



# Fiscal Affairs Department

## Policies for Implementing the Paris Mitigation Pledges

IAN PARRY

Fiscal Affairs Department, IMF

IAEE Conference, Plenary on Climate Policy, Groningen

June 10-13, 2018



# Mitigation Commitments for Paris: G20 Countries

Country	Mitigation pledge: Reduce...	2014		
		Share (%) of global CO <sub>2</sub>	Tons CO <sub>2</sub> /\$1000 GDP	Tons CO <sub>2</sub> per capita
Argentina	GHGs 15% below BAU in 2030	0.6	0.28	4.5
Australia	GHGs 26-28% below 2005 by 2030	1.2	0.23	15.8
Brazil	GHGs 37% below 2005 by 2025	1.5	0.37	2.3
Canada	GHGs 30% below 2005 by 2030	1.8	0.34	16.6
China	CO <sub>2</sub> /GDP 60-65% below 2005 by 2030	27.9	0.14	6.6
France	GHGs 40% below 1990 by 2030	0.9	0.14	4.4
Germany	GHGs 40% below 1990 by 2030	2.2	0.26	8.9
India	GHG/GDP 33-35% below 2005 by 2030	6.2	0.02	1.6
Indonesia	GHGs 29% below BAU in 2030	1.4	0.00	1.8
Italy	GHGs 40% below 1990 by 2030	1.0	0.21	5.3
Japan	GHGs 25% below 2005 by 2030	3.6	0.00	9.3
Korea	GHGs 37% below BAU in 2030	1.7	0.00	11.1
Mexico	GHGs 25% below BAU in 2030	1.3	0.03	3.5
Russia	GHGs 25-30% below 1990 by 2030	4.5	0.02	10.2
Saudi Arabia	GHGs 130 mn tons below BAU by 2030	1.5	0.20	16.0
South Africa	GHGs to 398-614 mn tons in 2025 and 2030	1.4	0.15	8.3
Turkey	GHGs up to 21% below BAU by 2030	0.9	0.21	3.8
United Kingdom	GHGs 40% below 1990 by 2030	1.3	0.23	6.3
United States	GHGs 26-28% below 2005 by 2025	16.0	0.32	16.3

Source. UNFCCC, IEA.

# Current Pricing: Global Price \$1/ton

Government	year introduced	Price 2017, US\$/ton CO2	Coverage, % of GHGs	Government	year introduced	Price 2017, US\$/ton CO2	Coverage, % of GHGs
<b>CARBON TAXES</b>				<b>CARBON TAXES</b>			
Br. Columbia	2008	24	70	South Africa	2016	10	80
Chile	2014	5	55	Sweden	1991	140	42
Colombia	2016	5	40	Switzerland	2008	87	33
Denmark	1992	27	45	UK	2013	24	25
Finland	1990	69-73	15	<b>TRADING SYSTEMS</b>			
France	2014	36	35	Alberta	2007	24	45
Iceland	2010	12	50	California	2012	15	85
Ireland	2010	24	40	EU	2005	6	45
Japan	2012	3	66	Kazakhstan	2013	2	50
Mexico	2014	1-4	46	Korea	2015	18	68
Norway	1991	56	50	N. Zealand	2008	13	52
Portugal	2015	8	25	RGGI	2009	4	21



