reform is not to have an adverse impact on the poor; in addition, as "owners" of national resources, the population may feel entitled to receive some form of dividend. The little-studied case of Bolivia illustrates these features well, but they are common to many other countries.

Well-functioning identification and payments systems are necessary for government to have the capacity to implement such reforms efficiently, effectively, and equitably, and in some countries the absence of such capacity makes it difficult to assume that it will be possible to include credible compensation policies as part of the reform package. However, as the case of Bolivia shows, even if having the technical and administrative capacity may be necessary for a credible reform, it is not sufficient. It is first necessary that the size, nature, distribution, and impact of the price subsidies be recognized to spur discussion and encourage political impetus towards reforming the system.

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I. Introduction

In common with a number of other countries, especially fuel producers, Bolivia subsidizes heavily the domestic consumption of energy. This paper provides a preliminary overview of the subsidies, estimating their size and their distribution, and considers some proposals to reform the current system of price subsidies towards more equitable and efficient transfer programs. Subsidies are economic benefits provided for policy purposes. They can have a broad range of forms, being explicit or implicit, through prices or providing cash or other benefits to consumers, producers, or intermediaries. What is common to subsidies is that they represent an economic intervention motivated by political goals: whether to protect certain groups, promote particular sectors, technologies or regions, or to encourage particular behaviors. Subsidies always imply transfers of value, but their origin and destination is not always obvious; neither are their size or their long term effects on the economy. Yet, they are common and often sustained for long periods. This is sometimes because governments set their policies based on short term needs or social or political pressures, with little information on the multiple impacts of policies or consideration of more effective alternatives.

Our focus on energy subsidies in the Bolivian case illustrates some of these issues and offers some proposals that may be useful for other producing countries. Since the 1950s, Bolivia has been a hydrocarbon-producer, and nationalistic ideologies have developed a strong sense of collective ownership of natural resources. Subsidies are therefore appropriately seen as distributing natural wealth dividends to the population, but the question is how best to do this. We pay particular attention to the implications of the current practice of using price subsidies to distribute dividends and the prospect of reforming this system.

Bolivia developed the capacity to supply for the energy needs of its internal market in the 1950s. It was soon clear to experts that the main potential was not in oil but in natural gas.[1] In the 1970s Bolivia began exporting natural gas to neighboring Argentina and started a long and difficult negotiation with Brazil. An audacious reform in the 1990s attracted foreign investment to the sector, and by the beginning of the new century Bolivia had the capacity to expand its own consumption while exporting to both Brazil and Argentina. Plans to further expand hydrocarbon exports in the form of LNG were cancelled but the country enjoyed an unprecedented export bonanza due to higher international prices. These were not seen as economic threats since Bolivia was a net exporter both in the 1970s and in the 2000s and was able to shield its economy from the growing costs of energy. Only in recent years has a concern over prices emerged, as an increasing proportion of the internal market has been supplied by imports due to a steady fall in oil production. However, even in this scenario, the authorities and experts shared confidence in the ability of gas exports to cover losses from oil imports. Implicit subsidies remained unaccounted for—domestic prices were determined by political decisions without factoring in the costs.

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[1] Oil usually refers to the liquid form of hydrocarbons, while natural gas is a hydrocarbon gas mixture mostly composed by methane. Both are carbon fuels created by decomposing organic materials millions of years ago.

Although we refer to energy subsidies, we focus on hydrocarbons. As we will see, they are the most important source of energy. Their pricing has probably affected other energy sources adversely, particularly electricity from hydraulic power, which has been shrinking during the last decades as implicit subsidies were imposed on the hydraulic electricity providers as non-recoverable costs. This paper will not address this issue, which implies that the overall subsidy problem is even larger than shown here. The paper estimates the size of the subsidies and how they have evolved in the last 12 years,[2] it considers the beneficiaries of the policy and indications of its impact on poverty and income inequality, and suggests an alternative approach to reduce the overall cost and distortionary impact of subsidies and to improve their distributional impact, so that resource dividends can further strengthen the sense of belonging and economic citizenship that characterizes the country.

A striking aspect of the subsidy issue in Bolivia is its absence from the national debate despite the fact that, as we will see, it involves huge sums, especially for so small a country. Subsidies in Bolivia are, for most people, invisible. Even policy makers and government authorities will probably be surprised by the data analyzed in this paper. There is little debate and even fewer studies and analysis based on empirical data.[3] Moreover, we argue that Bolivia is well-positioned, from a technical and capacity perspective, to reform its subsidy system. A crucial goal will be attained if these pages provoke further estimates and initiate a policy discussion aimed at improving its distributional effects.

II. Energy Subsidies in Bolivia

As most governments in the world have found, subsidies are easy to introduce, but difficult to remove. Bolivia is no exception to this rule. Whether pushed by political needs to calm social protests or to redistribute perceived gains from export booms, subsidies are a great temptation for governments, particularly when the country enjoys large fossil fuel reserves (oil and natural gas).

The Bolivian case offers an interesting twist because the traditional view of giving subsidies to promote certain policy goals is blended with the idea of sharing dividends with citizens. Both are framed in a political tradition of keeping most of the process under the control of the State.[4] As the paper will show, by fixing prices and taxes, the government creates subsidies on imported hydrocarbons and establishes a dividend distribution mechanism,

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[2] The period covers from 2005 to 2016, which is the export bonanza period and is coincidental to the approval in May 2005 of the current Hydrocarbons Law and the Evo Morales administration that began in January 2006, up to the last year with data at the time of writing this paper (February 2018).

[3] In 2018 Fundacion Milenio published three bulletins addressing hydrocarbons´ subsidies. Authors calculated subsidies based on estimations of domestic fuels sold at prices below the cost of production and also at consumer prices that were below international prices. However, they had only a 4-year series in one case, and 10 in another, with no chance to add the numbers. See https://fundacion-milenio.org/coy-370-salir-los-subsidios-al-petroleo-derivados-bolivia/ and links to other bulletins.

[4] This also explains why these policies are also labeled as part of the patrimonial and clientelistic political culture that has a long tradition. An ideology to challenge this tradition is embedded in the current Constitution, in the form of environmental rights and norms to protect "Mother Earth" against extractivism. Actual policies contradict them but at least they remain as the highest aspirational standard.

while also collecting rents to provide fiscal revenues. These already, to a degree, support cash transfers to certain groups, providing models for possible further reforms.[5]

As defined in the constitutional history of Bolivia, "natural resources belong to the people."[6] In general, the Bolivian people feel that wealth created in extractive activities should be shared throughout the State. Such a philosophy encourages cyclical promises of "nationalization" or State control over extractive industries. Those ideas are reinforced by long standing history lessons that are common even in primary school, that promote the images of a country enormously rich in natural treasures which are sought by all foreign powers, beginning with neighboring countries.[7] The strength of those ideas and their role in contemporary Bolivia has been analyzed as a social trauma by Boccara[8] and sets the ideological framework for the rentier trap that explains how the abundance of natural resources has become an obstacle for development.[9]

In 1985, anti-inflationary adjustments reformed fossil fuel pricing in a bid to stabilize the economy.[10] Until then, the fuels were underpriced, providing an uncontrolled price subsidy. The economic adjustment increased prices, raising new fiscal revenues even before the tax reform was legislated and applied.[11] The final prices of fuels were linked to the international prices, supply was restored and contraband was eliminated, thus allowing the government to receive an inflow of cash to cover spending. In the 1990s, the energy sector was subsequently reformed with an innovative privatization scheme called "capitalization," through which foreign companies brought fresh investments into the country and helped expand Bolivia's productive capacity at a rapid pace. Additionally, a complex tax system was applied to hydrocarbon production and trade, including value added taxes, production taxes

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[5] Renta Dignidad, a non-contributive universal pension to all citizens older than 60, began as Bonosol in 1997 as a way to share with citizens revenues from State investments and natural resources exploitation. While reluctant at the beginning, the Morales government created later two other cash transfer schemes: Bono Juana Azurduy for pregnant women, and bono Juancito Pinto for school students. This experience may provide both a technical underpinning for the feasibility of delivering targeted cash transfers and show that there is a connection between natural resource revenues and citizen benefits.

[6] Back in 1938 a definition was introduced in the Constitution, stating that all natural resources were primarily owned by the State ("son de dominio originario del Estado"). The political discourse in Bolivia confuses the people, the State and the Nation.

[7] Molina Fernando, El pensamiento boliviano sobre los recursos naturales, Ed. F Milenio, La Paz, 2009

[8] Boccara Bruno, Socio Analytic Dialogie: Incorporating PsychoSocial Dynamics into Public Policy, Lexington Books (June 25, 2014) chapter 4. This chapter was published in Spanish as Bolivia: Revirtiendo Traumas, Ed. Ceres-Plural, La Paz, 2013

[9] Laserna et al. La Trampa del Rentismo. Fundación Milenio, La Paz 2005

[10] An economic crisis unfolded during the transition to democracy, between 1982 and 1985, where hyperinflation reached record levels. The new government of Paz Estenssoro (1985-1989) faced the crisis with unorthodox free-market policies that included elimination of subsidies, public investments through local NGOs and a pegged exchange rate. Paz Estenssoro had been President during the 1950´s and 1960´s, leading a nationalist and statist movement. His free—market policies un the 1980´s were led by his Minister of Planning, Gonzalo Sánchez de Lozada, who would later become President (1993-1997 and 2002-2003), implementing innovative reforms before being overthrown by a radical uprising.

[11] Tax Reform Law 843 was signed in May 1986, less than a year later, but it took a few additional months to be fully implemented.

or regional royalties, profit taxes and a surtax when profits surpassed a certain level due to sudden changes in export prices.[12]

By 1990 it had become clear that Bolivia´s main potential was in natural gas rather than oil, whose production was doomed to decline. Experts therefore recommended encouraging gas consumption to replace liquid fuels as much as possible. Based on that view, authorities defined prices for internal consumption independently of both export prices and internal transportation costs, assuming that exports would be more than enough to compensate for any opportunity costs, especially as the internal market was very small compared to the export potential.[13]

Fuel prices were kept lower than in the international market but were loosely linked to fluctuations to keep the difference under control. However, in 1997 the Bánzer administration[14] decided to change the policy and went back to fixed prices for political reasons, detaching them from market price fluctuations. This quickly increased subsidies, particularly to the consumption of diesel oil. As predicted, exploration activities found more natural gas than oil reserves, and underpricing exportable natural gas became a long-term policy.

