

SUPPLEMENTARY INFORMATION

Global progress and backsliding on gasoline taxes and subsidies

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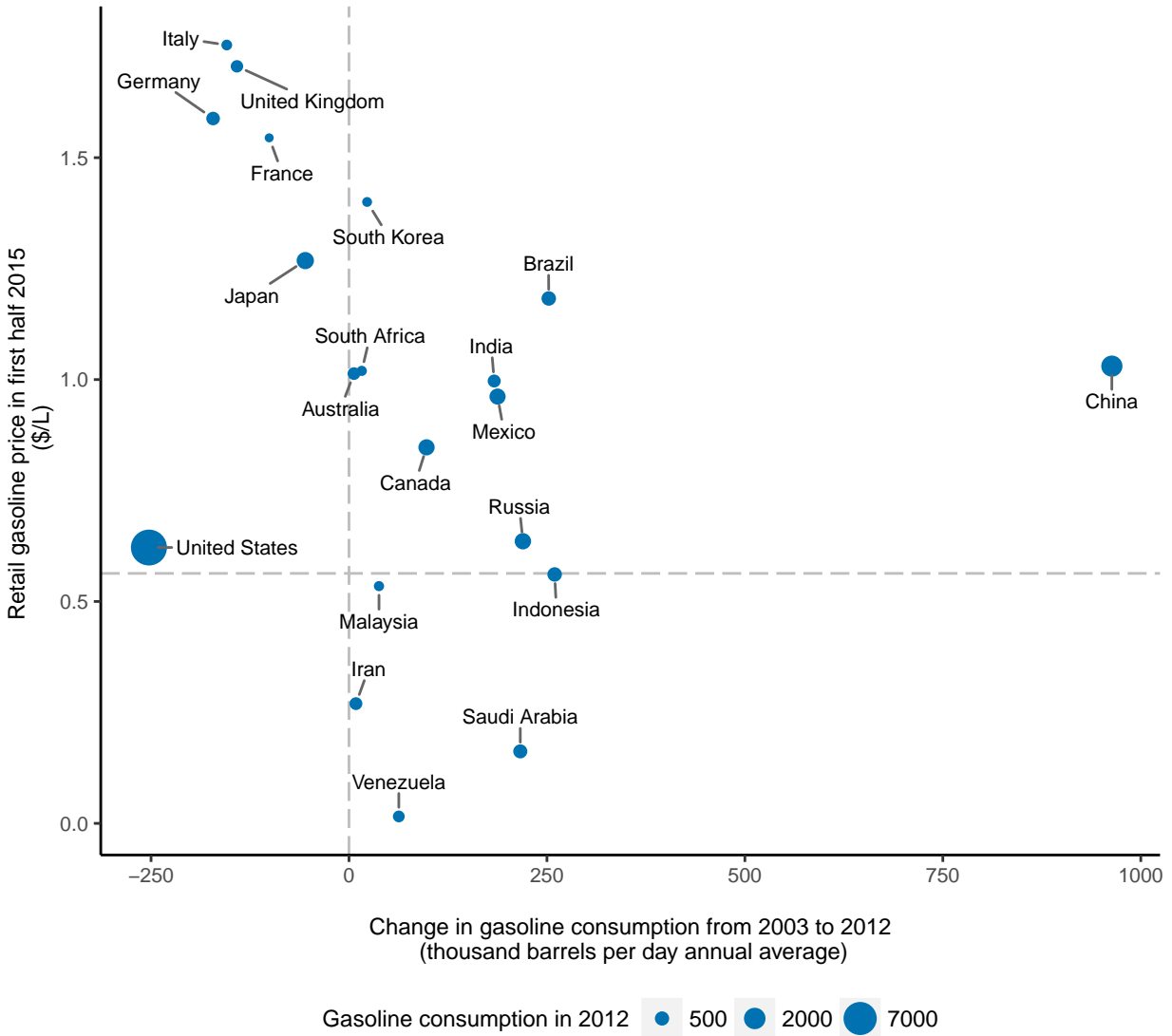
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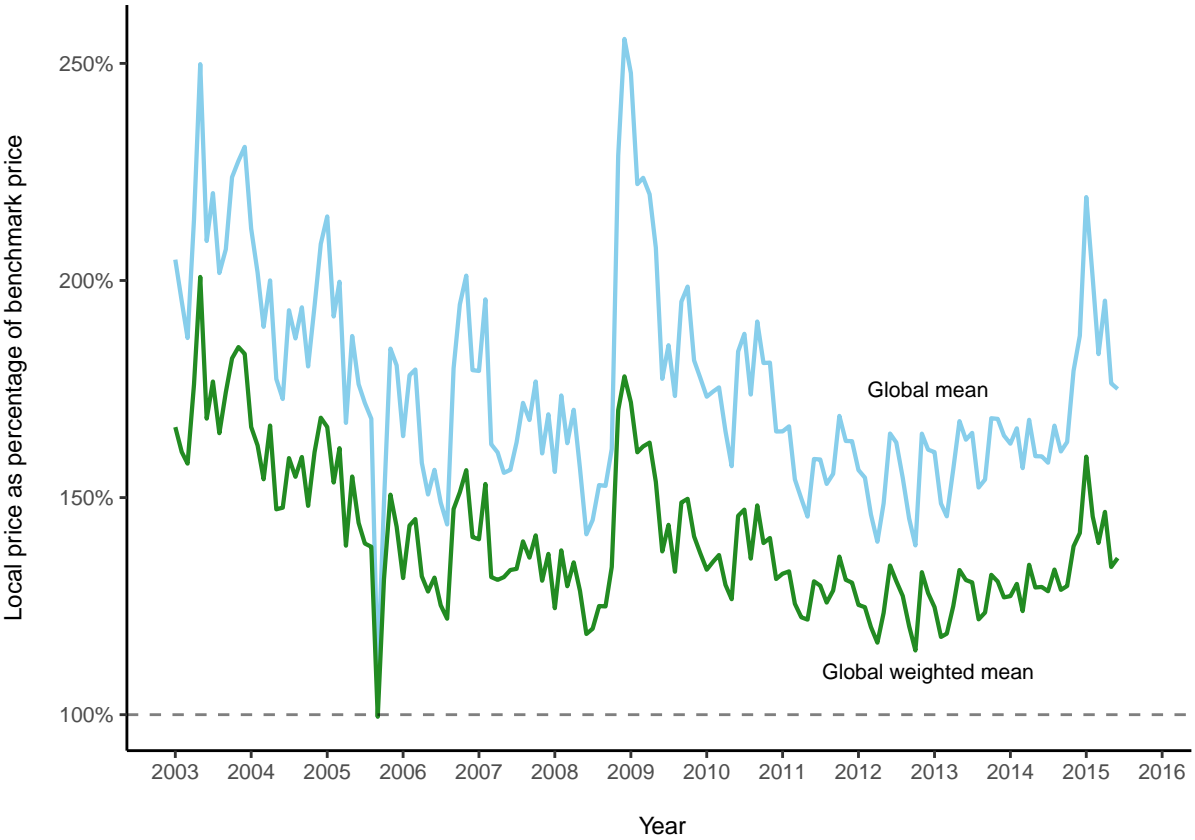
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Supplementary Figures