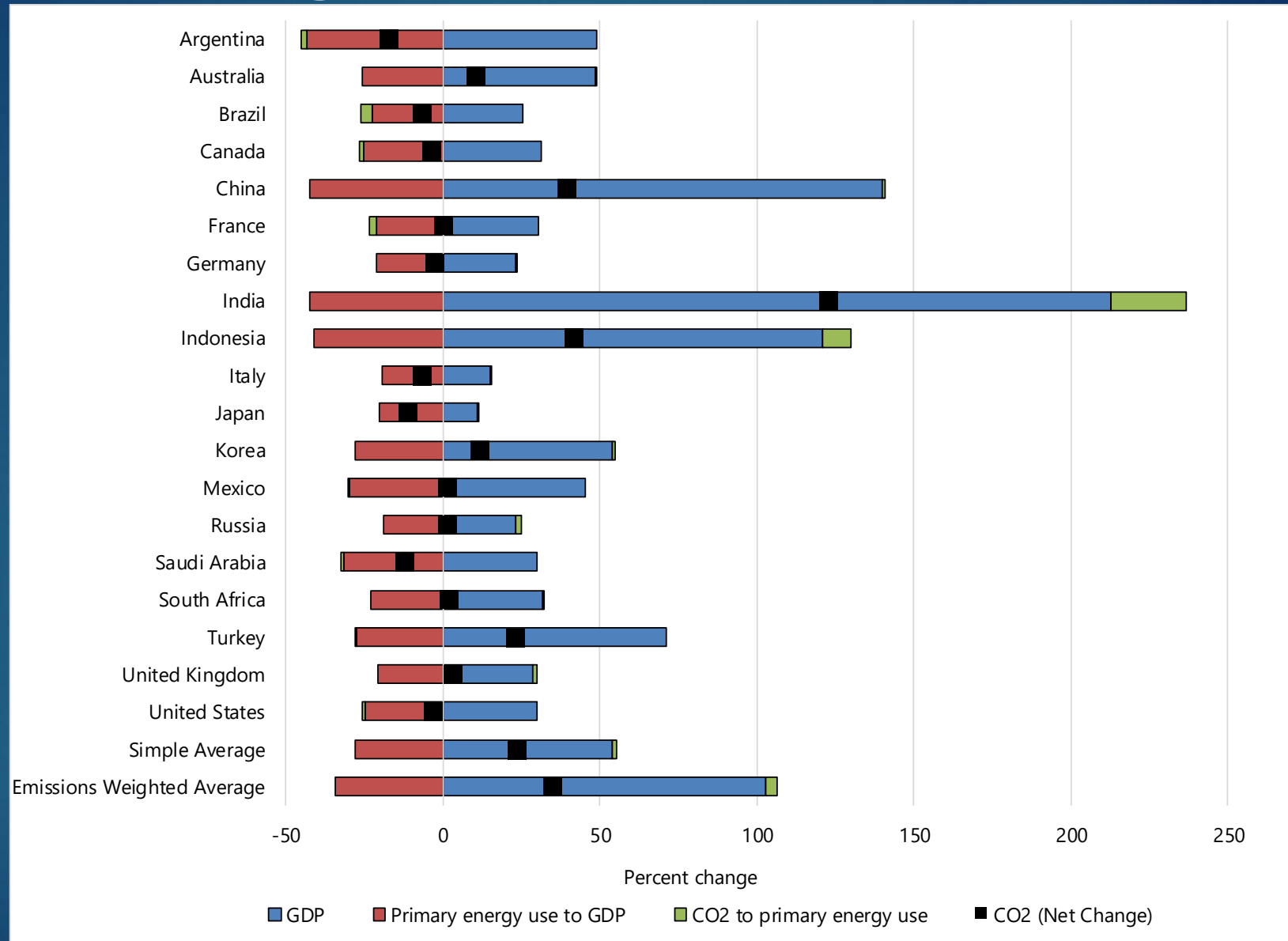
# Implementing Mitigation Commitments

- ▶ Policymakers need information on
  - ▶ Emissions, fiscal, economic impacts of carbon pricing; trade-offs with other instruments
  - ▶ International level informs dialogue on revisions to pledges
- ▶ Existing modelling useful though
  - ▶ Not always transparent, difficult replicate across countries or compare broad range of policies/metrics