Price subsidies are blind in the sense that the beneficiary is undefined. There is no specific target; whoever buys the product gets the benefit. It is usually applied with the argument that lower prices will make the product more accessible to the poor and may also support industrial investors. However, other impacts are usually ignored in the discussion prior to establishing subsidies; for instance, the environmental damage that might take place from a greater burning of fossil fuels. New and more efficient technologies may be discouraged by cheaper fuels. And because of price volatility, it is impossible to predict the opportunity costs of assigning fiscal resources to subsidies that may grow and reduce available funds for much needed public services, like health and education.

Energy and Hydrocarbon Trends

Energy subsidies in Bolivia are implemented in the form of price differentials.[15] By setting domestic prices lower than international prices, subsidies either absorb fiscal revenues when

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[12] Medinaceli Mauricio, La Nacionalización del Nuevo Milenio, Ed Fundemos, La Paz, 2007.

[13] According to former Superintendent Carlos Miranda, this policy was carefully discussed and successfully implemented as a mean to distribute natural gas dividends. Gas consumption increased and the need for imports remained relatively small. He acknowledges that the manufacturing industry did not take proper advantage to become more competitive, and also accepts that it is about time to gradually eliminate subsidies (personal communication).

[14] Bánzer Hugo was a military who took power by a coup d'état in 1971 and remained until 1978. He then became a leader of a political party and was elected democratically in 1997, dying during his term in 2002.

[15] In this paper we estimate subsidies based on the formula: $S = (Pi - Pd)*V$ where S means Subsidy, Pi represent the Prices in the international market, Pd the prices in the domestic market and V the volume of hydrocarbons, oil or natural gas, which is consumed. Of course, applying this is not an easy task as will be seen. There are no one and common prices for oil, gas nor fuels so that equivalents or proxys should be estimated as well, reducing the time to one-year periods even though there are often wild fluctuations within a year.

products are imported at higher prices, or reduce possible fiscal revenues when sold in the domestic market instead of being exported.[16] During the last decade or so, Bolivia has seen both types of effects. As the production of oil declined, self-sufficiency was lost, and Bolivia became an oil importer. At the same time, gas production increased and Bolivia´s exports were mostly of hydrocarbons, with the production of electricity strongly resorting to the use of natural gas.

**Figure 1. Energy production from oil and gas products (percentages)**
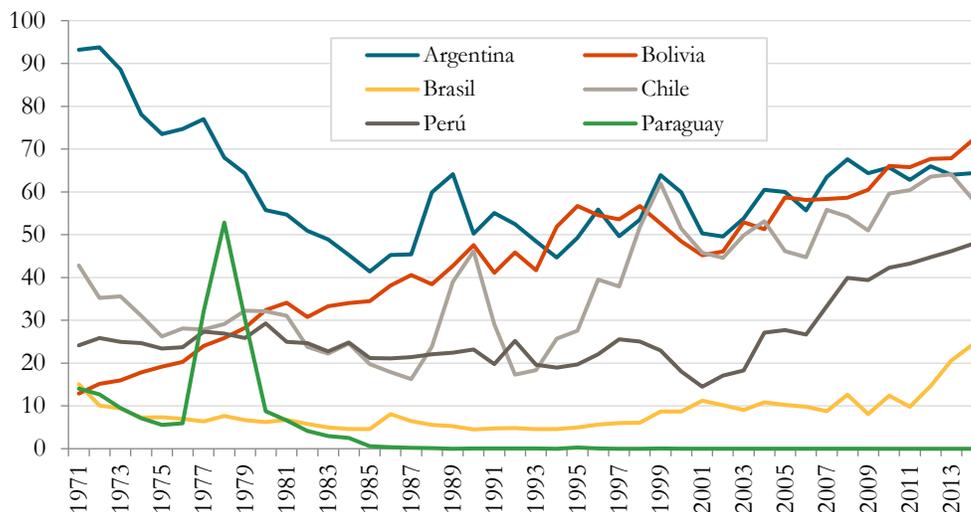
Source: World Bank.

Figure 1 shows the long-term trend towards oil and gas dependency in the production of electricity in Bolivia compared to its neighbors. In 1971 less than 15 percent of electricity was produced with fossil fuels, but this climbed to more than 70 percent in 2014. In the last decade, almost all of Bolivia´s neighbors have followed a similar pattern, but most had previously attempted to reduce hydrocarbon dependency. Bolivia did not, and its electric power supply is thus currently the most dependent on oil and gas. It can be argued that, having such abundance, it was logical to rely on natural gas. But that may have had a cost, reducing both export opportunities as well as the ability to take advantage of other promising sources of power supply, like hydraulic, solar and geothermal, with which the country is also richly endowed.

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[16] By Law 3058, promulgated in May 2005 by the President of the National Congress after Carlos Mesa vetoed, the Ministry of Hydrocarbons has the capacity to determine the prices at the "fiscalization point" where royalties and taxes are paid, and to define the pricing policy at the consumer level (Article 21). The regulatory bureau defines the final prices for the consumers (Article 25). Notably, however, article 90 of the same law prohibits "actions or conducts seeking to limit, restrict, falsify or distort competition, to concentrate or manipulate prices or qualities, to obtain illegitimate advantages, to reduce market access or to abuse a dominant position in a market, and other similar actions that may harm a particular or general economic interest or the consumer or user."

Figure 2. Bolivian exports (in thousand U$ dollars)
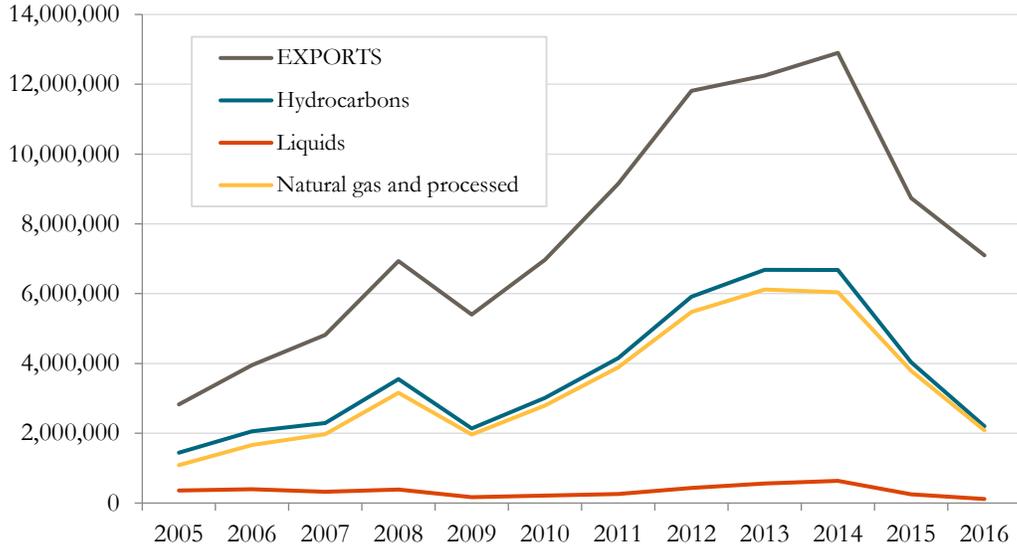
Source: Instituto Nacional de Estadística.

The export boom is illustrated in Figure 2, which shows total exports for the period 2005 to 2016, including hydrocarbons, which are further disaggregated to illustrate the relevance of natural gas. Most of the remaining exports come from minerals and industrial crops (soybean as the most significant). The graph shows a rapid and steady increase for most of the period, but also a steep decline since 2014. The unexpected bonanza had an even greater impact on Bolivia due to the coincidence of higher prices in the international market and the increase in physical production and exports (Figure 3) thanks to the fields discovered after 1995, and the conclusion of an export contract that demanded heavy investments in pipelines, with Brazil. Natural gas prices in Bolivia's export contracts are adjusted every three months on the basis of an oil basket. At the time there were no other reference points because most of the natural gas trade used costly pipelines that required long term commitments. During the last years the development of new technologies and infrastructure to transform gas to liquid and back to gas has changed the market and new pricing reference points have been established, much as for any other commodity.

Figure 3. Volume and prices of natural gas exports
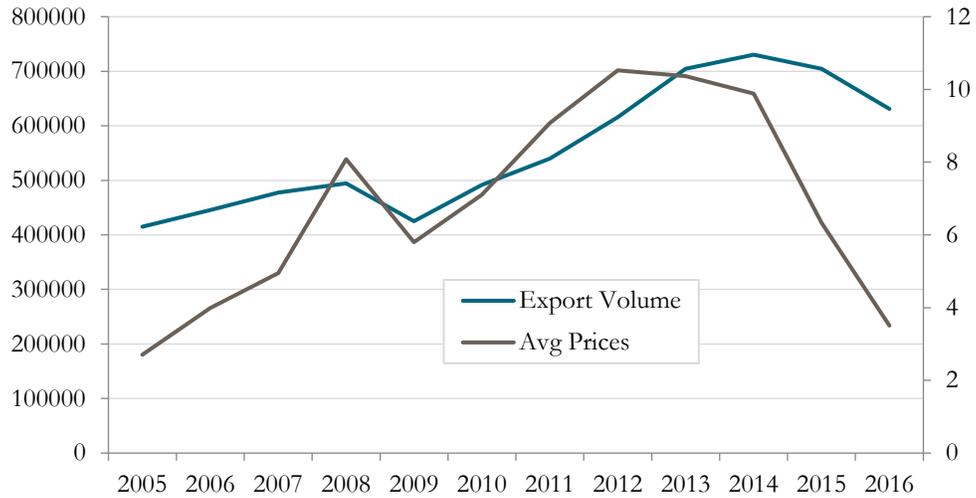
Left: Millions of cubic feet of gas. Right: U$ per thousand cubic feet of gas.
Source: Instituto Nacional de Estadística.

High global oil prices not only inflated exports but imports as well. As mentioned before, the concentration on natural gas changed the main sources of electricity production but liquid oil and oil products imports increased, as shown in Figure 4. The profile is similar to that of the export trend, but the scale is not; while in 2014 Bolivia exported 6.6 billion dollars in natural gas, it imported only 1.3 billion dollars of oil and fuels. Overall, the balance remained positive but subsidies, invisible as they are in these figures, have probably been eroding the long-term outcome.

