Energy subsidies revisited

Fernando Navajas

FIEL and University of Buenos Aires

Plenary Session "ENERGY ACCESS, TARIFF, SUBSIDIES AND SOCIAL ISSUES IN LAC"

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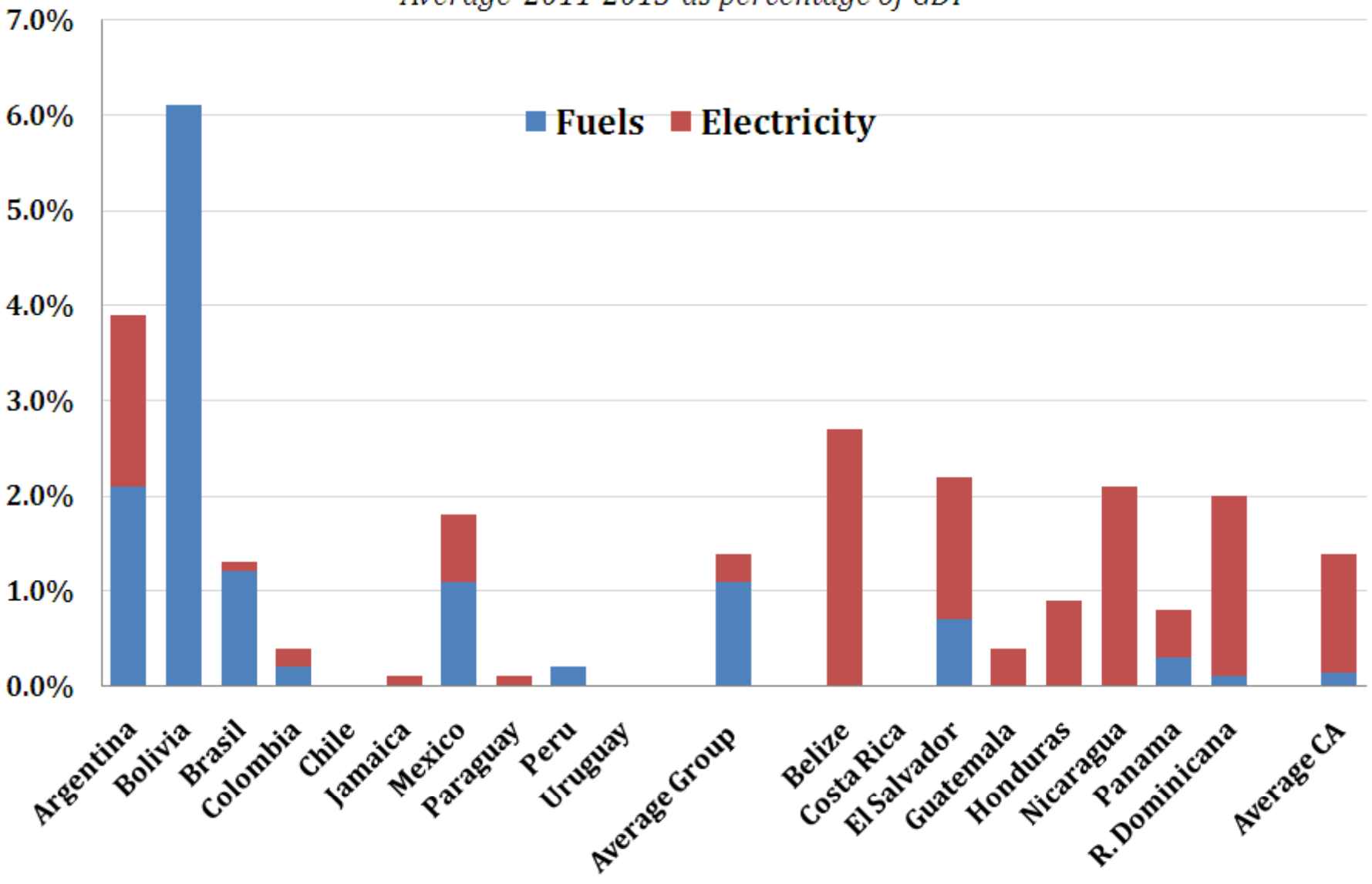
Energy Subsidies in Selected Countries in LAC

in Di Bella et al (IMF, 2015)