# IMF Spreadsheet Model for Individual Countries

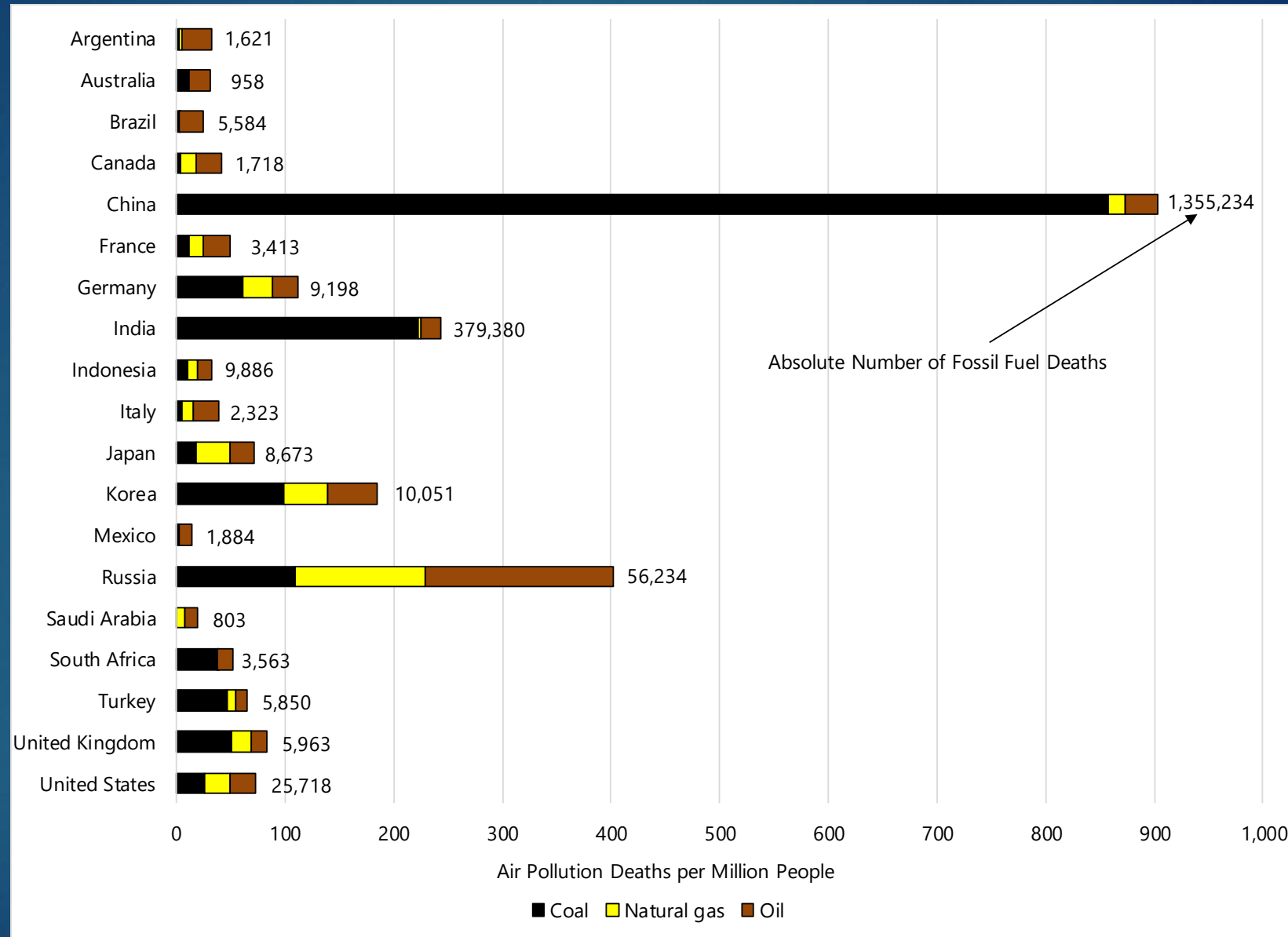
- ▶ Power, road transport, households, industry (from IEA)
  - ▶ Country projections using GDP, inc. elasts., tech. change, prices
- ▶ Policy impacts depend on elasticities
  - ▶ Set to mimic more sophisticated models/evidence
- ▶ Analysis is transparent
  - ▶ Wide range of countries/policies/metrics
- ▶ Caveats: simplifications and parameter uncertainty

# % Change in BAU CO<sub>2</sub>, 2015-2030



Source. IMF spreadsheet model.