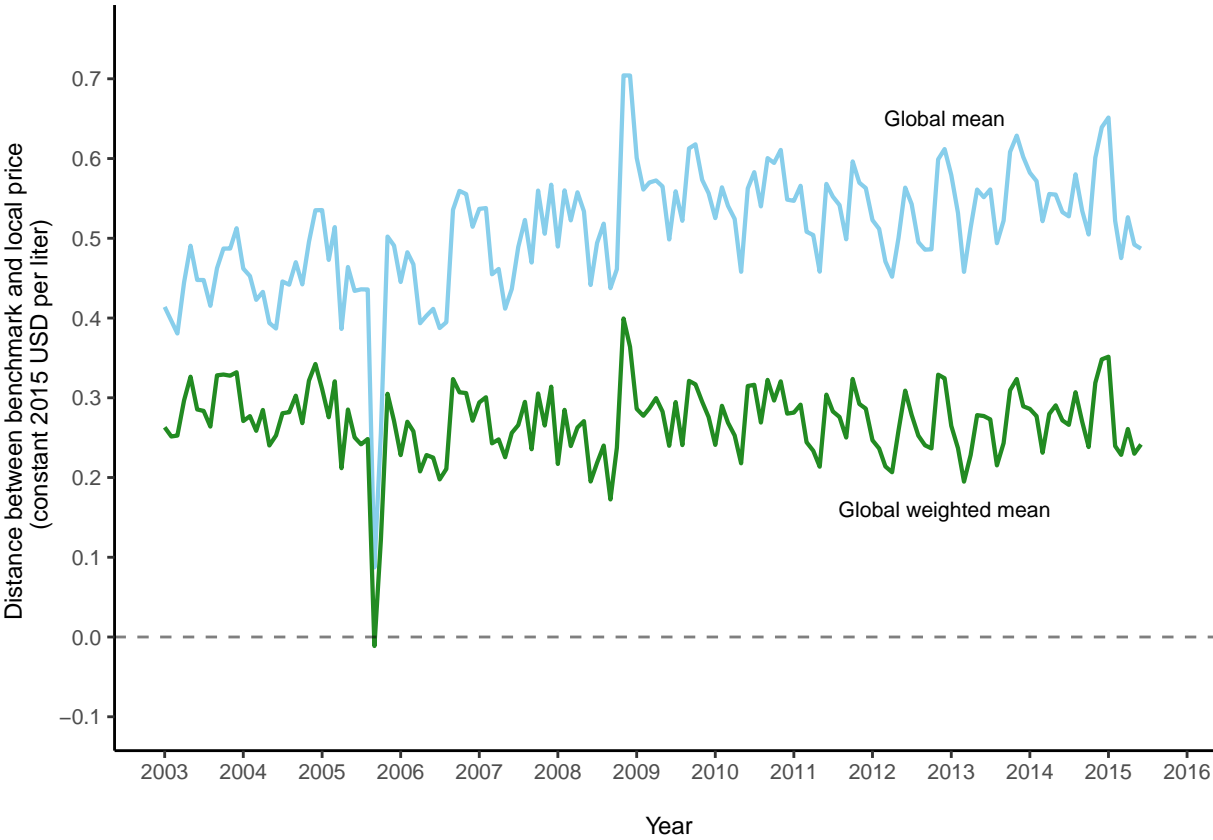
Supplementary Figure 1: **Retail prices in 2015 and changes in consumption 2003-2012 for top 20 gasoline consumers.**



