Political Determinants of Diesel Subsidies: some preliminary results

Cees van Beers
E-mail: c.p.vanbeers@tudelft.nl
June 23th, 2011

TU Delft
Delft University of Technology

Contents

- Background
- Hypotheses
- Data
- Model
- Estimation results
- Preliminary conclusions

TU Delft

Background

Government energy subsidies to producers and consumers

Producer subsidies mainly in developed countries

Consumer subsidies mainly in developing countries

Consumer subsidies: any government action directed primarily at the energy sector that lowers the price paid by energy consumers

Background

Existing studies on reforming energy subsidies expect:

1. reduction of carbon emissions (Burniaux et.al 1992; Burniaux and Chateau, 2009)
2. more efficient fossil fuel energy use
3. improved energy security.

Much less attention to practically implementing reform proposals.

Required is: identification of the benefits and costs of subsidy reform

First step: analysis of the political economy variables that govern subsidy policies

TU Delft

Hypotheses

Hypotheses along three lines:

1. Governance effectiveness: availability of instruments

2. Organization of political system: electoral competition and distribution of power within the system

3. Within system: power distribution

TU Delft

Hypotheses: governance effectiveness

Hypothesis 1: governments that are administratively weak tend to subsidize fossil fuel energy users more than governments that are administratively strong.

Administratively weak means not many effective policy instruments available. Hence, preference for highly visible policies to show effectiveness to national inhabitants

TU Delft

Hypotheses: organization political system

Hypothesis 2: the more democratic a country the less it will subsidize its domestic fossil fuel energy users.

Populist paradox (Andresen, 2008; Hirschman, 1970; Victor, 2009): "buying votes" to maintain political stability

TU Delft

Hypotheses: organization political system

Hypothesis 3: governments of countries with political systems that have a higher concentration of power tend to subsidize the fossil fuel energy users more than in case of a lower concentration of power.

Concentration of power leads to less representation (feeling) of voters

Bribing voters with beneficial policies to get re-elected or to maintain stability.

TU Delft

Hypotheses: within (democratic) system

Hypothesis 4: more domestic political power is dispersed leads to lower subsidies to fossil energy users

Hypothesis 5: the closer an election date is the higher the subsidy to fossil fuel energy users

Hypothesis 4 is related to hypothesis 2: governments of (democratic) countries with political systems that have a higher concentration of power tend to subsidize the fossil fuel energy users more than in case of a lower concentration of power. Difference is that now we are talking about power concentration within the system e.g. as a result of elections.

Dataset

Dataset composed of:

- More than 190 countries for the period 1991 -2009.

  - Retail (pump) prices of gasoline, diesel and kerosene from GTZ. (November data)

  - standard economic factors (IMF, OECD, WB data on GNP per capita, being fossil fuel exporter, etc.)

  - political economy factors

TU Delft

Political Economy Data

Two datasets:

1. Political economy data as composite indicators (Kaufmann et.al, 2010)

2. Database of Political Institutions: DPI 2010, December 2010

Political Economy Data: Kaufman et.al.

- Six dimensions are composite indicators (> 200 countries since 1996)

- compositions originate from many individual sources (e.g. Freedom House, Economist Intelligence Unit Index on democracy Transparancy International Corruption Index, etc.)

- based on perception of respondents.

- Values between 0 (low score) and 100 (high score)

- more info: www.govindicators.org

Political Economy Data

Political economy factors are (Kaufmann et.al, 2010):

1. *Process by which governments are selected, monitored and replaced*

- Voice and accountability:	influence citizens on government (freedom of press, expression)
- Political stability:	likelihood of destabilization

2. *Government capacity to formulate and implement effective policies*

- Government effectiveness:	quality of public services
- regulatory quality:	ability to pursue policies for private sector development

3. *Respect of citizens and state for institutions*

- Rule of Law:	confidence in society rules
- Control of Corruption:	use of public power for private gain

Political Economy Data

- Database of Political Institutions: DPI 2010

Many variables dealing with:

1. Chief executive positions: president or prime minister in parliamentary democracy, years chief executive is in office, chief is military officer, etc.
2. Party variables in legislature: concentration of government party seats in parliament, vote share opposition parties, etc.
3. Electoral rules: electoral competition on legislation and/or executives, plurality, proportional representation, etc.
4. Stability and Checks & Balances