Figure 4. Imports of oil and fuels and reference prices
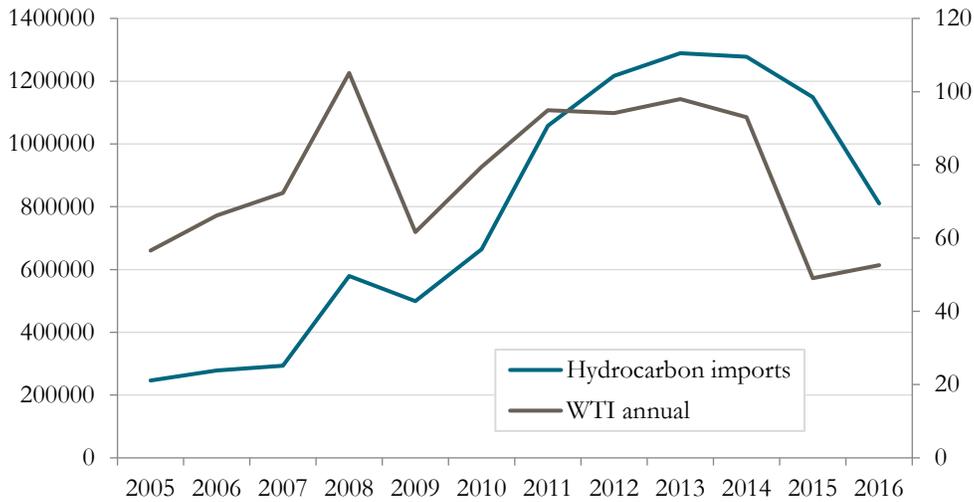
Left: Imports CIF in thousand dollars. Right: In U$ per oil barrel WTI
Source: Instituto Nacional de Estadística.

Subsidies in the Period 2005–2016

Price Gap Estimates

Since energy subsidies were sustained by price differentials, they were not necessarily included in the fiscal budget; the government did not receive the money that could have come from selling energy at higher prices, either in the domestic or the external markets. In a sense, the sacrifice has been off the books. We now estimate the size of that "sacrifice" and who benefitted from it.[17]

Since there are no official estimates, we compare prices and apply them to volumes to capture the subsidies, whether they imply higher fiscal spending or reduced fiscal revenues.[18]

From the prices summarized in Table 1, only Jet Fuel has an internal price a little higher than that abroad. All the other items are sold in the domestic market at much lower prices. Taking a simple average, domestic prices are a little over half of their international levels (52.3 percent).

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[17] As interesting and necessary as they are, we will not address here the issue of Post-Tax subsidies, that basically underscore the importance of imposing Pigouvian taxes to change production, investment, technology and consumption patterns to reduce some of the externalities of using fossil fuels. For an estimate, see How Large Are Global Energy Subsidies? by David Coady, Ian Parry, Louis Sears, and Baoping Shang, IMF Working Paper WP/15/105.

[18] This approach was carefully presented and applied in Measuring Energy Subsidies Using the Price-Gap Approach: What does it leave out? by Doug Koplow Earth Track, Inc. August 2009.

Table 1. Comparative prices of fuels and gas (2016)

Product	Volume	Bolivia	International	Bolivia	International
		Bs	Bs	U$	U$
Gasoline Especial	Liter	3.74	8.68	0.537	1.247
Diesel Oil	Liter	3.72	8.88	0.534	1.276
Glp Home use	Kilogram	2.25	3.75	0.323	0.539 (1)
GNV	m3	1.66	2.58	0.239	0.371
Jet Fuel Emp.Nal.	Gallon	10.49	6.65	1.507	1.380

Source: Instituto Nacional de Estadística. With the exception of (1) which accounts for the price in Peru by the end of 2016, according to Price-Osinergmin.

When we compare gasoline and diesel prices with those in the neighboring countries, we can see a similar difference, as shown in Figure 5. Domestic prices in Bolivia range between 46.9 percent and 48.5 percent of the average in the surrounding markets which, broadly, price all hydrocarbons at close to international levels.

Figure 5. Prices of gasoline and diesel in Bolivia and neighbors (U$/lt)
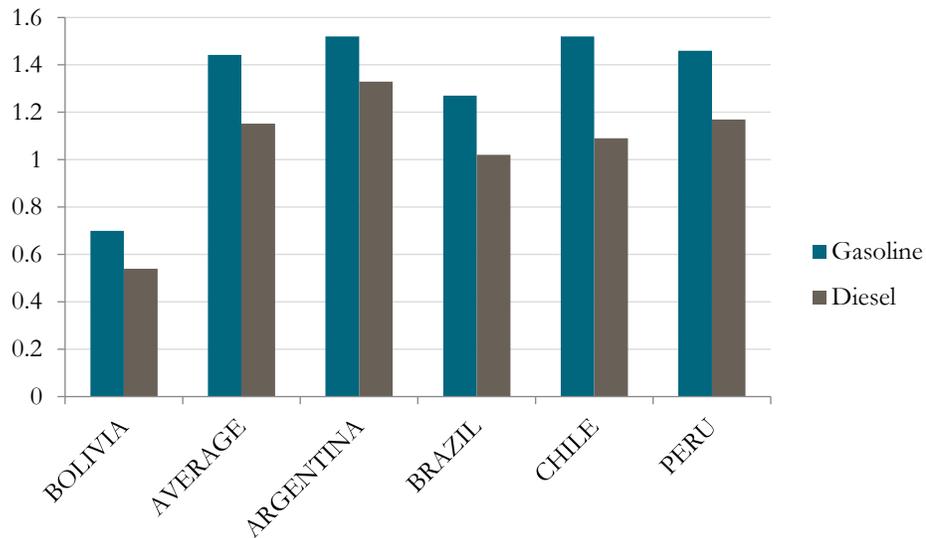
Source: Instituto Nacional de Estadística. Agencia Nacional de Hidrocarburos.

Subsidies on Imported Oil

Based on this information and considering the processing and transportation costs that must be added into the final price, we may fairly assume that subsidies represented about 40 percent of the international prices in 2016. Since we know the level of oil imports and the average prices in international markets, we can estimate how much was transferred to the consumers via price differentials. In 2016 Bolivia imported 811 million dollars in oil liquids

and at the time, a barrel of oil was sold at 52.6 dollars. As was shown above, in 2016 domestic prices were about 50 percent of their international counterparts. However, part of the final price includes internal processing that adds value, so we can assume that about 40 percent of imported value was transferred as a subsidy to consumers. If prices had been fluctuating in the internal market, it would have been logical to apply the same proportion (40 percent) for the rest of the period, but domestic prices remained fixed during the whole period. Therefore, we instead use the fixed equivalent price in 2016 as a reference for the period and estimate the changing proportion of subsidies as the international price of oil changes. We also assume that processing costs have remained fairly constant and apply an estimated average. Using this approach, we found that in 2008, when world oil prices reached their highest level of 108 dollars a barrel, the subsidies in the Bolivian domestic market may have represented 75 percent of the imported value.

Table 2 presents the results of these estimates; see also Figure 6. The first line shows the actual value of oil imports each year and the second the average price of oil in the international market (WTI). The third line expands the equivalent domestic price in 2016 to the whole period, since the sale prices were fixed during those years. The fourth line expresses the equivalent price in relative terms, as a proportion of the international price. The fifth applies that proportion to the value of imports and adds a fixed amount for processing costs at domestic refineries to estimate the possible recovered value of the imports when sold at the low and fixed prices. Finally, the sixth line finds the difference and provides an estimate of the annual subsidy of imported oil and liquids from oil.

Table 2. Estimation of subsidies on imported oil (x 000)

Item	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Hydroc Imports	246526	278699	293393	579066	501101	687250	1111191	1286544	1298407	1278540	1149785	811430
WTI annual	56.63	66.15	72.38	105.09	61.64	79.43	94.91	94.18	97.96	93.02	49.06	52.64
Domestic equivalent price	26.32	26.32	26.32	26.32	25.32	26.32	26.32	26.32	26.32	26.32	26.32	26.32
Relative domestic price	46%	40%	36%	25%	43%	33%	28%	28%	27%	28%	54%	50%
Recovered value	214576	210888	206691	245025	313958	327721	408158	459528	448844	461753	716792	505715
Subsidy (difference)	31950	67811	86702	334041	187143	359529	703033	827016	849563	816787	432993	305715

Note: Prices in U$ per barrel, estimates in thousand dollars.
Sources: Instituto Nacional de Estadística for hydrocarbons imports, and for WTI average price. The remaining lines are the author´s calculations.

From these estimates, we find that during the twelve years covered in the table subsidies amounted to a total of 5 billion dollars, or an average of 412 million dollars a year. Even though they have been declining due to the fall in oil prices, they still account for quite a

sizable amount relative to the Bolivian economy. They are, in fact, still more than all the combined cash transfers provided by the government to people older than 60 (Renta Dignidad), to school children (Bono Juancito Pinto) and to pregnant women (Juana Azurduy), which are financed by hydrocarbon rents mobilized through the Impuesto Directo a los Hidrocarburos, or IDH.[19] It is important to stress that all these programs, financed by the IDH, have proven to be beneficial for consumers. Future programs can build on their success.

Figure 6. Estimation of subsidies on imported oil (in thousands of U$)
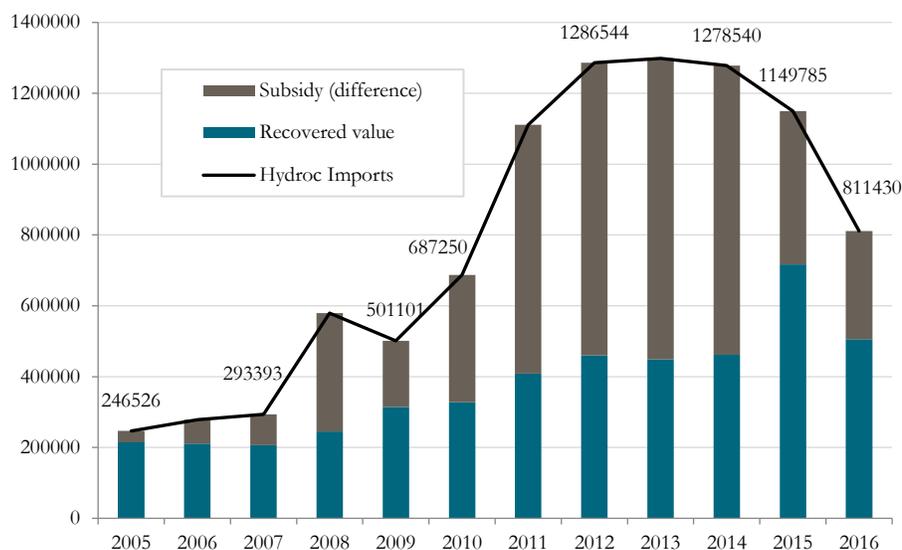
Source: Author´s calculations.