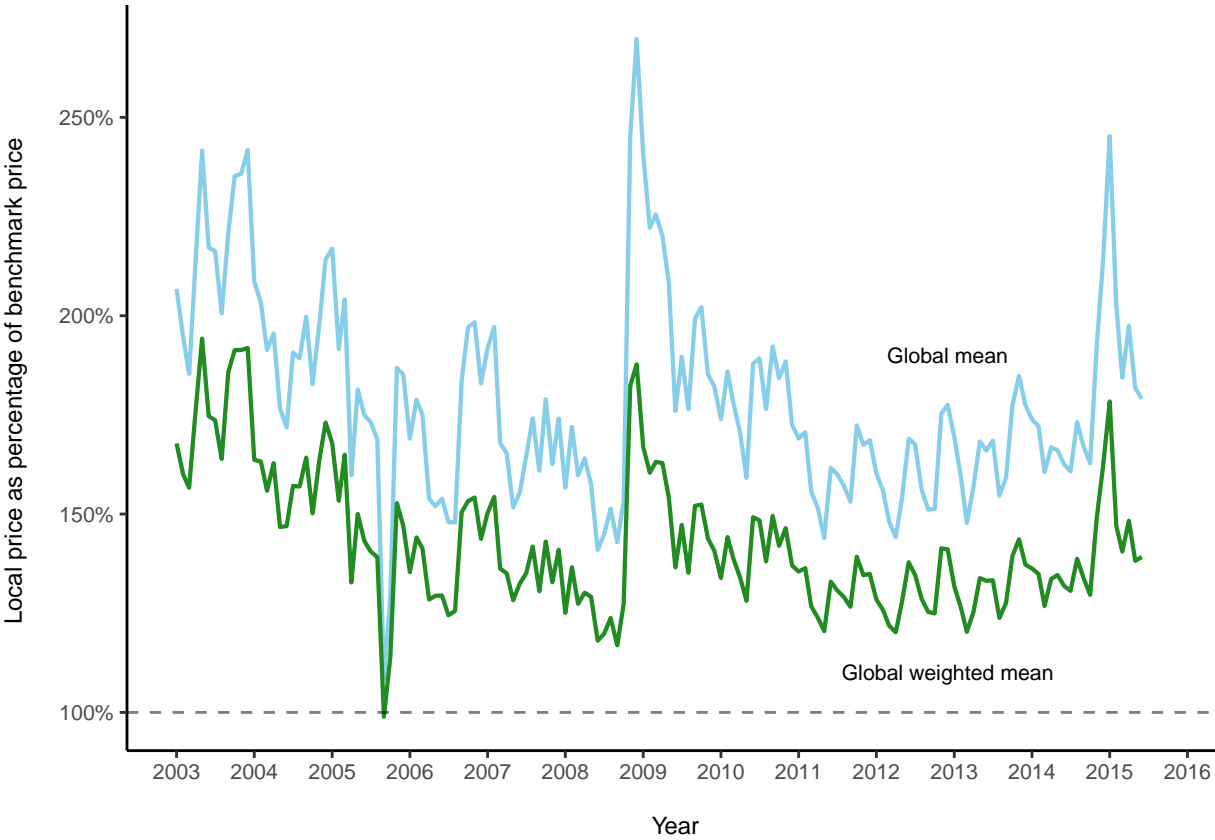
Supplementary Figure 2: **Global mean taxes as a percentage of benchmark over time.** New York Harbor conventional refined gasoline is used as the benchmark price.