Model specification

$$P^{d}_{i,t} = a_0 + a_1 P^{w}_{i,t} + a_2\ Economic\ factors_{i,t} + a_3\ Political\ \ factors_{i,t} + \mu_{i,t} \quad (1)$$

$$P^{w}_{i,t} - P^{d}_{i,t} = \beta_0 + \beta_2\ Economic\ factors_{i,t} + \beta_3\ Political\ \ factors_{i,t} + \varepsilon_{i,t} \quad (2)$$

$P^{d}_{i,t}$ = domestic retail dieselprice in country i at time t per liter diesel

$P^{w}_{i,t}$ = world market crude oil price (model (1)) or diesel hub price (model (2)) in country i at time t per liter

$P^{w}_{i,t} - P^{d}_{i,t}$ = price gap consumer subsidy in country i at time t per liter fossil fuel

TU Delft

Model: independent variables

Standard economic factors
(expected sign on dieselprices (model (1) and diesel subsidies (model (2)):

	Model (1)	Model(2)
• GDP per capita	(+)	(-)
• Being a net fossil fuel energy exports	(-)	(+)
• Net oil demand (vulnerability to oil shock)	(+)	(-)

TU Delft

Random Effect Panel Estimations: economic factors

	dieselsubsidy (PG)	dieselprice
Crudeoil price		1.319***
		(0.061)
GDP per capita	-0.644***	0.569***
	(0.135)	(0.105)
Netoilexporter	7.239	-15.993***
	(4.885)	(3.071)
Net Oil Demand	-0.022	0.002**
	(0.018)	(0.001)
Constant	yes	yes
Time dummies	yes	yes
Observations	861	1455
Groups	173	174
Adj. R^2 overall	0.219	0.481

TU Delft

Hypotheses: governance effectiveness

Hypothesis 1: governments that are administratively weak tend to subsidize fossil fuel energy users more than governments that are administratively strong.

Relevant variable: regulatory quality and government effectiveness (Kaufmann et al)

TU Delft

Random Effect Panel Estimations: economic and political factors: Hypothesis 1

	dieselsubsidy (PG)	dieselp	dieselsubsidy (PG)	dieselp
Crudeoil price		1.345***		1.338***
		(0.061)		(0.062)
GDP per capita	-0.423***	0.391***	-0.451***	0.439***
	(0.175)	(0.110)	(0.161)	(0.110)
Netoilexporter	4.599	-13.878***	5.233	-14.315***
	(5.227)	(3.124)	(5.002)	(3.120)
Net oil demand	-0.002	0.002*	-0.002	0.002*
	(0.002)	(0.001)	(0.002)	(0.001)
Regulatory quality	**-0.248***	**0.234*****		
	(0.139)	**(0.079)**		
Government effectiv.			**-0.213***	**0.177*****
			(0.112)	**(0.067)**
Constant	yes	yes	yes	yes
Time dummies	yes	yes	yes	yes
Observations	858	1451	858	1451
Groups	172	173	172	173
Adj. R^2 overall	0.222	0.489	0.213	0.483

TU Delft

Hypotheses: organization political system

Hypothesis 2: the more democratic a country the less it will subsidize its domestic fossil fuel energy users.