Average 2011-2013 as percentage of GDP



Central America in 2011

in Izquierdo et al (IADB, 2013)

Cuadro 1: Energía: gasto público, subsidios y filtraciones. países del estudio, año 2011

en % del PIB

País	Transferencias del gobierno central (1)	del cual subsidios (2)	Subsidio eléctrico (3a)	del cual residencial (4a)	Filtración subsidio eléctrico (3b)	del cual residencial (4b)
Belice	–	–	–	–	–	–
Costa Rica	–	–	–	–	–	–
El Salvador	1,18%	1,15%	0,44%	0,44%	0,27%	0,27%
Guatemala	0,57%	0,27%	0,27%	0,27%	0,16%	0,16%
Honduras	0,94%	0,94%	0,94%	0,83%	0,72%	0,62%
Nicaragua	1,72%	1,60%	1,60%	1,22%	0,98%	0,68%
Panamá	0,81%	0,81%	0,81%	0,73%	0,63%	0,54%
Rep. Dominicana	1,94%	1,68%	1,56%	1,19%	0,96%	0,66%
Promedio estudio	**1,19%**	**1,08%**	**0,94%**	**0,78%**	**0,62%**	**0,49%**

Where do subsidies come from in LAC?

- Cushion external oil price shock impact on fuels?
  - OK but, not so clear given evidence on electricity
- Thus, oil price shocks cum previous mistakes in electricity policy?
  - May be, but only in some cases in Central America
- Low institutional quality cum resource availability?
  - Some evidence (IMF, 2015), but endogeneity is here.
- Low income and unwillingness to pay?
  - Some evidence, but it overlaps with Central America
- Unsustainable political opportunism?
  - So it seems in Argentina (Hancevic, Cont and Navajas, 2015), but a case of its own.

A broad definition

- End-user, actual consumer prices (q) below <u>socially efficient</u> producer prices that add up upstream energy (p*) and downstream infrastructure or commercial services (T*) and taxes (1+t*); where "*" means socially efficient

$$S = \left((p^* + T^*)(1 + t^*) - q\right) X(q, k_h) \qquad (1)$$

S=subsidies, p*=producer (social) energy prices,

T*= tariffs t*=taxes, q= actual consumer prices;

$X(q,k_h)$ energy demand, k_h=capital stock of households (efficiency)

Decomposition

- Let´s rewrite (1) as:

$$
\left.
\begin{aligned}
S = \{ & \big((p+T)(1+t) - q \big) + && \text{(i)} \\
& (p^{*} - p)(1+t^{*}) + && \text{(ii)} \\
& (T^{*} - T)(1+t^{*}) + && \text{(iii)} \\
& (t^{*} - t)(p^{*} + T^{*}) \} X(q, k_h) && \text{(iv)}
\end{aligned}
\right\} \quad (1)
$$

Subsidies may arise from

i. Fiscal subsidies; government transfers q<(p+T)(1+t)
ii. Energy producer prices below opportunity costs p<p*,
iii. Tariffs (transmission, distribution) or downstream margins below opportunity costs or efficient values T<T*
iv. Lower than efficient taxes t<t*,

Many issues from (1)

1. Fiscal Subsidies $q<(p+T)(1+t)$
2. Financing
3. Non fiscal departures from opportunity costs
   - 3.1. Wholesale market intervention ($p<p^*$)
   - 3.2. Downstream intervention ($T<T^*$)
   - 3.3. Taxes ($t<t^*$)
4. Social issues: incidence, access and pricing
5. Energy efficiency $X(q^*,k^*)<X(q,k)$

1. “Fiscal” energy subsidies

- The part in (1) with fiscal budget (or off-budget) transfers, that may (or may not) be consistent with government fiscal statistics

$$S_F = [(p+T)(1+t)-q)]X(q,k_h) \qquad (2)$$

- Relevant if macro-fiscal issues are addressed,
  - Argentina (Navajas, 2015),
  - Public expenditure review (Izquierdo et.al. IADB, 2013)
  - IMF(2015): coverage of pre-tax energy subsidies in LAC,
    - but lacks explicit connection to fiscal statistics.