Supplementary Figure 3: **Global average implicit taxes using WTI-based gasoline benchmark prices.**



Supplementary Figure 4: **Global average price as percentage of benchmark price using WTI-based benchmark.**



Supplementary Tables

Supplementary Table 1: **Country list.** List of countries and monthly observations used in the analysis.

Country name	Start date	End date	No. monthly obs.
Afghanistan	Mar 2004	Jun 2015	126
Albania	Jul 2008	Jun 2015	79
Algeria	Jan 2003	Jun 2015	150
Angola	Jan 2003	Jun 2015	150
Argentina	Jan 2003	Jun 2015	150
Armenia	Jan 2003	Mar 2015	138
Australia	Jan 2003	Jun 2015	150
Austria	Jan 2003	Jun 2015	150
Azerbaijan	Jan 2003	Jun 2015	150
Bahrain	Jan 2003	Jun 2015	150
Bangladesh	Jan 2003	Jun 2015	150
Belarus	Sep 2006	Jun 2015	106
Belgium	Jan 2003	Jun 2015	150
Belize	Jan 2003	Feb 2015	146
Benin	Jan 2003	Jun 2015	138
Bolivia	Jan 2003	Jun 2015	150
Bosnia and Herzegovina	Jan 2003	Jun 2015	150
Botswana	Jan 2003	Jun 2015	150
Brazil	Jan 2003	Jun 2015	150
Bulgaria	Jan 2003	Jun 2015	150
Burkina Faso	Jan 2003	Jun 2015	150
Burundi	Jan 2003	Jun 2015	140
Cambodia	Jan 2003	Mar 2015	146
Cameroon	Jan 2003	Jun 2015	132
Canada	Jan 2003	Jun 2015	150
Central African Republic	Jan 2003	Jun 2015	130
Chad	Jan 2003	Jun 2015	150
Chile	Jan 2003	Jun 2015	150
China	Jan 2003	Jun 2015	150
Colombia	Jan 2003	Jun 2015	150
Congo	Jan 2003	Jun 2015	146
Congo, Dem Rep	Jan 2003	Jun 2015	150
Costa Rica	Jan 2003	Jun 2015	150
Cote d'Ivoire	Jan 2003	Jun 2015	137
Croatia	Jan 2003	Jun 2015	150
Cyprus	May 2004	Jun 2015	134
Czech Republic	Jan 2003	Jun 2015	150
Denmark	Jan 2003	Jun 2015	150
Dominican Republic	Jan 2003	Jun 2015	143
Ecuador	Jan 2003	Jun 2015	150
Egypt	Jan 2003	Jun 2015	150