Subsidies or Dividends Distribution on Gas Consumption

The domestic consumption of natural gas is subsidized by law. According to Article 87 of the Hydrocarbon´s Law 3058, the export price of natural gas "may be adjusted to competing prices" in the consumer markets, but "in no circumstances will the internal price of gas be greater than fifty per cent (50 percent) of the minimum export contract."[20] Despite this framing of the law, domestic prices have remained constant since 2005, and not adjusted to reach the 50 percent level as specified. Had they done so, the price subsidy would have grown or declined at the same rhythm as the export prices which moved as shown in Figure 7.

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[19] The IDH, Impuesto Directo a los Hidrocarburos or Direct Tax on Hydrocarbons, is a tax on production, regardless of production costs. As a way of collecting revenues, such a tax is simple and effective, but it may work only at high prices or for highly productive deposits. See Medinaceli 2007 op. cit.

[20] Article 87 (Price of Natural Gas). The export price of Natural Gas may be framed within the competing prices of liquid gas where there is no gas consumption. In no circumstances will the internal price of Gas should be greater than fifty per cent (50%) of the minimum export contract.

Figure 7. Estimates of subsidies on internal consumption of natural gas (relative to export prices in U$ per million cubic feet)
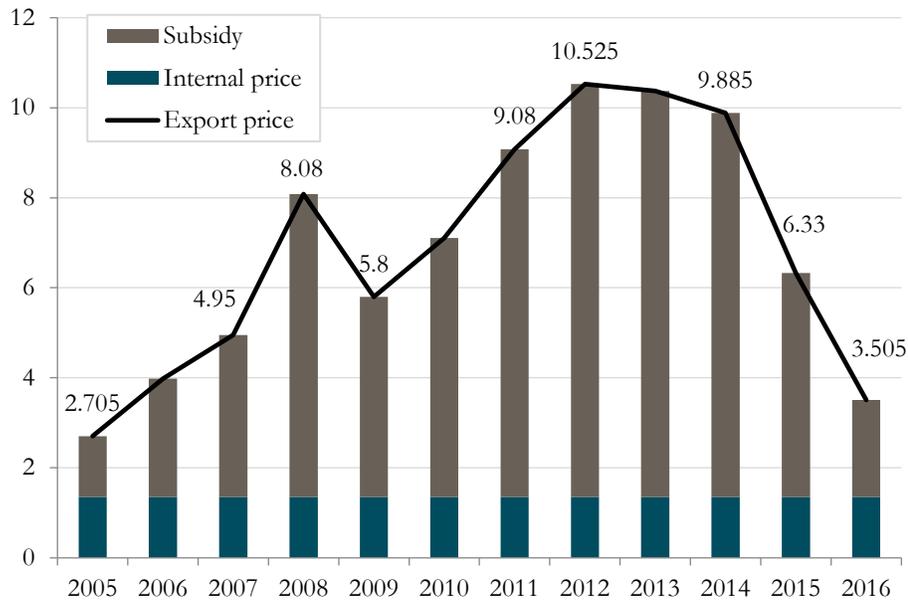
Source: Author´s calculations.

According to these estimates, the subsidy may have represented as much as 87 percent of the price in 2012, when export prices to Argentina and Brazil reached their maximum. Applying those prices to actual volumes of natural gas consumption in the internal market, we find that total subsidies in the period reached 5.6 billion dollars, or an average of $ 471 million a year. If we use for comparison the maximum authorized prices in Law 3058 (half of the export prices), the amount of subsidy would have been much lower, in the order of $ 3.5 billion in the period.[21]

Purchasing expensive oil from foreign sources to sell at low prices demanded subsidies in the order of 5 billion dollars in the eleven years between 2005 and 2016. Selling natural gas at low prices that could have been exported at higher prices, implied a subsidy on the order of another 5.6 billion dollars. This means that during the period 2005-2016 Bolivia "allocated" around 10.6 billion dollars to these energy subsidies; although the annual amounts varied with prices, the average annual subsidy would have been around 883 million dollars.

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[21] It may be argued that since the Law established a maximum price of half of the export price, a subsidy should be only the difference of actual prices and those of the legal price. But that would be an argument ignoring the existing economic opportunity of getting the export price also for the portion of the natural gas production that was consumed internally.

Subsidies or Dividends on Oil Production for Domestic Consumption

Using the same methodology, we can also estimate the implicit subsidy on domestic oil production that was sold in the internal market at prices lower than those of the international market. Bolivia is still an oil producer, and has refining capabilities to produce gasoline, jet fuel, kerosene and a variety of lubricants. Oil extraction has been fairly stable during the period but was ever less able to cover rising demand, as shown in Figure 8, making imports a growing source of supply.

Figure 8. Sales, production and imports of condensed oil (million barrels)
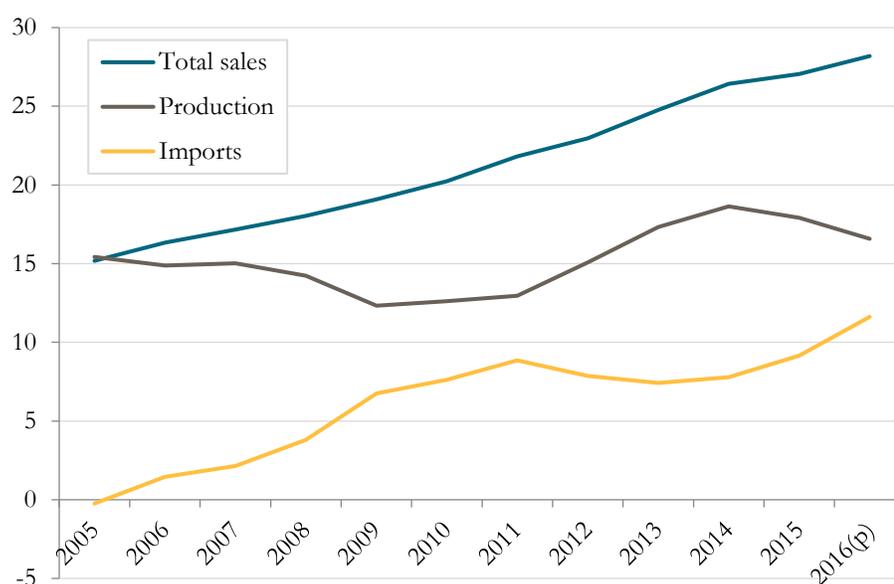
Source: YPFB in Instituto Nacional de Estadística.

Applying the same price gap methodology to this data, we can estimate the annual subsidies that may be assigned to the consumption of hydrocarbons from domestic origin. The results are shown in Table 3; subsidies from exportable oil amounted to more than 8 billion dollars for the period, or an average of 668 million dollars a year for the 12 years under analysis.

Table 3. Estimation of subsidies on the domestic production of oil

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016(p)
Oil Production	15.42	14.88	15.03	14.23	12.33	12.61	12.96	15.09	17.33	18.64	17.91	16.57
WTI annual	56.63	66.15	72.38	105.09	61.64	79.43	94.91	94.18	97.96	93.02	49.06	52.64
Domestic equivalent price	26.32	26.32	26.32	26.32	26.32	26.32	26.32	26.32	26.32	26.32	26.32	26.32
Relative domestic price	46%	40%	36%	25%	43%	33%	28%	28%	27%	28%	54%	50%
Implicit Subsidy	367.4	492.7	592.2	1020.9	335.5	569.7	788.9	924.0	1141.6	1143.31	307.3	336.1

Source: Instituto Nacional de Estadística. Author´s calculations.

Adding Up Subsidies and Dividends

Figure 9 aggregates the estimates for all three sources of energy subsidies: those coming from oil imports, those from selling exportable gas at low prices and those from selling exportable oil at low prices. They peak at almost $2.9 billion in 2013 and are impressive for a small economy like Bolivia´s, whose annual GDP is around $ 30 billion even after several years of steady growth.

Figure 9. Subsidies on energy consumption (million dollars)
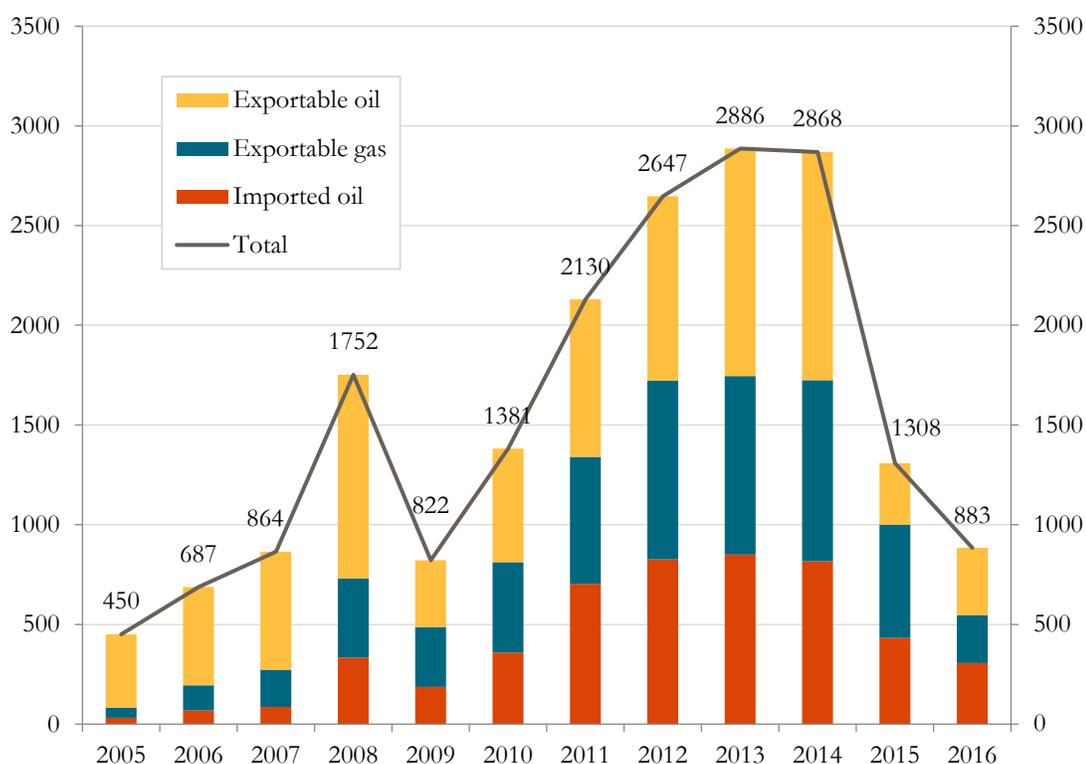
Figure 10 presents the total energy subsidies estimated in this paper as a proportion of GDP. The average for the whole period was a substantial 6.59 percent. Although subsidies have been declining due to the decline in world prices, they remain much higher than the global average subsidy of 0.7 percent of GDP.[22]

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[22] As calculated for 2011-2013 by Coady et al. at IMF Working Paper WP/15/105, page 17.