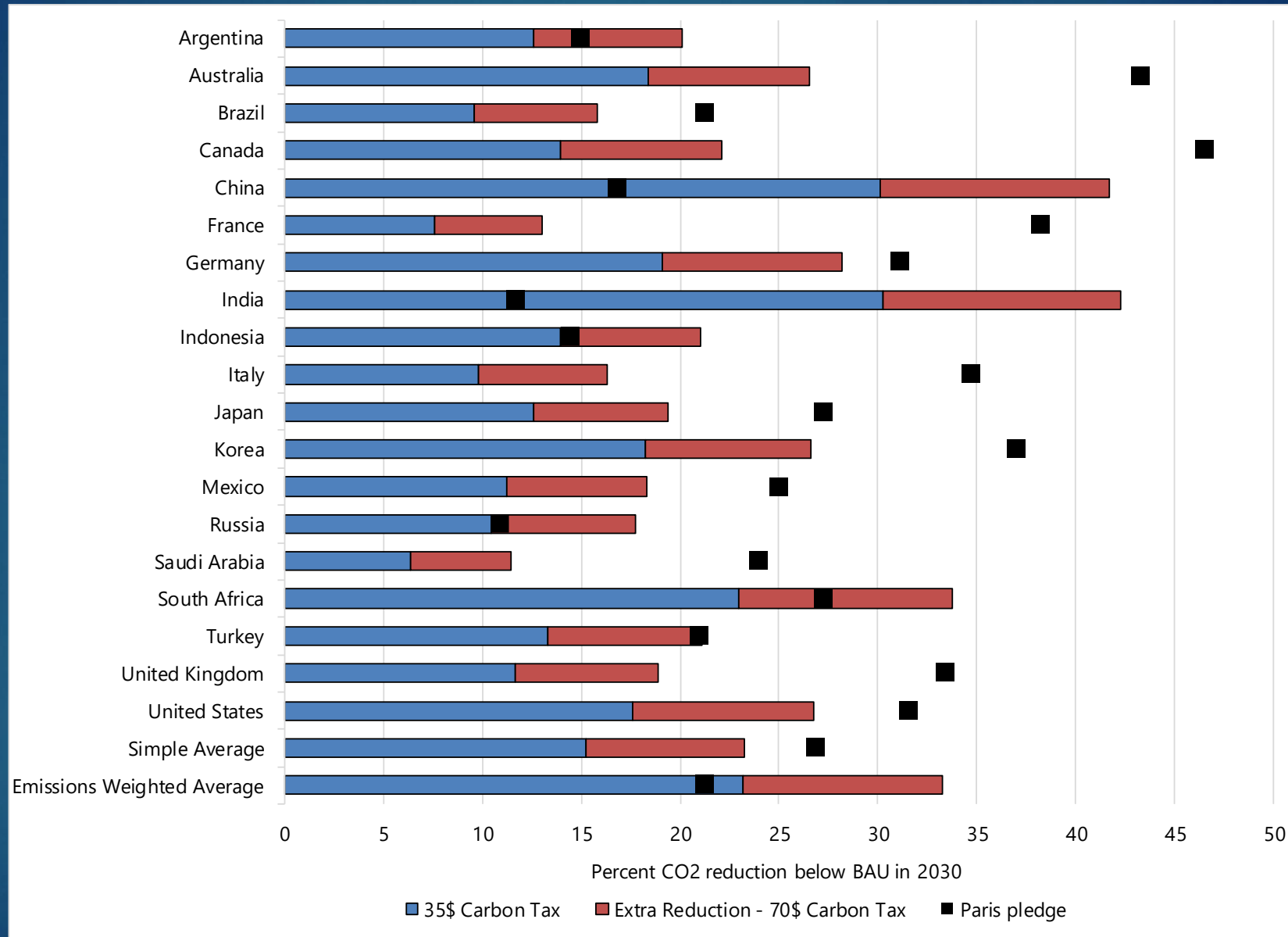
# BAU Outdoor Air Pollution Death Rates from Fuels, 2030



Source. IMF spreadsheet model.