Country name	Start date	End date	No. monthly obs.
El Salvador	Jan 2004	Jun 2015	138
Equatorial Guinea	Jan 2003	Jun 2015	150
Estonia	Jan 2003	Jun 2015	150
Ethiopia	Jan 2003	Jun 2015	150
Finland	Jan 2003	Jun 2015	150
France	Jan 2003	Jun 2015	150
Gabon	Jan 2003	Jun 2015	150
Gambia	Jan 2003	Jun 2015	144
Georgia	Jul 2008	Jun 2015	84
Germany	Jan 2003	Jun 2015	150
Ghana	Jan 2003	Jun 2015	149
Greece	Jan 2003	Jun 2015	150
Guatemala	Jan 2003	Jun 2015	150
Guinea	Jan 2005	Jun 2015	126
Guinea-Bissau	Jan 2003	Apr 2015	86
Guyana	Jan 2003	Jun 2015	150
Haiti	Jan 2003	Jun 2015	150
Honduras	Jan 2003	Jun 2015	150
Hungary	Jan 2003	Jun 2015	146
India	Jan 2003	Jun 2015	150
Indonesia	Jan 2003	Jun 2015	150
Iran	Jan 2003	Jun 2015	150
Iraq	Jan 2003	Jun 2015	150
Ireland	Jan 2003	Jun 2015	150
Israel	Jan 2003	Jun 2015	150
Italy	Jan 2003	Jun 2015	150
Jamaica	Feb 2004	Jun 2015	134
Japan	Jan 2003	Jun 2015	150
Jordan	Jan 2003	Jun 2015	150
Kazakhstan	Jul 2009	Jun 2015	72
Kenya	Jan 2003	Jun 2015	150
Kuwait	Jan 2003	Jun 2015	150
Kyrgyzstan	Jan 2003	Jun 2015	150
Laos	Jan 2003	Jun 2015	150
Latvia	Jan 2003	Jun 2015	150
Lebanon	Jan 2003	Jun 2015	150
Lesotho	Jan 2004	Jun 2015	136
Liberia	Jul 2008	Mar 2015	74
Libya	Jan 2003	Jun 2015	150
Lithuania	Jan 2003	Jun 2015	150
Luxembourg	Jan 2003	Jun 2015	150