Figure 10. Energy subsidies as a proportion of GDP
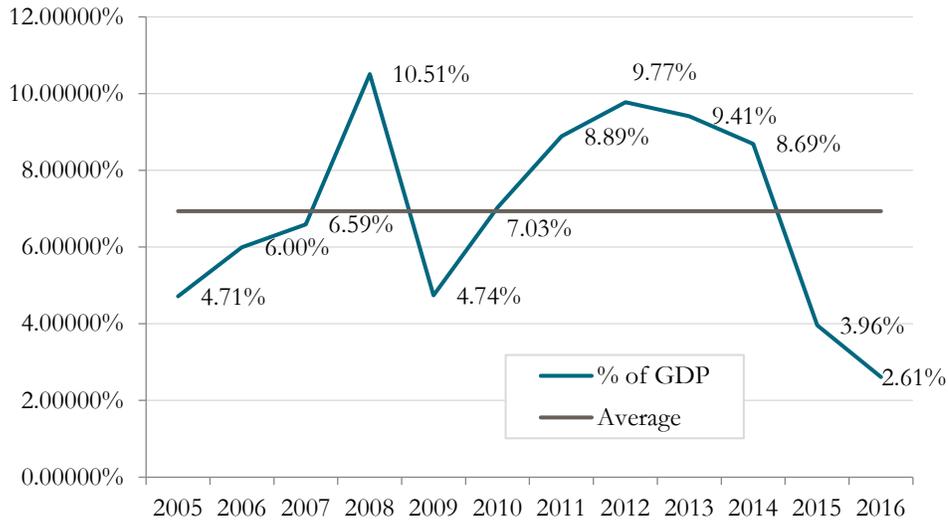
The numbers also tell the story of a policy's unexpected outcomes. At the beginning of the period, the total of all these types of subsidy accounted for $ 450 million, most stemming from the domestic production of oil and gas sold at low prices in the internal market. They doubled in a couple of years and rapidly got out of hand. At the peak of this process, in 2012, Evo Morales defined subsidies as a "cancer" for the government, even though he was only thinking about the subsidies to imported oil. Nevertheless, even then the export bonanza was still providing for a fiscal surplus.[23]

As Figure 11 shows, the Bolivian public budget had surpluses from 2006 to 2013, but since 2014 entered in a significant deficit of about 7 percent of GDP since 2015. If the calculated subsidies were added up, the situation would show an interesting scenario, with greater potential surplus and smaller deficits since 2014. The current deficit in 2016, that included the subsidized prices on oil imports, was 6.62 percent of the GDP according to our figures. But if the subsidies estimated here were eliminated, not only on imported oil but also leveling prices on domestic production to international standards, the deficit would shrink to around 4 percent of the GDP. Looking back, it is striking to see how enormous potential surpluses were lost in the past. Not totally lost, as we will see in the next section, but not wisely spent.

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[23] See http://www.abc.com.py/edicion-impresa/internacionales/evo-califica-de-cancer--subsidio-a-combustible-354307.html

Figure 11. Energy subsidies and fiscal deficit (million dollars)
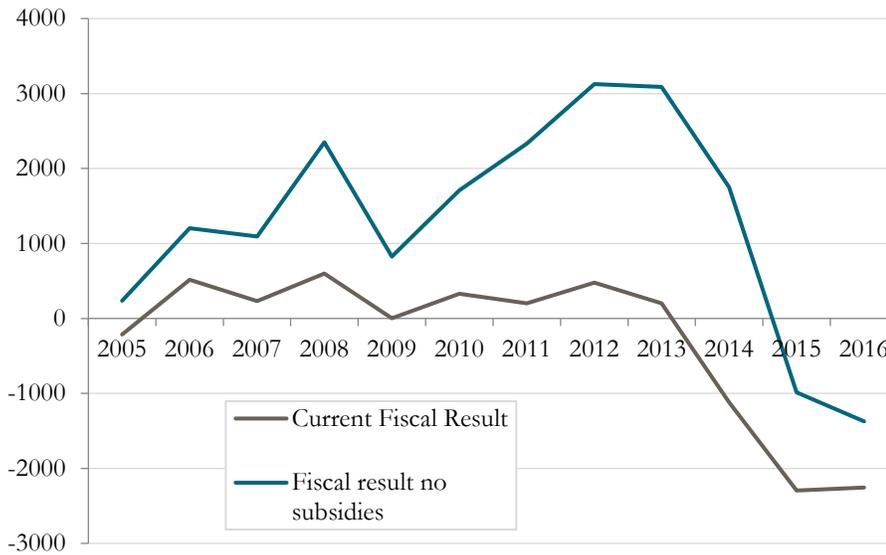
Source: Fiscal deficit from https://countryeconomy.com/deficit/bolivia and subsidies are author´s calculations.

III. Who Has Benefitted from These Subsidies?

To understand the distributional impact of energy subsidies across households we apply household data on income and expenses to identify patterns of energy-related consumption. We use the latest Household Survey of the National Statistics Institute of 2015. The survey captures information country-wide, using a sample of 10,171 households. It is quite extensive and detailed but, as with most surveys, it is based on unverified answers. Respondents may be reluctant to give actual information on income and expenses and will probably provide lower numbers, fearing taxes or other possible policy interventions. However, at least as a first approximation, we can assume a constant level of mis-reporting and use the data as a proxy.[24]

According to the survey data-base, the average monthly income in Bolivia is 653 US dollars per household, which amounts to 7,846 dollars a year. The same survey tells that the average size of a household is 3.67 persons, so that the per-capita income would be 2,136 dollars a year.[25] This information and the distribution of income at household level by deciles, is displayed in Table 4.

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[24] It is usually noted that highest incomes are highly underreported, particularly related with non-labor incomes. However, adding them would not change significantly our observations.

[25] National accounts provide a figure for national income closer to 3 thousand dollars a year, which includes labor income, trade revenues and production taxes among other items. But they do not provide information on how the national income is distributed, relying as we are on the same household survey taken by the National Statistic Institute.

Table 4. Household Income distribution by deciles

Income Deciles	Monthly household income (Bs/Mo)	Monthly Household Income U$/Mo (6.95)	Annual Household Income (U$)
Lower tenth	391.73	56.36	676.36
2	1028.79	148.03	1776.33
3	1735.17	249.66	2995.97
4	2342.10	336.99	4043.91
5	2974.74	428.02	5136.25
6	3706.09	533.25	6399.01
7	4611.18	663.48	7961.74
8	5829.13	838.72	10064.69
9	7793.61	1121.38	13456.59
Higher tenth	15015.76	2160.54	25926.49
Total	4543.99	653.81	7845.73

Source: Household Survey INE 2015. Author´s processing.

As illustrated by Figure 12, income in Bolivia is quite unevenly distributed. The highest decile has an income that is 38 times that of the lowest decile, and the Gini coefficient is 0.4555.[26]

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[26] The Gini coefficient declined over the past decade due to a consistent policy of reducing salary differentials, increasing the entry level job payments and reducing higher salaries, and also by cash transfers to the poor although defined by age (older than 60) and access to public services, public education and maternity health services.

Figure 12. Household Income distribution. Annual average in US dollars
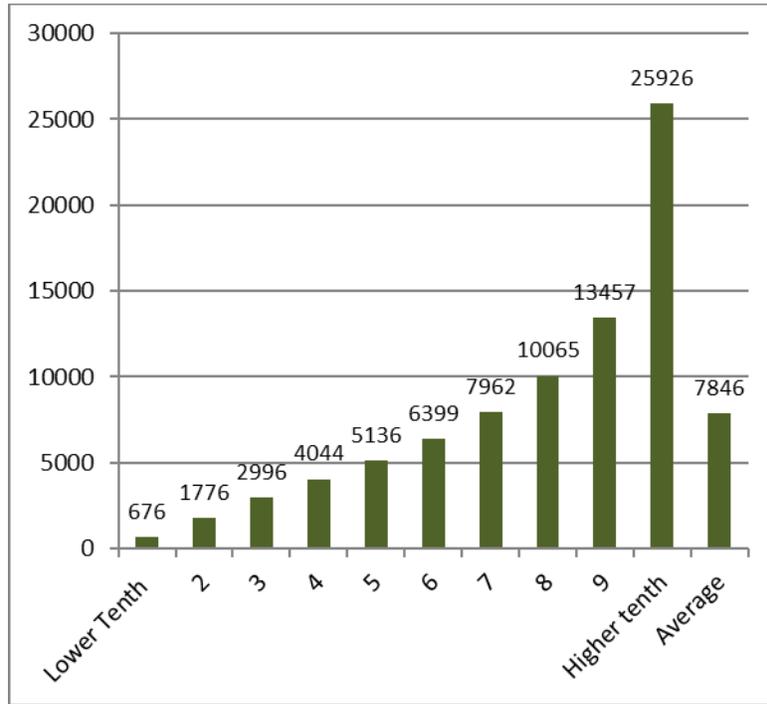
Source: Household survey INE 2015, author´s calculations.

The survey also collects detailed information on expenses and we use this to obtain energy-related expenses for each decile. Although energy prices factor into virtually all prices in the economy, we focus on a number of energy-intensive categories --electricity bills, transportation expenses and the direct consumption of fossil fuels for cars, cooking and other uses. This yields the patterns shown in Table 5.

Table 5. Household income and energy related expenses (Bs/Mo)

Tenth groups	Monthly household income (Bs/Mes)	Electricity	Local public transportation	Provincial travel[27]	Fuels	Energy related expenses	As a % of Household Income
Lower tenth	391.73	38.99	23.61	26.54	17.68	106.83	27.3%
2	1028.79	49.63	39.25	33.23	28.37	150.49	14.6%
3	1735.17	59.25	73.67	31.64	44.13	208.69	12.0%
4	2342.10	63.89	87.70	28.44	39.65	219.69	9.4%
5	2974.74	70.36	96.70	34.85	38.31	240.22	8.1%
6	3706.09	82.19	118.24	31.48	52.49	284.40	7.7%
7	4611.18	94.86	133.09	23.95	78.62	330.52	7.2%
8	5829.13	101.36	145.71	30.27	86.08	363.41	6.2%
9	7793.61	124.53	151.89	50.85	129.81	457.07	5.9%
Higher tenth	15015.76	158.35	185.63	38.36	164.29	546.63	3.6%
Total	4543.99	86.76	105.57	32.97	67.95	293.24	6.5%

Source: Household Survey, INE 2015. Author´s processing.