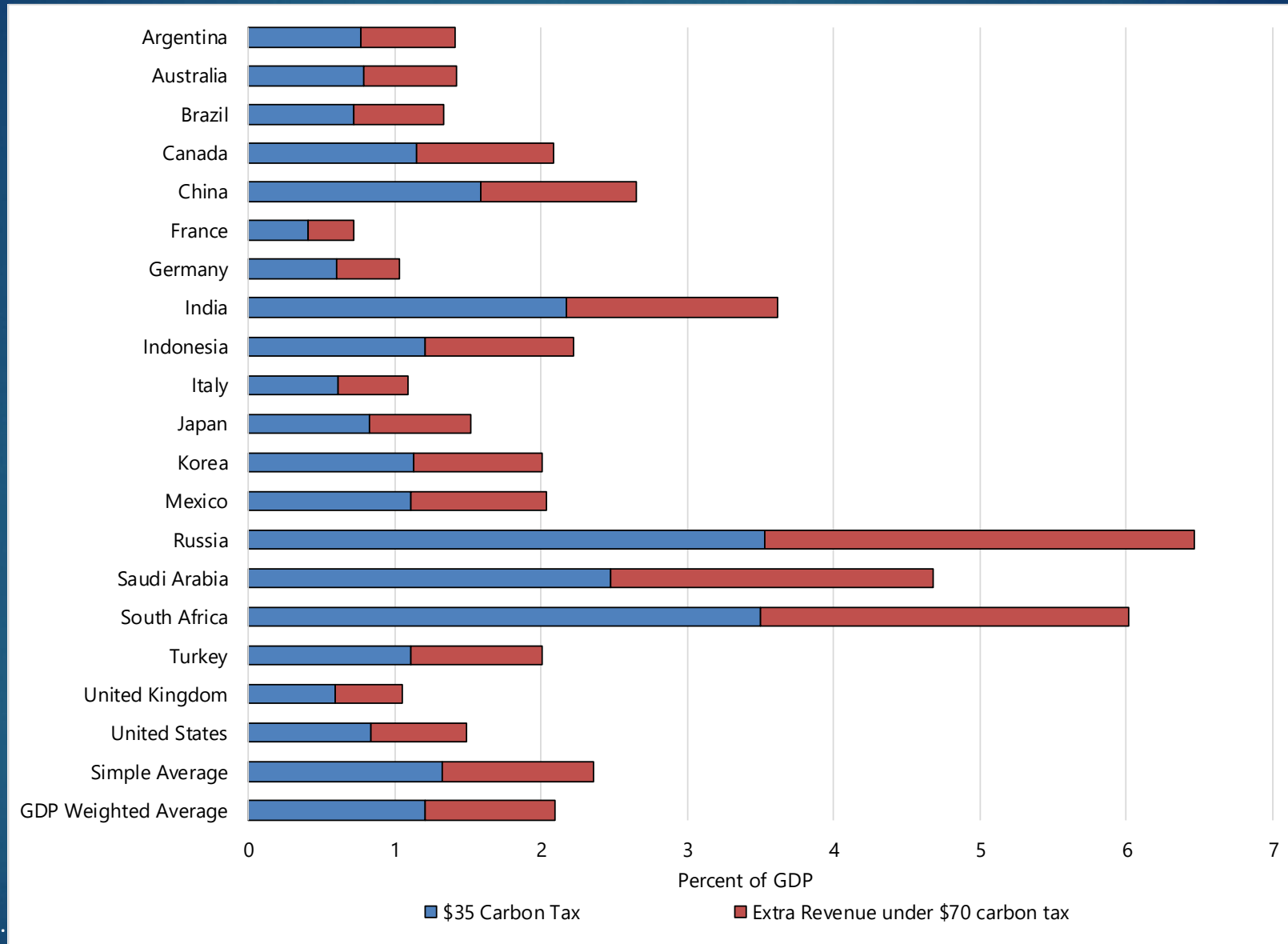
# % Reduction in CO<sub>2</sub> from Carbon Taxes, 2030



Source. IMF spreadsheet model.