1. Adjustments to fiscal subsidies

- **Foregone revenues** usually not included (e.g., as tax expenditures) in government statistics.
  - IMF (2015) quotes several cases of foregone revenues, but without detailed quantification
  - If $q<p+T$ then there is a foregone revenue equal to $t.((p+T)-q)$ or shadow revenue equal to $t^*.((p^*+T^*)-q)$.
  - Estimates: Navajas (2015) tax-exempt imports of gasoil and gasoline in Argentina (0.3% of GDP in 2014). Catena and Navajas (2011) measure foregone revenues in Central America (0.2% of GDP)
- **Intertemporal** fiscal effects, usually not included, and much more difficult to estimate. (Plante (2014) being perhaps the exception).

2. Financing of subsidies

- Stabilization funds
  - Chile, Colombia (Garcia and Calderon, 2013), Peru
- Off budget and hidden cuasi-budgetary operations
  - IMF (2015) mentions difficulties to grasp, eg. Brazil
- Money printing or central bank reserves.
  - Argentina (Navajas, 2015), Venezuela
- Distortionary taxes
  - Plante (2014), with Intertemporal balanced budget and allocative effects
- Cross-subsidization
  - Colombia (Melendez, 2008; Mina and Shcherbakova, 2012); Costa Rica (Izquierdo et.al, 2015; Rabinovich, 2014)
- Cuasi-rents from past (sunk) investments
  - Many cases, Argentina best example

3. Non-fiscal departures from opportunity costs

- Any distortion that deviate actual producer prices below opportunity (social) costs ($p<p^*$, $T<T^*$) adds to S, even if there is no budget impact.
  - See (iii) and (iv) in (1)
  - Any externatility at the producer (not consumption) level , that cannot be addressed by consumer taxes
  - Even pecuniary ones: Exchange rate overvaluation adds to S. Hard to be included.
- More relevant for energy : Wholesale (upstream)market intervention (e.g. electricity, natural gas, oil) is common to many subsidization stories

3.1. Wholesale market intervention (p<p*)

- Upstream or wholesale market interventions may reap efficient quasi-rents, or any type of sunk costs, etc.
  - Transfer subsidies downstream across the board and without budgetary costs (excluding long run consequences)
  - It may occur regardless of the type of energy or technology (i.e., thermal or hydro generation in electricity)
- Degree of wholesale market intervention important in characterizing inefficiencies due to subsidy policies
  - Less intervention in transport fuels in LPG and natural gas (Argentina, Bolivia) than in and electricity (Argentina again in large scale, Brasil, Dominican Republic, Nicaragua).
  - Benchmark with levelized-opportunity-costs of generation show significant departures.

3.2. Downstream intervention (T<T*)

- Fuels: regulation of value chain, compressing margins starting from fixed end-user prices. Losses in state owned operations
  - Bolivia, Venezuela, Uruguay, Mexico, Nicaragua (LPG), EL Salvador (LPG)
- Electricity (and Natural Gas in Argentina): not recognizing opportunity costs in transmission and distribution as a form of stripping cuasi rents of past sunk investments of regulated private firms. Losses in state owned enterprises.
  - Argentina par excelence, Dominican Republic, Honduras, Nicaragua

3.3. Taxes (t<t*)

- Better mechanism to manage subsidies than market and price distortions.
- t* hardly observed in practice, IMF (2014), Newbery (2005);
  - Not even OK in best institutional environments in LAC like Chile (Parry and Strand, 2010) or Uruguay (Navajas, Panadeiros and Natale, 2012)
- When (t*-t) is computed shows significant additions to subsidies; Clements et. al. (IMF, 2013)
- Changes in t mostly used in transport fuels, after price shocks or permanently,
  - Several accounts for Central America, (Catena and Navajas, 2011), Bolivia and Uruguay (Navajas et al, 2012), and Mexico (IMF, 2015)

4. Social issues: distributive impacts

- Large empirical literature finds substantial share of subsidies goes to non-poor
  - Fuel subsidies in developing economies (Arze de Granado et.al IMF 2010). Same pattern for LAC
  - Izquierdo, et al (IADB, 2013) for Central America. Large energy subsidies in electricity that have more than 60% of “inclusion error”, being 0.6% of GDP on average
  - Large welfare effects of subsidy cycle in Argentina (Hancevic, Cont and Navajas, 2015).
- Thus, gains for improvements are large
  - Priority: reduce “inclusion error”

