
# Energy Price Reform: A Guide for Policymakers

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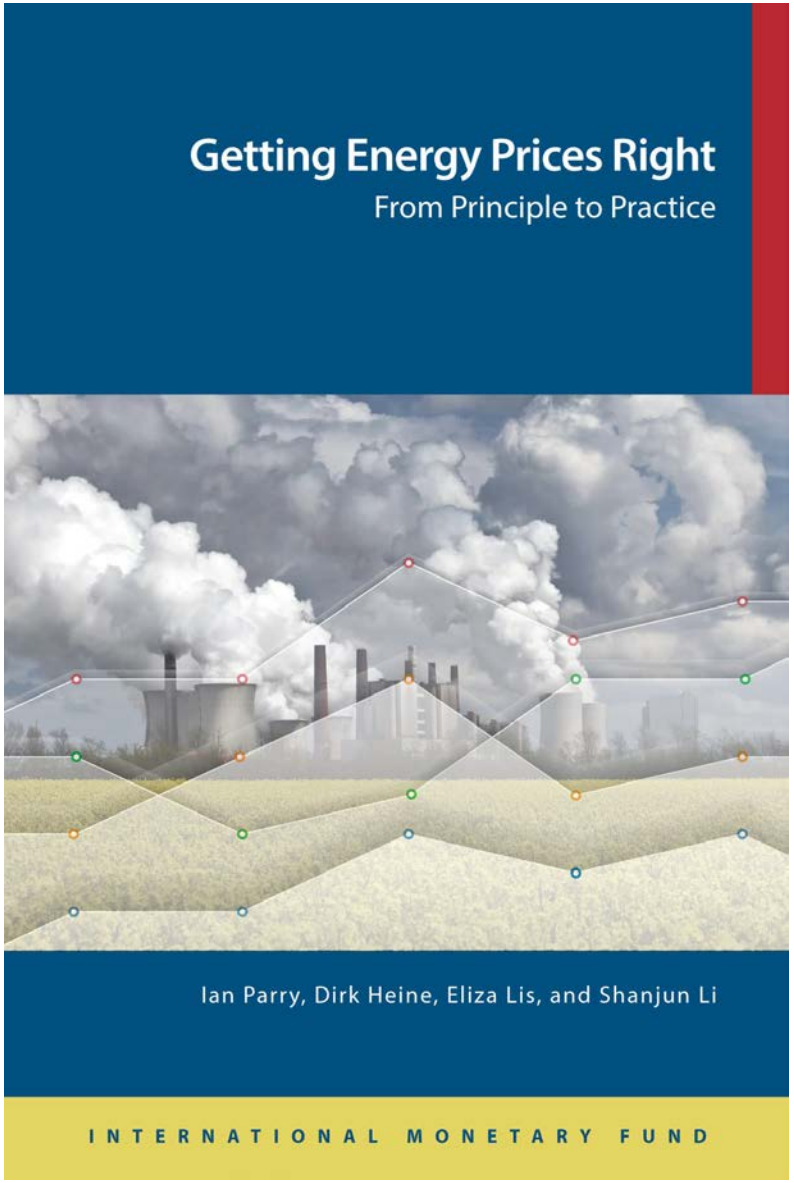
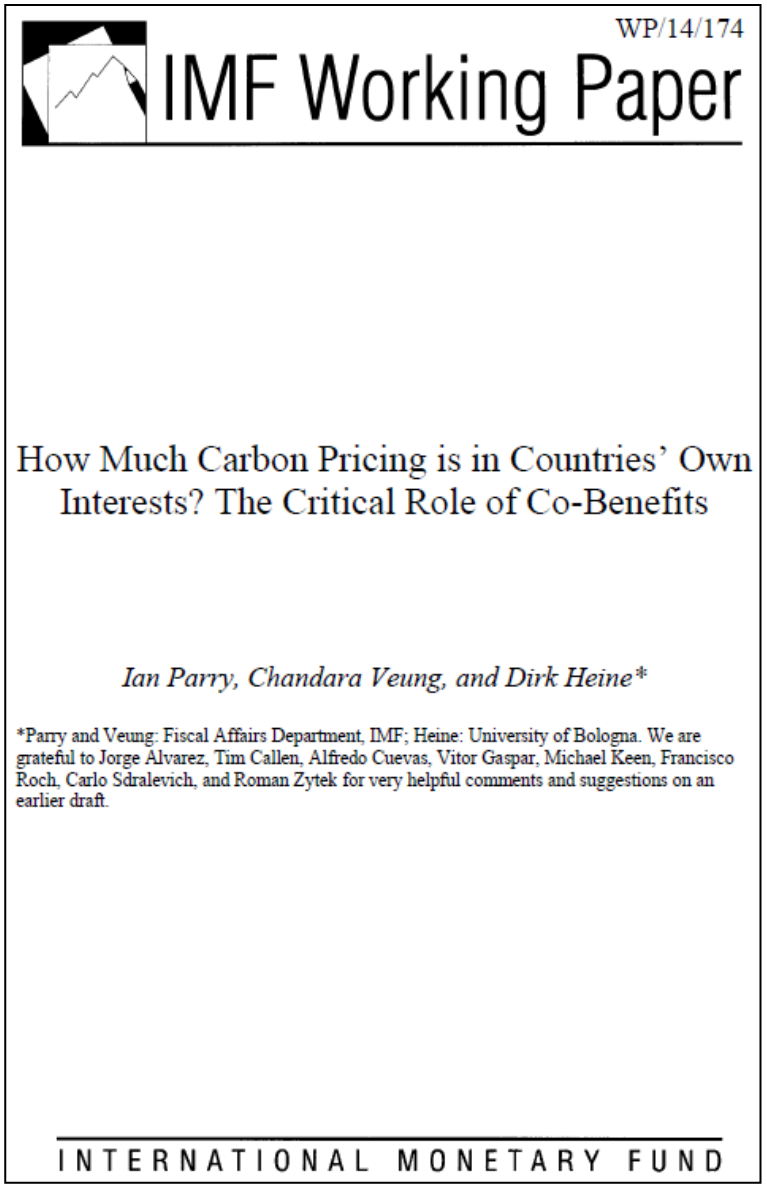
Environmental Defense Fund, February 26, 2015