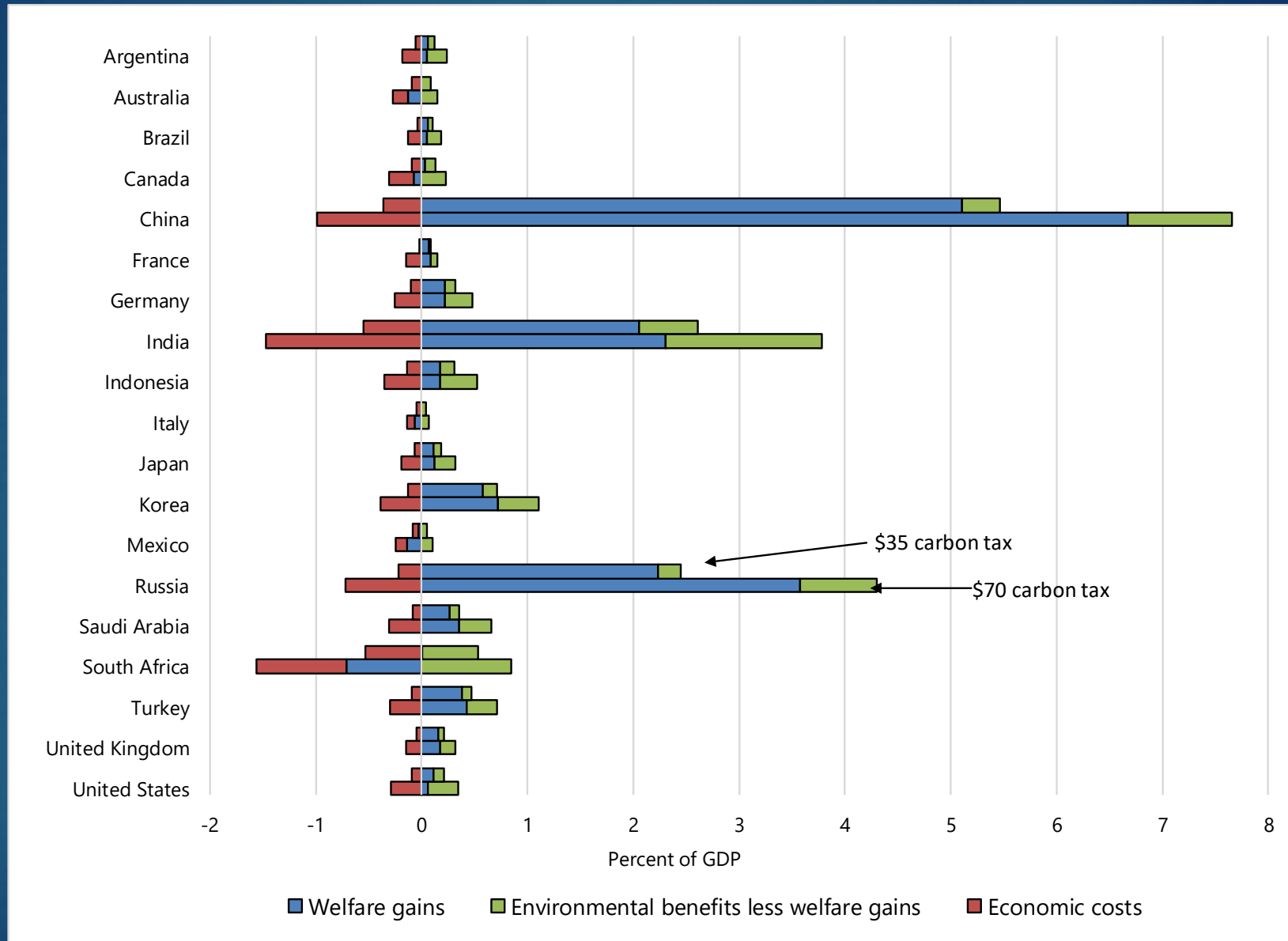


# Revenue (% GDP) from Carbon Taxes, 2030



Source. IMF spreadsheet model.