Energy-related expenses as calculated by this method are quite unequal although certainly less so than overall income distribution. The expenses for the highest decile are 5 times greater than those for the lowest decile, but this still means that the relative weight of energy in the family baskets is very different. Energy related expenses absorb 27 percent of the household income in the lowest decile, while in the highest they represent less than 4 percent. Figure 13 compares the absolute and relative weight of energy related expenses by tenths of household income. Expenses are in local currency per month, to the vertical left, and relative weight in percentage of household income to the vertical right.

Considering this situation, some form of subsidy, or dividend distribution, seems justified. Higher energy prices would severely hit the poor and probably cause widespread social protests, just like the ones that erupted in 2010 when the government increased fuel prices to reduce cross-border fuel smuggling.[28] Even though the government tried to reduce subsidies during the Christmas Holidays reactions were immediate and violent, so that the President decided to continue living with the "bleeding subsidies" as he described them.[29] Even after

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[27] The survey differentiates local from provincial travels, even though both are made using public transportation in buses and trucks. The first are more relevant for urban dwellers while the second for the rural population. In both cases those costs include transportation of goods produced by them. They seem to be high probably due to long distances and the time required to travel in areas mostly connected by difficult roads.

[28]. There are no estimates on how large contraband fuel sales are, only occasional declarations of concern by the authorities.

[29] On Sunday December 26, 2010, the government increased the price of gasoline by 73 percent. Protests and demands erupted so quickly that by Friday December 31, 2010, the decision was reversed. There was not even time to assess its impact on prices. In fact, Consumer Price Index in December 2010 increased 1.76 percent, a little more than the previous month—1.11 percent—with no change in fuel prices. People and politicians reacted out of fear of what might have happened. A militant blog reproduced the official report where Evo Morales

the fiscal deficit increased to reach more than 7 percent of GDP in 2017, there have been no more talks on changing the subsidy policy.

Figure 13 illustrates how difficult it is to remove energy subsidies in general; even if people at the higher levels perceive the greater hit in absolute terms, people at lower levels of income receive a far stronger relative hit. However, changing the policy is inevitable at some point, because of the eventual exhaustion of the export bonanza and the rapid growth of fiscal and trade deficits. The challenge, considering the degree of reported inequality, is to do it in a way that at least does not aggravate the distribution of benefits and that preferably improves it.

Figure 13. Energy related expenses per decile of household income (Bs)
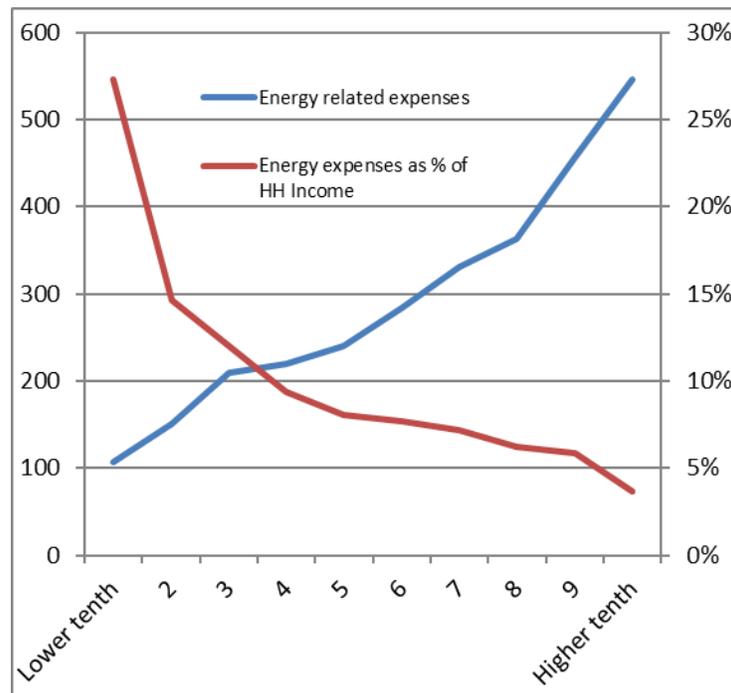
Source: Household Survey INE 2015, author´s processing.

What is the scope for redistribution of the subsidy? As a first approximation we proxy the distribution by the pattern of energy-intensive consumption. If the poorest tenth accounts for 3.6 percent of the energy consumption of all the Bolivian households, it also means that only 3.6 percent of the subsidies are benefitting them. On the other end of the scale, the richest tenth accounts for 19 percent of energy expenses, so this group receives 19 percent of the subsidies' benefits. At this point, we know that there are price subsidies on both oil imports and gas exports, and they represented together around 1,557 million dollars a year during the last 12 years. This means that—abstracting from the subsidies that do not find

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defined subsidies as a bleeding: https://flagelodelocorrecto.wordpress.com/2010/12/31/evo-morales-suspension-de-subsidios-para-carburantes-impedira-sangria-economica/

their way ultimately into household consumption[30]—the poorest families received an equivalent of 189 dollars a year through price subsidies, while the richest families enjoyed an annual subsidy of 970 dollars each.

Table 6. Energy related expenses per household income decile

Deciles Group of HH Income	% of energy related expenses	Annual Subsidies U$ per HH
Lower tenth	3.64%	189
2	5.23%	267
3	7.18%	371
4	7.55%	390
5	8.26%	427
6	9.77%	505
7	11.37%	587
8	12.50%	645
9	15.71%	812
Higher tenth	18.81%	971
Total	100.00%	517

Source: Household Survey INE 2015, author´s processing.

Table 6 shows that almost 60 percent of the households receive a subsidy lower than the average and thus may even be on the losing side, despite the fact that the implicit subsidies represent almost half of their reported income as in the case of the poorest decile. Some would argue that, in the absence of these subsidies, public expenses could be greater and reach them in the form of improved quantities and quality of public goods and services. However, this still leaves the problem of severely impacting their already low levels of cash spending. Experience also suggests that public goods often end up being distributed as unequally as subsidies or even more so, particularly when public investments are concentrated in certain areas that made them accessible only to a very small part of the population.[31] In fact, considering the many failures in Bolivia's public investments during the last decade or so, consumer subsidies at least provide a benefit to the public which, as unequal as they may be, are possibly greater than they would be from many other public expenditures. But they could be provided more efficiently and generate much better

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[30] These estimates do not take into account energy subsidies to industries in producer goods or export sectors where benefits may not be passed on to households; neither do they estimate direct and indirect energy intensities for all components of consumption. Rather, they concentrate on a small number of energy-intensive consumption categories to provide an illustrative picture of the distribution of subsidies across income groups.

[31] The Executive Board Assessment of the "2017 Article IV Consultation" says that "most social spending in Bolivia is regressive and warrants review. There is a clear case for removing broad-based fuel price subsidies and offsetting the impact on the poorest with targeted support. Reforms should be well planned and accompanied by a detailed communications plan. More generally, social spending could be made more effective by focusing it on those most in need, including by introducing progressive fees for high-income earners."

outcomes in terms of equality and poverty reduction, as well as with far lower market distortions, through direct payments.

IV. Can Bolivia Improve its Subsidy and Dividends Regime through Direct Payments?

As already noted, despite being very large energy subsidies are mostly invisible. They emerge indirectly by selling cheaply in the internal market exportable goods that have substantially higher prices abroad. As an old saying states: "out of sight, out of mind." For the part that demands fiscal resources there is concern in some ranks of the government, but the issue has not been high on the public agenda and is not part of any current public priority. It is true that at the beginning of 2011 the government tried to increase gasoline prices, but it did so in such a clumsy way that the measures provoked an immediate and violent social rejection. The government retreated and never provided a full and convincing explanation of the fiscal problem caused by energy subsidies. By 2014 global oil prices reduced and the burden of fiscal subsidies fell too, even though they remain very high for the Bolivian economy, especially as, and on the other side, export prices for gas also fell.

The subsidy problem is largely off the political radar screen. Authorities in government, outside of the Ministry of Finance, seem unaware of the problem and there appears to be little or no concern to find alternatives to reduce them or change the system. Across the political aisle the situation is even worse. Opposition parties are weak and disorganized, lacking technical capacity to discuss in-depth issues like subsidies and price differentials. They are mostly reactive to government initiatives with a focus on political, rather than economic, themes. Occasionally, the media publishes data and opinion articles but in the absence of public interest, there is little follow up. In terms of public opinion, the problem therefore does not exist. Citizens are probably aware that energy prices are lower than in neighboring countries, but this is probably justified by the argument that Bolivia enjoys nature´s gift of many resources, and a general belief that all benefit from low prices.

However, the problem is too big to be ignored and is growing, as energy consumption continues to rise. Sooner, rather than later it will become a relevant issue; hopefully by then, this paper will have helped to increase the transparency of the subsidy regime and stimulated debate on what can be done to improve the system. Energy subsidies are introducing severe distortions in the Bolivian economy and may be causing more harm than good. They erode the ability of the State to better serve the public and promote an economic structure that is ever less able to compete globally. The public budget is increasingly harder to forecast because of subsidy policies established in the bonanza period combined with increasing domestic consumption and continuing volatility in world fuel markets. However, simply eliminating energy subsidies may be even worse than continuing their current distribution because of the impact on the poor. In any event, such a course would not be politically acceptable. The most effective approach, following examples such as Iran's hydrocarbon reform and India's reform of its large LPG subsidy program, would be to shift from the current "blind" model of low energy prices to a more transparent and equitable model of compensation through cash transfers.

Compensation Possibilities

One option to eliminate subsidies is to compensate for increased costs experienced by typical consumers. On average, as estimated here (and abstracting from subsidies that do not go into consumption), subsidies totaled almost 300 dollars a year per family in 2016.[32] If that amount were to be delivered to each family, the economic cost would be the same but 60 percent of the households would receive at least enough cash to cover their higher energy costs while the poorest would receive more, raising their disposable income and expanding their consumption possibilities. The lowest decile would be far better off, with more income available for consumption after covering energy related expenses.[33] The top 40 percent would receive a partial compensation, but the higher costs of energy consumption would remain a low proportion of their overall income and spending.