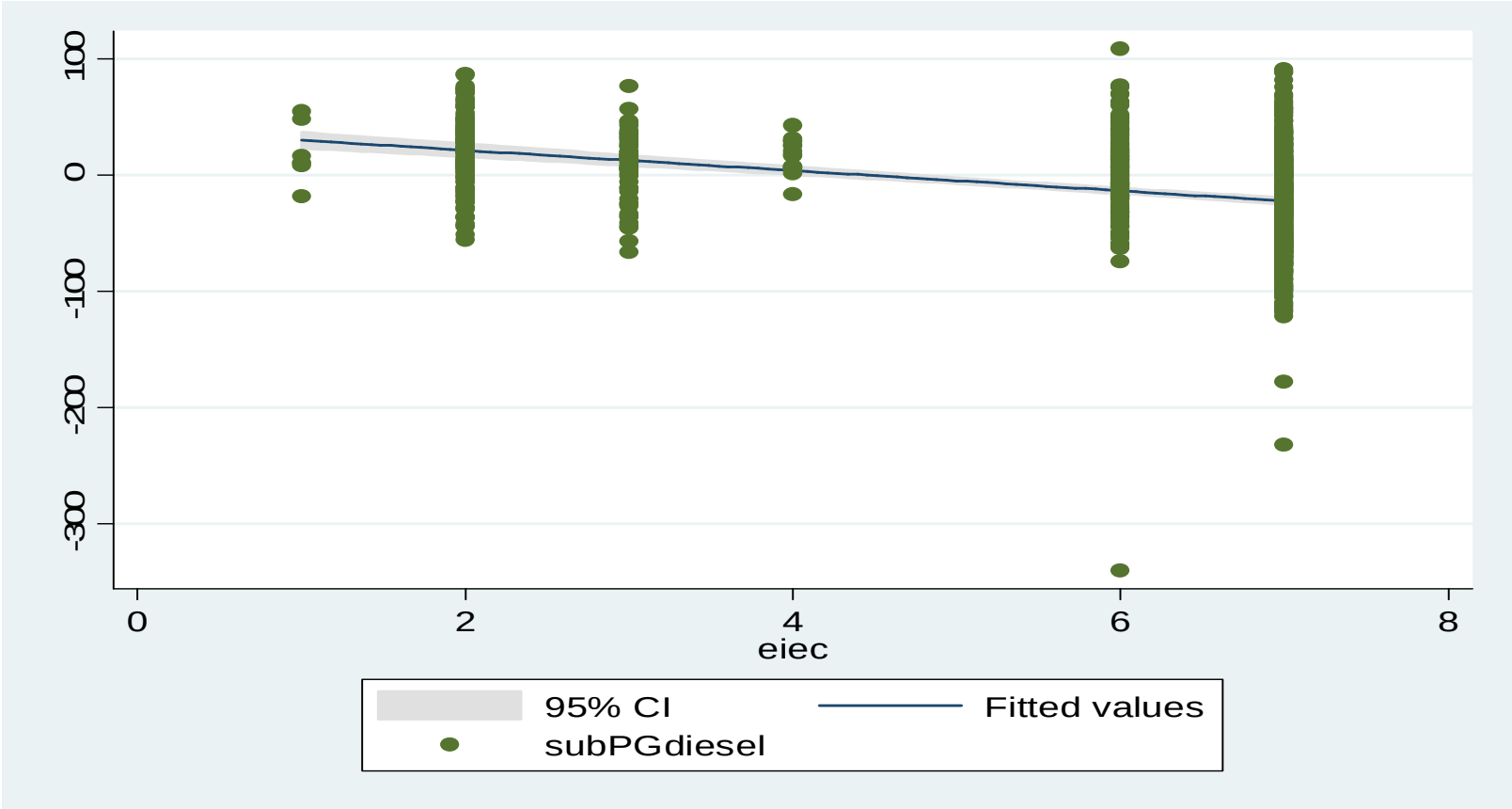
Electoral competition

Scale:
1 no executive electoral competition
2 unelected executives
3 elected, 1 candidate
4. 1 party, multiple candidates
5. multiple parties are legal but only 1 party won seats
6. multiple parties win seats but largest party received more than 75 % of seats
7. as 6 but largest party got less than 75 % of seats

Democracy is dummy variable with value 1 if electoral competition is 6 or 7 and 0 otherwise.

TU Delft

PG subsidy diesel vs. executive electoral competition



TU Delft

Random Effect Panel Estimations: economic and political factors: Hypothesis 2

	dieselsubsidy (PG)	dieselp
Crudeoil price		1.314***
		(0.063)
GDP per capita	-0.671***	0.575***
	(0.129)	(0.103)
Netoilexporter	6.300	-14.490***
	(4.895)	(3.116)
Net oil demand	-0.002	+0.002**
	(0.002)	(0.001)
Democracy	**-13.524*** **	**8.921*** **
	(3.356)	**(2.406)**
Constant	yes	yes
Time dummies	yes	yes
Observations	837	1414
Groups	164	164
Adj. R^2 overall	0.284	0.500

TU Delft

Hypotheses: organization political system

Hypothesis 3: governments of countries with political systems that have a higher concentration of power tend to subsidize the fossil fuel energy users more than in case of a lower concentration of power.

Relevant variables:

1. system has been Parliamentary (1) or Presidential (0)
2. Pr, proportional representation (1 if proportional representation; 0 otherwise) (only in democracies)

Source: DPI 2010 data

Random Effect Panel Estimations: economic and political factors: Hypothesis 3

	dieselsubsidy (PG)	dieselp		dieselsubsidy (PG)	dieselp
Crudeoil price		1.345***			1.378***
		(0.064)			(0.067)
GDP per capita	-0.438***	0.419***		-0.823***	0.709***
	(0.155)	(0.110)		(0.129)	(0.105)
Netoilexporter	4.161	-13.824***		7.396	-15.164***
	(4.509)	(2.926)		(5.839)	(3.612)
Net oil demand	-0.002	+0.002**		0.0002	0.001
	(0.015)	(0.001)		(0.002)	(0.001)
System	**-11.615*** **		**9.832*** **		
	(3.605)	**(2.061)**			
PR				**-13.872*** **	**10.535*** **
				(4.673)	**(3.612)**
Constant	yes	yes		yes	yes
Time dummies	yes	yes		yes	yes
Observations	833	1407		735	1247
Groups	164	164		155	155
Adj. R^2 overall	0.241	0.505		0.274	0.506