Country name	Start date	End date	No. monthly obs.
Macedonia	Apr 2006	Jun 2015	111
Madagascar	Jan 2003	Jun 2015	150
Malawi	Jan 2003	Jun 2015	150
Malaysia	Jan 2003	Jun 2015	150
Mali	Jan 2003	Jun 2015	149
Malta	Jun 2004	Jun 2015	133
Mauritania	Jan 2003	Jun 2015	142
Mauritius	Jan 2003	Jun 2015	150
Mexico	Jan 2003	Jun 2015	150
Moldova	Jan 2003	Jun 2015	150
Mongolia	Jan 2003	Jun 2015	150
Montenegro	Jul 2006	Jun 2015	108
Morocco	Jan 2003	Jun 2015	150
Mozambique	Feb 2003	Jun 2015	149
Myanmar	Jan 2003	Jul 2014	139
Namibia	Jan 2003	Jun 2015	146
Nepal	Jan 2003	Jun 2015	150
Netherlands	Jan 2003	Jun 2015	150
New Zealand	Jan 2003	Jun 2015	150
Nicaragua	Jan 2003	Jun 2015	150
Niger	Jan 2003	Jun 2015	150
Nigeria	Jan 2003	Jun 2015	150
Norway	Jan 2003	Jun 2015	150
Oman	Jan 2003	Jun 2015	150
Pakistan	May 2006	Jun 2015	109
Panama	Jan 2003	Jun 2015	150
Papua New Guinea	Jan 2006	Apr 2015	112
Paraguay	Jan 2003	Jun 2015	150
Peru	Jan 2003	Jun 2015	150
Philippines	Jan 2003	Jun 2015	150
Poland	May 2004	Jun 2015	134
Portugal	Jan 2003	Jun 2015	150
Qatar	Jan 2003	Jun 2015	150
Romania	Jan 2003	Jun 2015	150
Russia	Jan 2003	Jun 2015	150
Rwanda	Jan 2003	Jun 2015	150
Saudi Arabia	Jan 2003	Jun 2015	150
Senegal	Jan 2003	Jun 2015	144
Serbia	Jan 2003	Jun 2015	150
Sierra Leone	Jan 2003	Jun 2015	144
Singapore	Jan 2003	Jun 2015	150
Slovakia	Jun 2004	Jun 2015	133

Country name	Start date	End date	No. monthly obs.
Slovenia	Jan 2003	Jun 2015	150
Somalia	Jan 2003	Jun 2015	146
South Africa	Jan 2003	Jun 2015	150
South Korea	Jan 2003	Jun 2015	150
Spain	Jan 2003	Jun 2015	150
Sri Lanka	Jan 2003	Jun 2015	150
Sudan	Jan 2003	Jun 2015	150
Suriname	Jan 2003	Jun 2015	150
Swaziland	Jan 2003	Jun 2015	150
Sweden	Jan 2003	Jun 2015	150
Switzerland	Jan 2003	Jun 2015	150
Syria	Jan 2003	Jun 2015	150
Taiwan	Jan 2003	Jun 2015	150
Tajikistan	Jan 2003	Jun 2015	150
Tanzania	Jan 2003	Jun 2015	146
Thailand	Jan 2003	Jun 2015	150
Timor-Leste	Jan 2003	Jun 2015	150
Togo	Jan 2003	Jun 2015	150
Trinidad	Jan 2003	Jun 2015	150
Tunisia	Jul 2005	Jun 2015	112
Turkey	Jan 2003	Jun 2015	150
UAE	Jan 2003	Jun 2015	150
Uganda	Jan 2003	Jun 2015	141
Ukraine	Mar 2003	Jun 2015	148
United Kingdom	Jan 2003	Jun 2015	150
United States	Jan 2003	Jun 2015	150
Uruguay	Jan 2003	Jun 2015	150
Uzbekistan	Oct 2008	Jun 2015	81
Venezuela	Jan 2003	Jun 2015	150
Viet Nam	Jan 2003	Jun 2015	150
Yemen	Jan 2003	Jun 2015	150
Zambia	Jan 2003	Jun 2015	150
Zimbabwe	Feb 2009	Jun 2015	76

Supplementary Table 2: **Sensitivity to alternate start and end dates.** Values in the table correspond to six-month averages of the first half of the respective start and end year. The “number of countries” column refers to the number of countries with non-missing gasoline price data for both the start date and the end date. The first row presents values for timeframe included in the main text. SP stands for “start-point”, EP stands for “end-point”, and WM stands for “weighted-mean”.