If reducing the load of subsidies on the fiscal budget were seen as a priority, the cash transfer could be smaller. For instance, if price subsidies were eliminated and half of the estimated cost were transferred as a payment of 150 dollars a year per family the fiscal load would be halved. The two poorest deciles would still be fully compensated (the lower gaining almost 9 percent in net terms); in this scenario, the next five deciles would receive more than half of their increased fuel-related expenses, and only the upper deciles would receive less than half of their increased expenses in energy. However, it would be difficult for any group to protest, since all households would be treated equally, receiving the same transfer or "national dividend." This would also conform well to Bolivia's sense of national ownership of resources and strengthen the sense of community among citizens who would be openly treated as equal.

Of course, we know that households are not the only political constituency in Bolivia. Syndicates and unions have a strong ability to force the government into negotiations by mobilizing their bases or blockading roads. This is particularly true for the big and influential, even if sometimes informal, transportation unions. If they feel affected by rising prices when subsidies are eliminated, their protests may stall reform. Special arrangements may be needed on top of compensation to citizens, including the freedom to adjust tariffs to compensate for rising prices. In any case, whatever is done to reform the current system must take into account the likely responses from groups that benefit from current subsidies as well as reach out to those that will gain the most from reforms.

To better understand what would happen to equity and poverty under different subsidy scenarios, Table 7 uses current data from the 2015 Household Survey. All amounts are in

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[32] Our estimations for subsidies on imports and on production consumed in the domestic market for 2016 amount 883.1 million dollars. Projections from the Household Survey estimate a little more than 3 million households.

[33] The average monthly income of the lower tenth is 392 Bs with energy related expenses at 106 Bs. If subsidies were removed, their energy related expenses would be twice as much, so their available income would drop from 286 to 180 Bs. But if they receive a cash compensation equivalent to the average of current subsidies, they would get 293 Bs a month, which is more than the increase in energy costs, leaving them with an available income which is more than 60 percent greater. The second decile would end up with around 15 percent more cash, while most of the groups in the middle would be even. Only the top 40 percent will reduce their available cash. See Table 7.

Bolivian currency (Bs) and refer to monthly household income and expenses. From the first column we can see that income distribution is uneven with a Gini of 0.4555 and an income gap between the higher and the lower tenths of 38 times. However, the underlying or market-based level of equality can be measured in terms of available income after (subsidized) energy related expenses, as in column 3. The Gini coefficient increases as does the income gap, to 51 times. The total elimination of energy subsidies would be very difficult to absorb, particularly for those at the lower level of the scale. All groups would feel a reduction in disposable income, but the hit would be felt most in the lower deciles. The Gini coefficient would climb to 0.4857 and the income gap, measured by the relationship between the highest and the lowest decile, would soar to 78 times. We can also see what would happen if all subsidies are removed and the total amount is equally distributed in cash transfers to every family (column 5). The available income after energy expenses would be greater than in the current situation for 60 percent of the families, with small decreases for the top 4 deciles. The Gini coefficient would improve to 0.4522 and the gap will decrease to 30 times.

This ideal scenario may not be reached in Bolivia, since price subsidies on the internal consumption of domestic oil and gas production may be impossible to remove, at least completely.[34] So we can consider an intermediate scenario, where half of the subsidies are removed and compensated in cash, by delivering a fixed amount to each household. That is illustrated in column 6. The lowest 20 percent would have more available income which will have a positive impact in reducing poverty. The Gini coefficient would be lower than the current one for disposable income and the inequality gap would also improve, moving down from 51 to 37.

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[34] Remember the mentioned common beliefs but also the fact that changing the situation may require changing the law that imposes for the internal market half the export prices for natural gas.

Table 7. Impact on income distribution of energy subsidy scenarios

Deciles of Household Income	Monthly income (1)	Energy related expenses (2)	Disposable income (3)	Dispos Inc without subsidies (4)	Dispos with no subsidies & cash comp (5)	Half way (no liq & cash) (6)
Lower Tenth	391.7	106.8	284.9	178.1	471.3	324.7
2	1028.8	150.5	878.3	727.8	1021.0	874.4
3	1735.2	208.7	1526.5	1317.8	1611.0	1464.4
4	2342.1	219.7	2122.4	1902.7	2195.9	2049.3
5	2974.7	240.2	2734.5	2494.3	2787.5	2640.9
6	3706.1	284.4	3421.7	3137.3	3430.5	3283.9
7	4611.2	330.5	4280.7	3950.1	4243.4	4096.8
8	5829.1	363.4	5465.7	5102.3	5395.5	5248.9
9	7793.6	457.1	7336.5	6879.5	7172.7	7026.1
Higher tenth	15015.8	546.6	14469.1	13922.5	14215.7	14069.1
Average	4544.0	293.2	4250.7	3957.5	4250.7	4104.1
Gini	0.4555	0.2493	0.4696	0.4857	0.4522	0.4625
High/Low deciles´ Income	38		51	78	30	43

Source: from 1 to 3, processed from INE Household Survey 2015. From 4 to 6, Author´s calculations based on subsidies calculated by the author and presented in Figure 6.

If means testing were feasible,[35] an alternative would be to target the poor and provide a cash compensation only to the bottom of the scale. But such an approach is not only administratively expensive but socially divisive, frequently creating opportunities for corruption, bureaucratic abuse and clientelistic practices.[36] A "universal" personal payment therefore seems to be more appropriate because it will also stress the sense of belonging and ownership by all.[37]

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[35] An evaluation of the method shows that it may be particularly difficult to apply means testing in Bolivia. See "Accuracy and Poverty Impacts of Proxy Means-Tested Transfers: An Empirical Assessment for Bolivia," by Stephan Klasen and Simon Lange, Discussion Paper 164 Courant Research Centre, Georg-August-Universität Göttingen, January 6, 2015.

[36] Proxy indicators can be used to target compensation, like having children in public schools or making use of specific welfare services. But using them may lead to increasing demand for these services which may result in a deterioration of service quality or to greater expenditures, in particular if the compensation represents an attractive amount. Supply improvements would be essential, but, as long as the financial system is used for transfers, additional data could be collected to identify higher income people to be excluded from the transfer because all bank accounts are related to the national ID number that identifies each citizen.

[37] Price increases in hydrocarbons will require a process of adjustment in tariffs and prices, particularly in the transportation sector. Allowing the suppliers of those services to raise prices may convince them to accept the reform, while recipients of transfers must be clearly informed that the flow of cash to them compensates those

Compensation Mechanisms

Bolivia already has a long history of cash transfers. In 1997, the Bonosol was created to pay an annual pension to all citizens older than 65. In 2006 the Bonosol was changed to Renta Dignidad, expanding its coverage to citizens older than 60, and linking this benefit with hydrocarbon revenues. In 2016, over 422 million dollars were delivered to 1,299,287 beneficiaries by this one program alone. They were able to receive their money in monthly payments from authorized agents—mostly banks but other fixed and mobile payment points are used, including many operated by the Bolivian military[38]— or to make retirements every quarter. In 2016, payment of Renta Dignidad required more than 11 million transactions.

Biometric identification has been introduced to make the process more secure. All institutions in charge of making payments are connected to a central data base which is continually updated, so that no matter where he or she happens to be, a beneficiary may claim the payment by providing his or her unique ID number and pressing a finger on a small scanner as a proof of identity. While an identity card is usually requested as confirmation the key identifier is the fingerprint. More generally, Bolivia has a highly developed civil registration and identification system with wide coverage. Voter registration drives greatly enhanced citizen registration coverage, notably for the 2008 referendum which saw a massive expansion in the voter roll, including in remote communities.[39] Bolivia therefore has the essential mechanisms for an efficient and accountable transfer system.

Nevertheless, while individual identification is strong, accurately registering household heads for family-based transfers could be difficult. Many families are based on informal arrangements and many more consist of single parents or divorced couples. One approach could be to deliver the cash transfers to all adult women. It is often argued that women are more responsible and efficient when administering expenses for the family. Families with more adult women among their members would certainly benefit the most, but this type of cash transfer could not only compensate for the removal of subsidies, but also promote

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increases. When the rational of the reform is explained and the possible outcomes are advanced to the population, the probability of conflict is minimized as was shown in the India and Iranian cases.

[38] At national level, payment centers are available in more than 900 financial points-of-service, operating online transactions in real time. There are also more than 200 fixed and mobile pay points at military installations; the mobile military units are equipped with mobile satellite equipment interfaced to the main database of beneficiaries, enabling people to collect payments online from any location. Marcelo Ticona Gonzales, "Bolivia (Plurinational State of) The Dignity Pension (Renta Dignidad): A Universal Old-age Pension" ILO 2011, Successful Social Protection Floor Experiences.

[39] Biometric identification was also introduced for voting, so that most of the Bolivian citizens older than 18 already have a registration in the electoral system. Bolivia also has a Civil Registration Service that provides ID cards to all citizens based on their Birth Certificate, a picture and fingerprints. Most of this system is already digital and the information is centralized and connected to the data base of the electoral system. The 2012 Census found that 20% of the total population did not have an ID card but according to the LAPOP 2014 survey, 98 percent of adult population already holds such a card. In the short run, a universal cash transfer based on the ID card would probably leave some people out but, at the same time (as in South Africa and other countries) linking benefits to registration would provide a powerful motivation to register. In Bolivia the law states that getting an ID is free of fees but in practical terms there are costs, in money and time, including long travels for rural population. The cash compensation would cover them easily and people will have better chances to have access to other public goods.

gender equality in a very direct way, which may result in further positive outcomes very much in line with the current gender pay gap discussion. Instead of dividing the total dividend amount by the number of households (3 million), the compensation cash-per-beneficiary would divide the total amount by the number of women older than 18 (3.5 million).