# Plan of Talk

- Major externalities and designing fiscal policies to address them
- Measuring externalities
- Corrective tax estimates
- Implications for carbon pricing

# Based On


Getting Energy Prices Right
From Principle to Practice
Ian Parry, Dirk Heine, Eliza Lis, and Shanjun Li
INTERNATIONAL MONETARY FUND


WP/14/174
IMF Working Paper
How Much Carbon Pricing is in Countries' Own Interests? The Critical Role of Co-Benefits
Ian Parry, Chandara Veung, and Dirk Heine*
*Parry and Veung: Fiscal Affairs Department, IMF; Heine: University of Bologna. We are grateful to Jorge Alvarez, Tim Callen, Alfredo Cuevas, Vitor Gaspar, Michael Keen, Francisco Roch, Carlo Sdralevich, and Roman Zytek for very helpful comments and suggestions on an earlier draft.
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# Major Externalities and How to Address Them

# Major Environmental Problems

- Carbon emissions
  - projected warming 3-4$^{O}$C by 2100 (with tail risks)
- Local (outdoor) air pollution
  - > 3 million premature deaths a year
- Road congestion/accidents
  - London motorists impose congestion cost of $40/gal.
  - accidents cause 1.2 million deaths
- Other externalities beyond our scope:
  - opaque (e.g., energy security, indoor air pollution)
  - smaller in magnitude (e.g., oil spills)

# Fiscal Instruments must be Center Stage

- Effective
  - if targeted at the right base
- Cost effective
  - if revenues used productively
- Balance environmental benefits and costs
  - if tax rates aligned with external costs
- Fiscal policies should have three elements…

# 1. Fuel Charges for Carbon Emissions

- = $CO_2$ damage/ton × $CO_2$ emissions factor
  - e.g., straightforward extension of motor fuel excises

- Or price emissions (but administration more complex)

# 2. Charges for Local Air Emissions

- Problem is fine particulates
  - produced directly
  - indirectly from $SO_2$, $NO_x$

- = damage/ton × emissions factor (summed over emissions)
  - with rebates for control technologies
  - or price emissions (if administration feasible)

# 3. Charges for Congestion, Accidents

- Excessive because motorists do not consider
  - congestion costs
  - pedestrian injuries, property damage, etc.