TU Delft

Hypotheses: within system

Hypothesis 4: more domestic political power is dispersed leads to lower subsidies to fossil energy users

Relevant variable:

Concentration of government seats
(= sum of squared seats of all parties in government: Herfindahl)

Source: DPI 2010 data

TU Delft

Random Effect Panel Estimations: economic and political factors: Hypothesis 4

	dieselsubsidy (PG)	dieselp
Crudeoil price		1.333***
		(0.066)
GDP per capita	-0.673***	0.613***
	(0.143)	(0.113)
Netoilexporter	8.040	-16.026***
	(5.371)	(3.322)
Net oil demand	-0.002	0.002*
	(0.002)	(0.001)
Concentration government seats	**17.598*** (5.483)**	**-8.882*** (2.922)**
Constant	yes	yes
Time dummies	yes	yes
Observations	782	1330
Groups	159	160
Adj. R^2 overall	0.243	0.492

TU Delft

Hypotheses: within (democratic) system

Hypothesis 5: the closer an election date is the higher the subsidy to fossil fuel energy users

Relevant variable (democracies):

Executive election (= 1 if there was an executive election in this year)

Source: DPI 2010 data

TU Delft

Random Effect Panel Estimations: economic and political factors: Hypothesis 5

	dieselsubsidy (PG)	dieselp	dieselsubsidy (PG)	dieselp
Crudeoil price		1.320***		1.346***
		(0.063)		(0.064)
GDP per capita	-0.658***	0.568 ***	-0.444***	0.421***
	(0.137)	(0.106)	(0.155)	(0.110)
Netoilexporter	6.950	-15.281***	4.419	-13.916***
	(5.000)	(3.128)	(4.506)	(2.924)
Net oil demand	-0.002	0.003**	-0.002	0.002**
	(0.002)	(0.0001)	(0.002)	(0.001)
Executive election	**-0.658**	**0.234**	**-1.171**	**0.765**
	(2.082)	**(1.496)**	**(2.033)**	**(1.511)**
System			**-11.601*** **	**9.856*** **
			(3.580)	**(2.060)**
Constant	yes	yes	yes	yes
Time dummies	yes	yes	yes	yes
Observations	837	1417	833	1407
Groups	164	164	164	164
Adj. R^2 overall	0.221	0.475	0.243	0.506

TU Delft

Random Effect Panel Estimations: economic and political factors: Hypothesis 5

	Presidential		***Parliamentary***	
	dieselsubsidy (PG)	dieselp	dieselsubsidy (PG)	dieselp
Crudeoil price		1.287***		1.502***
		(0.063)		(0.147)
GDP per capita	-0.911***	-0.727 ***	-0.999***	0.751***
	(0.137)	(0.106)	(0.168)	(0.110)
Netoilexporter	-4.727	-9.502***	7.053	-13.397**
	(4.507)	(3.008)	(13.217)	(8.212)
Net oil demand	-0.004***	0.003**	0.003	-0.001
	(0.001)	(0.0001)	(0.003)	(0.002)
Executive election	**0.166**	**0.973**	**-13.6131*** **	**-0.963**
	(1.958)	**(1.443)**	**(6.131)**	**(7.002)**
Constant	yes	yes	yes	yes
Time dummies	yes	yes	yes	yes
Observations	546	923	287	484
Groups	108	111	57	58
Adj. R^2 overall	0.125	0.472	0.235	0.484

TU Delft

Preliminary conclusions

1. Democracies seem to provide less fossil fuel consumer subsidies than non-democracies and is related to political stability (hypothesis 1).
2. Within democracies: election systems guaranteeing more influence of voters on power reduce fossil fuel consumer subsidies (hypotheses 2).
3. Better regulatory quality and government effectiveness of sound policies reduce fossil fuel consumer subsidies, more dominantly in non-democracies (hypotheses 3).
4. More spread of power as the outcome of an election system reduces fossil fuel consumer subsidies (hypothesis 4) but effect is less dominant than the design of the system leading to spread of power (hypotheses 2).
5. Elections do not affect fossil fuel consumer subsidies (hypothesis 5).