There is also a tradeoff between the frequency and the administrative cost of transactions. At one extreme, there could be a single dividend payment a year, biometrically verified. Setting the date of the payment a few days before or after the recipient's birthday, would spread transactions through the calendar year. Such a program would be simple and inexpensive, requiring only some 3 million payments. Of course, the number would be greater for monthly, or bi-monthly payments.[40]

There is also great potential to jump-start mobile money through such a transfer system. According to the 2015 INE household survey, 81.5 percent of the heads of household have a personal cell phone, as do 80.6 percent of all people older than 18. Tigo of Millicom, one of the main providers of cell phone services in Bolivia, has introduced Tigo Money to enable payments and transfers between people and businesses. Tigo Money started in 2014 and is already transferring almost 300 million dollars a year in more than 75 million small transactions. Tigo Money is also included in the "Aministradora de Cámaras de Compensación y Liquidación" (automated clearing house) created by the banking system, so that Bolivia already has interoperability between bank accounts and mobile money, which facilitates transfers and payments. Users can even send money to an individual without a personal cell phone, using his or her name and identity number, and sending the payment order to a registered local store where it can be cashed out. The system has around 1,500 local points to make deposits or cash out, and it can be easily expanded at a lower price than opening bank agencies or installing ATMs. It seems that the company is still working at a loss but the Kenyan experience give them hope.[41]

Despite this potential coverage, in the short-term, there would need to be special arrangements for the 19 percent of heads of household with no available cellular phone especially as many are probably those who would most need compensation. As in the similar case of South Africa, where around one-fifth of social transfer recipients are not financially included, it will be crucial to make sure they can receive payments as close as possible to their places of residence. As discussed, Bolivia already has some alternatives, and this

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[40] As in India, with the "Give it Up" program described by Gelb et al., the higher end of the income structure may be encouraged to give up the cash in favor of a program that can provide other benefits for the poor, for instance, allowing them to designate orphanages or rural health services as the recipients of their cash subsidy.

[41] The other two providers of cell phone services, the State owned Entel and the private Viva, controlled by Trilogy International, are also trying to create digital wallets but they are moving at a slower pace. Viva works in close association to a couple of banks, and Entel received authorization from the regulator and is trying to setup an enterprise with other state-owned companies. An interesting description of the experience is in a paper by Tiago Novais and José Sanin, who found that the regulator and the Central Bank have already established an enabling framework for further development of digital payments. See https://www.gsma.com/mobilefordevelopment/programme/mobile-money/mobile-money-interoperability-in-bolivia-a-case-study-for-latin-america/

problem will reduce over time as the convenience of digital payments provides an incentive for financial inclusion. The microfinance boom in Bolivia has created several small-scale financial institutions with branches located in distant rural towns that could facilitate these transactions. Additionally, the exponential growth of the State-owned Banco Union in the last few years has given way to the opening of several branches in the rural areas; these too could become "payment banks." Lack of mechanisms for identifying citizens and making payments to them is not a serious obstacle to the reform of energy subsidies.

V. Conclusions and Recommendations

Energy subsidies in Bolivia are created by price differentials between domestic and international markets, holding internal prices fixed while the international market is extremely volatile. Subsidies involve a combination of importing expensive oil and selling this, as well as domestic oil, cheaply, and selling natural gas at prices lower than export parity. Between 2005 and 2016, subsidies represented more than 18 billion US dollars, with an average of $ 1.556 billion a year. By 2012, subsidies had risen to 9.77 percent of GDP. They declined as global prices fell but remained much greater than the global percentage of 0.7 percent.

Subsidies were regressive, providing more benefits to the upper income deciles; on average, the highest decile is estimated to have received a subsidy some 5 times greater than the lowest. However, since income distribution is even more unequal, such a pattern of energy subsidies has had a positive effect on equity; the energy-related expenses of the lower deciles are proportionally greater than for the rich. The subsidies also introduce price distortions, biasing economic agents in their allocation of resources, with price controls also influencing investments with the potential to diversify energy sources. In addition to the impact on carbon emissions, this may be creating long-term development problems that over-shadow the current perceived benefits. With rising consumption and declining exports rents from natural resources will shrink and reduce fiscal revenues. Even if subsidies have declined with lower world prices, they are becoming an unsustainable burden because the fiscal budget has entered again into a period of large deficits.

Moving towards a reform of the subsidy policy is thus crucial and urgent for the Bolivian economy. However, there is an attitude of indifference towards the problem, with little awareness of the magnitude of the subsidies, or discussion among politicians, the media and the population. No doubt this is partly because the subsidies are largely invisible, apart from the fiscal subsidy on imported oil. The first stage in any reform must therefore be to increase transparency and awareness of the subsidies and how they are now allocated. Citizen education is essential, as well as communication and engagement with political actors.

One initial step, as practiced, for example, in India's ongoing reforms of its fertilizer and LPG subsidies, is to make the size of the subsidies transparent. Under the new arrangements, Indian farmers still receive fertilizers at subsidized prices, but the invoices show the subsidy in addition to the price to be paid by the farmer. By increasing awareness of the subsidy, this opens the way to further reforms such as linking a baseline allocation of subsidized fertilizer to the amount of the land owned by the farmer and its productive

characteristics as shown in a soil health card.[42] In Bolivia, as well as making the subsidy apparent on direct fuel and power billings, transport companies could be required to indicate the size of the subsidy on bus tickets.

Even after the need for reform becomes clear, changing the subsidy regime will pose a major political challenge. As we have already seen, simply eliminating the subsidies will promote social conflict. Some form of popular participation in the hydrocarbon rents is inevitable, both for reasons of political philosophy (the State owns the resources on behalf of the people) and for reasons of equity. The question is how such participation should be implemented. Peaceful change is only possible if an open, transparent, and inclusive method is applied, so that the people not only understand the need for the reform but also receive compensation, at least partially, and during an extended period of adjustment and adaptation.

Citizens will therefore need to be compensated in some form, especially those in the lower income deciles. In the Bolivian situation, the best option is a universal transfer; this would also favor the poor and resonate politically. A universal payment is more progressive than the current system and it will reduce poverty while creating, at the same time, a sense of belonging and citizenship that is consistent with the prevailing view that "the people own the resources" and that will certainly have positive effects on the population. More targeted compensation could be considered but could be divisive and prone to corruption or political manipulation.

Regarding mechanisms, Bolivia already has the building blocks in place to implement a resource dividend transfer program. These include existing social protection programs that can serve as models, a comprehensive ID system, and high mobile coverage that can be leveraged into mobile money platforms to facilitate transfers. The regulatory framework in this area is supportive, with interoperability between mobile and bank accounts. Special arrangements will be needed to reach the approximately 20 percent who might not yet be digitally included, but there are already mechanisms to do this, such as sending payment vouchers to shops and other points of encashment. Recipients can be identified through their ID number and fingerprint, with the ID card produced as another factor. In any event, the number of people who are not financially included will fall over time, especially with the incentives provided by a universal transfer program. To avoid becoming locked-in to unsustainable transfers, the level could be linked to certain parameters such as oil and natural gas prices, and it might also have a phase-out deadline presuming its elimination in the longer-run. However, the case of Bolivia shows that, while advanced digital payments and identification systems can be helpful in strengthening the capacity of states to reform subsidy systems, they are not necessarily the binding constraint in all countries. In this case, the primary constraint lies at a more basic level of understanding.

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[42] Microsave 2017 "Assessment of AeFDS (Aadhaar enabled Fertilizer Distribution System) Pilot," Lahore, India. http://www.microsave.net/files/pdf/Assessment_of_AeFDS_Aadhaar_enabled_Fertilizer_Distribution_System_Pilot.pdf

Annex 1: Underlying Data

Item	Units	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Source
GDP	U$ x000	9549078	11451869	13120160	16674325	17339992	19649631	23963033	27084498	30659339	32996188	33000198	33806396	*WB data*
Current Fiscal Result	U$ million	-215	515	230	599	2	329	201	479	203	-1118	-2295	-2256	*countryeconon*
Deficit (%GDP)	% of GDP	-2.25%	4.47%	1.74%	3.57%	0.01%	1.67%	0.83%	1.76%	0.66%	-3.36%	-6.90%	-6.62%	
IMPORTS (CIF)														
Hydrocarbons	U$ x000	246526	278699	293393	579066	501101	687250	1111191	1286544	1298407	1278540	1149785	811430	*INE*
Hulla, coque y briquetas	U$ x000	28	18	49	33	26	154	263	373	256	1062	1178	1041	*INE*
Hydrocarbon imports	U$ x000	246468	278605	293285	578991	498834	664540	1057604	1216620	1289164	1277418	1148584	810317	*INE*
Gas promedio	U$ x000	29	76	59	42	2241	22556	53324	69551	8987	60	23	71	*INE*
TOTAL	U$ x000	2440067	2925769	3587952	5100167	4577380	5603874	7935746	8590086	9699046	10674101	9843078	8515082	*INE*
EXPORTS (FOB)														
Hydrocarbons	U$ x000	1443208	2059928	2290827	3548731	2135173	3014855	4148676	5909931	6682691	6674652	4032607	2197824	*INE*
Liquids	U$ x000	356705	392165	319589	389645	167599	217081	263792	431003	564758	636275	247844	116215	*INE*
Natural gas and processed	U$ x000	1086503	1667762	1971238	3159086	1967574	2797774	3884884	5478928	6117933	6038377	3784763	2081609	*INE*
TOTAL	U$ x000	**2826718**	**3951546**	4821827	6932929	5399575	6966052	9145764	11814578	12251725	12899078	8737108	7095787	*INE*
NATURAL GAS SALES														
Internal market	Mill cubic feet	47967	51575	59055	67345	78516	82531	97697	99260	106413	113966	112073	116473	*YPFB INE*
External market	Mill cubic feet	367011	394080	418785	427075	346275	409245	442086	516478	598003	616349	592581	514594	*YPFB INE*
TOTAL	Mill cubic feet	414978	445655	477840	494420	424791	491776	539783	615738	704416	730315	704654	631067	*YPFB INE*
PRICES														
WTI (average year)	U$/barrel	**56.63**	**66.15**	**72.38**	**105.09**	**61.64**	**79.43**	**94.91**	**94.18**	**97.96**	**93.02**	**49.06**	52.639	*US EIA*
Natural Gas avg X prices	U$/mill cubic f	2.705	3.985	4.95	8.08	5.8	7.105	9.08	10.525	10.37	9.885	6.33	3.505	*YPFB INE*
SUBSIDIES & DIVIDENDS														
Siubsidies on Imported oil	U$ x000	31950	67811	86702	334041	187143	359529	703033	827016	849563	816787	432993	305715	*Author Est*
Dividens on Exportable gas	U$ x000	50790	126273	185541	397293	299517	451663	637758	896126	895077	907969	567266	241237	*Author Est*
Dividends on Exportable oil	U$ x000	367388	492678	592239	1020914	335523	569736	788879	924049	1141562	1143311	307338	336114	*Author Est*
Total	U$ x000	450128	686762	864482	1752248	822183	1380928	2129671	2647190	2886202	2868067	1307597	883066	*Author Est*