Argentina: Energy subsidies accross households 2003-2014

Distribution of natural gas subsidies and electricity subsidies across households between 2003-2014				
Decile	Natural Gas		Electricity	Total
1	3.5%		6.7%	5.0%
2	5.8%		8.1%	6.9%
3	7.1%		9.6%	8.3%
4	8.4%		9.4%	8.9%
5	10.0%		9.8%	9.9%
6	11.9%		10.5%	11.2%
7	12.6%	**83.6%**	10.7%	**75.6%** 11.7%
8	13.8%		10.8%	12.3%
9	13.8%		11.4%	12.6%
10	13.2%		13.0%	13.1%

Source: Hancevic, Cont and Navajas (2015)

Argentina: Energy subsidy cycle 2003-201X? Large destabilization of welfare of the poor

Table 5

Electricity: Average Annual Percentage Change in Welfare									
	Aversion coefficient *v=0.5*			Aversion coefficient *v=1*			Aversion coefficient *v=2*		
Decile	2003-07	2008-14	201X?	2003-07	2008-14	201X?	2003-07	2008-14	201X?
1	1.9%	4.6%	-5.0%	2.0%	5.0%	-5.5%	3.1%	7.6%	-8.3%
2	1.1%	2.8%	-3.1%	1.2%	2.9%	-3.1%	1.2%	2.9%	-3.2%
3	1.0%	2.5%	-2.8%	1.0%	2.5%	-2.8%	1.0%	2.5%	-2.8%
4	0.8%	2.0%	-2.2%	0.8%	2.0%	-2.2%	0.8%	2.0%	-2.2%
5	0.7%	1.7%	-1.9%	0.7%	1.7%	-1.9%	0.7%	1.7%	-1.9%
6	0.6%	1.5%	-1.6%	0.6%	1.5%	-1.6%	0.6%	1.5%	-1.6%
7	0.5%	1.3%	-1.4%	0.5%	1.3%	-1.4%	0.5%	1.3%	-1.4%
8	0.4%	1.1%	-1.2%	0.4%	1.1%	-1.2%	0.4%	1.1%	-1.2%
9	0.4%	0.9%	-1.0%	0.4%	0.9%	-1.0%	0.4%	0.9%	-1.0%
10	0.3%	0.6%	-0.7%	0.3%	0.7%	-0.7%	0.3%	0.7%	-0.8%
Total	0.6%	1.4%	-1.6%	0.8%	1.9%	-2.1%	1.6%	3.9%	-4.3%

Source: Hancevic, Cont and Navajas (2015)

4. Social issues: access

- Well established empirical literature shows that it is better (more equitable) to subsidize access than consumption. (e.g. Komives et.al, 2005)
- Inclusion errors are compounded by the incomplete access of households to subsidized energy; electricity (in Central America); natural gas (in Argentina).
  - Using Ω-measure in Marchionni et.al. (2008) for Argentina
  - Ω= (% of poor with access/% access)x (Average subsidy to poor /Average subsidy). Ω<1 regressive
  - Ω=0.5 (electricity); =0.35 (natural gas) in previous data
- Subsidies to access: need to look at the "ladder" of access to quality of energy of households; energy efficiency implications, see Navajas (2013)

4. Social issues: pricing

- Poor targeting as the consequence of poor pricing
  - Low distributive power of low-user schemes, Navajas (2009) gas in Argentina; or increasing blocks Mina and Shcherbakova (2012, electricity in Colombia
- Best pricing policy is a 2-part tariff with personalized (targeted) lump-sum subsidies

$$q^h = (A^h - S^h) + (p + T)x$$

  - $S^h > A^h$ is a negative fixed charge that inverts the negative distributional effects of 2PT, precisely!
  - leave low income households outside fixed costs financing
- Screening low income households: Chile has this; Colombia half way; others case well behind

Final remarks

1. Evidence on subsidies shows significant magnitude with different patterns across countries but with similar low distributional power.
2. No comprehensive decomposition of all sources of subsidies yet.
3. Best directions of reform: a) reduce substantial inclusion errors; b) subsidize access; c) avoid interfering with wholesale markets; d) move towards lump-sum and targeted schemes
4. Lump sum subsidies look better in terms of allocative and distributive effects as well as promoting energy efficiency

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