# Dom. Welfare Effect (% GDP) of Carbon Taxes, 2030



Source. IMF spreadsheet model.

# CO<sub>2</sub> Impact of Other Policies Rel. to Carbon Tax, 2030

Country	Coal tax	ETS	Electricity output tax	Electricity CO <sub>2</sub> tax	Road fuel taxes	Energy efficiency combination
Argentina	0.09	0.48	0.19	0.44	0.05	0.38
Australia	0.77	0.79	0.36	0.77	0.03	0.29
Brazil	0.35	0.45	0.04	0.39	0.15	0.33
Canada	0.24	0.39	0.03	0.35	0.06	0.34
China	0.95	0.70	0.20	0.64	0.01	0.28
France	0.28	0.27	0.00	0.22	0.05	0.39
Germany	0.76	0.76	0.18	0.74	0.01	0.22
India	0.95	0.89	0.36	0.86	0.01	0.25
Indonesia	0.65	0.74	0.32	0.69	0.06	0.32
Italy	0.34	0.58	0.15	0.55	0.04	0.30
Japan	0.67	0.60	0.25	0.55	0.02	0.35
Korea	0.84	0.74	0.24	0.71	0.00	0.26
Mexico	0.18	0.56	0.35	0.52	0.06	0.41
Russia	0.28	0.48	0.18	0.46	0.02	0.36
Saudi Arabia	0.00	0.59	0.38	0.51	0.07	0.44
South Africa	0.95	0.65	0.46	0.62	0.03	0.42
Turkey	0.60	0.58	0.25	0.53	0.01	0.36
United Kingdom	0.51	0.56	0.17	0.54	0.02	0.32
United States	0.54	0.68	0.25	0.66	0.06	0.30

Source. IMF spreadsheet model.

# Revenue from Other Policies Rel. to Carbon Tax, 2030

Country	Coal tax	ETS	Electricity output tax	Electricity CO2 tax	Road fuel taxes	Energy efficiency combination
Argentina	0.02	0.34	0.29	0.28	0.19	-0.001
Australia	0.24	0.41	0.41	0.36	0.19	-0.001
Brazil	0.08	0.23	0.15	0.14	0.33	-0.004
Canada	0.07	0.14	0.11	0.11	0.24	-0.001
China	0.67	0.42	0.29	0.23	0.09	0.000
France	0.13	0.07	0.03	0.03	0.23	-0.001
Germany	0.28	0.25	0.26	0.22	0.15	0.000
India	0.63	0.62	0.64	0.48	0.12	0.000
Indonesia	0.17	0.38	0.34	0.31	0.20	-0.001
Italy	0.12	0.27	0.25	0.24	0.20	-0.001
Japan	0.21	0.49	0.43	0.41	0.12	0.000
Korea	0.33	0.42	0.44	0.38	0.06	0.000
Mexico	0.05	0.33	0.30	0.29	0.22	-0.001
Russia	0.11	0.37	0.36	0.35	0.07	0.000
Saudi Arabia	0.00	0.52	0.44	0.43	0.08	0.000
South Africa	0.76	0.55	0.50	0.47	0.14	-0.001
Turkey	0.21	0.40	0.38	0.36	0.10	0.000
United Kingdom	0.21	0.25	0.24	0.22	0.15	0.000
United States	0.18	0.31	0.32	0.29	0.27	-0.002

Source. IMF spreadsheet model.



# Concluding

- ▶ Strong envir./fiscal/economic advantage of carbon taxes →
  - ▶ Tax should be centerpiece/unilateral action can be in own interest
- ▶ High carbon prices needed to meet pledges →
  - ▶ complementary policies needed to increase effectiveness (e.g., R&D, infrastructure for renewables and EVs)
- ▶ Wide cross-country dispersion in needed prices →
  - ▶ need for carbon price floor arrangement
  - ▶ trading of mitigation credits (ITMOs) could encourage participation