Start year	End year	Number of countries	SP mean tax (¢)	EP mean tax (¢)	CAGR mean tax (%)	SP WM tax (¢)	EP WM tax (¢)	CAGR WM tax (%)	SP % benchmark (%)	EP % benchmark (%)	SP WM % benchmark (%)	EP WM % benchmark (%)	Countries with rising taxes (%)
2003	2015	129	42.8	50.9	1.44	27.9	24.2	-1.18	210.0	191.6	171.6	143.6	64.3
2001	2015	115	43.9	51.8	1.39	25.5	20.1	-1.97	213.3	193.2	165.7	136.3	69.6
2005	2015	138	47.7	51.2	0.59	29.1	25.0	-1.25	190.2	192.2	154.9	145.0	55.8
2001	2013	120	42.8	51.0	1.46	25.6	18.0	-2.88	210.5	157.2	165.9	120.4	65.8
2003	2013	134	42.0	49.8	1.43	28.0	22.5	-1.81	207.8	155.9	171.8	125.3	59.7
2005	2013	143	46.8	50.8	0.68	29.2	23.6	-1.74	188.4	157.0	155.1	126.6	58.0
2001	2011	120	42.8	51.7	1.59	25.6	20.7	-1.76	210.5	156.9	165.9	122.8	65.8
2003	2011	134	42.0	50.4	1.53	28.0	25.3	-0.83	207.8	155.5	171.8	127.9	59.0
2005	2011	143	46.8	51.5	0.80	29.2	26.6	-0.76	188.4	156.7	155.1	129.4	59.4

Supplementary Notes

Supplementary Note 1: Top gasoline consumers

Using a list based on the top 20 gasoline consumers, Supplementary Figure 1 shows a comparison of retail gasoline prices in 2015 versus the change in gasoline consumption from 2003 to 2012, in thousands of barrels per day (note that 2012 is the latest year in which the EIA provides annual gasoline consumption data by country). With the exception of the United States, countries in which gasoline consumption has declined tend to have the highest gasoline prices (France, Germany, Italy, UK). With the exception of South Korea, countries in which gasoline consumption has increased tend to have relatively low gasoline prices. Among these latter fourteen countries, five are persistent subsidizers while five have prices within \$1/L of the benchmark average.

Supplementary Note 2: Alternate benchmark

Our main findings are robust to the use of an alternative benchmark: over-time changes in net implicit taxes in both absolute and *ad valorem* terms are substantively similar when employing different pre-tax gasoline benchmark prices. This is primarily due to the high correlation in changes over time across different raw supply costs (different crude oil blends) and across different marginal costs (different refining margins).

As an alternate benchmark, we use a WTI-based blend of gasoline — as opposed to a Brent-based blend, as used in the main text — using the spot price for conventional refined gasoline along the U.S. Gulf Coast as reported by the EIA. This refers to spot contracts for delivery of refined gasoline in any port city along the coastline of Texas and Louisiana.

Implicit taxes in terms of the difference between local price and a supply cost based on a WTI-based blend of gasoline have increased 22.5% from the first half of 2003 to the first half of 2015, but have decreased 7.4% or a CAGR of -0.6% when weighted by gasoline consumption share. The WTI-based benchmark increased 38.3% during this period. Supplementary Figure 3 shows the

global mean tax over time using this alternative benchmark.

Taxes as a percentage of supply cost using a WTI-based blend have declined from 210% in the first half of 2003 to 198% in the first half of 2015. If prices are weighted by gasoline consumption share, implicit taxes as a percentage of supply cost have declined from 172% in the first half of 2003 to 149% in the first half of 2015, a CAGR decline of 1.2%. Supplementary Figure 4 shows the global mean tax as a percentage of supply cost over time using this alternative benchmark (compared to Supplementary Figure 2, which shows the tax as a percentage of the Brent-based blend used in the main text).

The list of persistent subsidizers in the main text also remains unchanged when using a WTI-based blend of gasoline instead of a Brent-based blend.