- Ideal policy: mileage-based charges
  - for busy roads (congestion)
  - varying with driver risks (accidents)
  - on axle weight of trucks (road damage)

- Interim: reflect externalities in fuel taxes
  - but reduce ~50% (mileage portion of fuel response)

# Other Policies…

- …are needed, such as:
  - public infrastructure investments
  - for related market failures (e.g., technology spillovers)

- But should not detract from getting prices right
  - corrective taxes may yield biggest welfare gains
  - other policies don't affect efficient energy taxes

# Measuring Externalities

# Uncertainties/Controversies

- No ‘correct’ tax all should agree on but
  - provide transparent framework
  - accommodates different views (disciplines debate)
  - robust direction for reform
  - spreadsheet tool for sensitivity analysis

# Damages from Carbon

- $35/ton $CO_2$ (US govt.)
  - recent EU ETS prices < $10/ton

# Air Pollution Damages from Coal

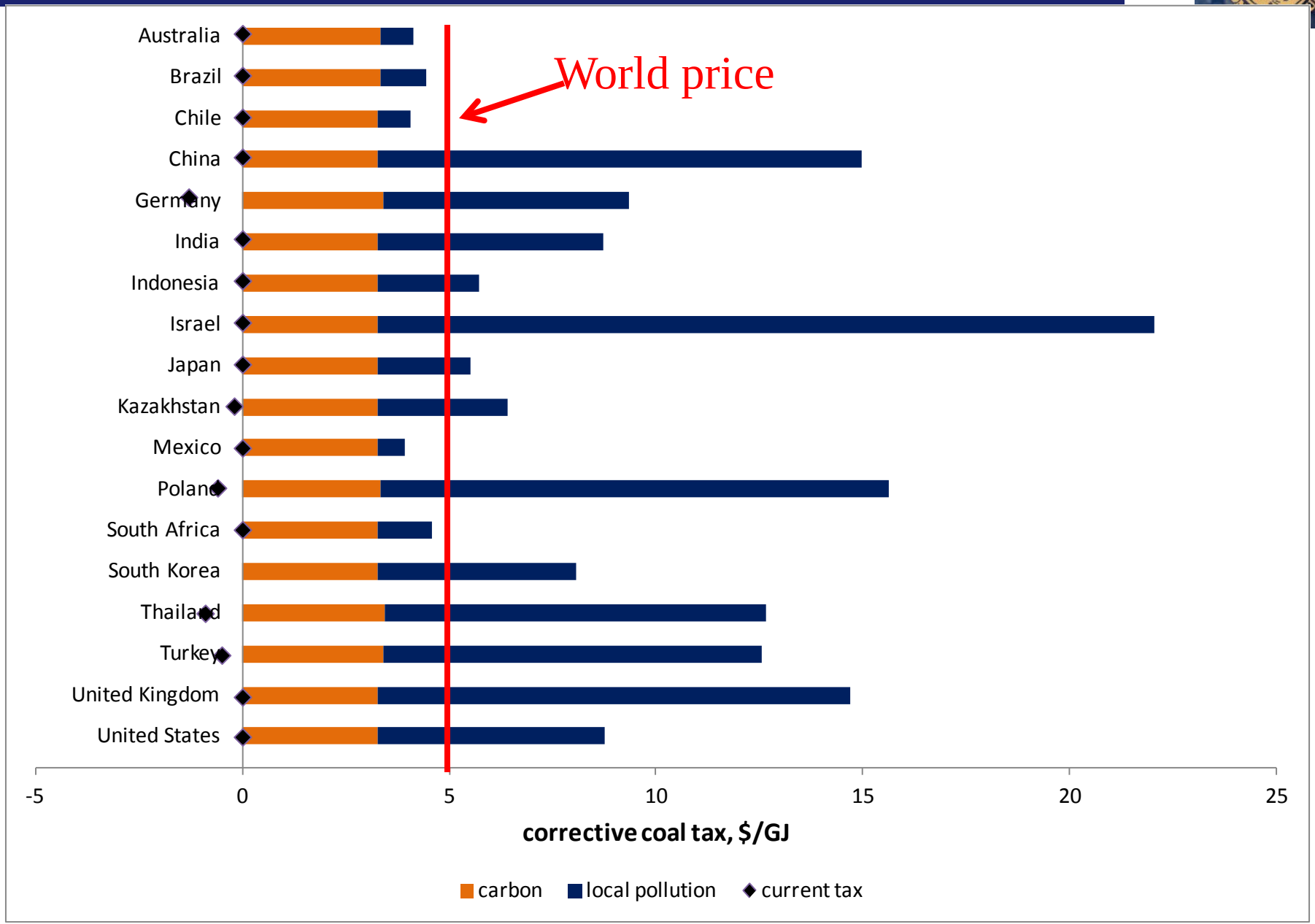
- Population exposure
  - power plant location → number of people in proximity
- Exposure → mortality risk
  - evidence from Global Burden of Disease
- Monetize health effects
  - evidence on inc. elast. of VSL (OECD)
- Damage per unit of fuels
  - country-specific emissions factors

# Congestion

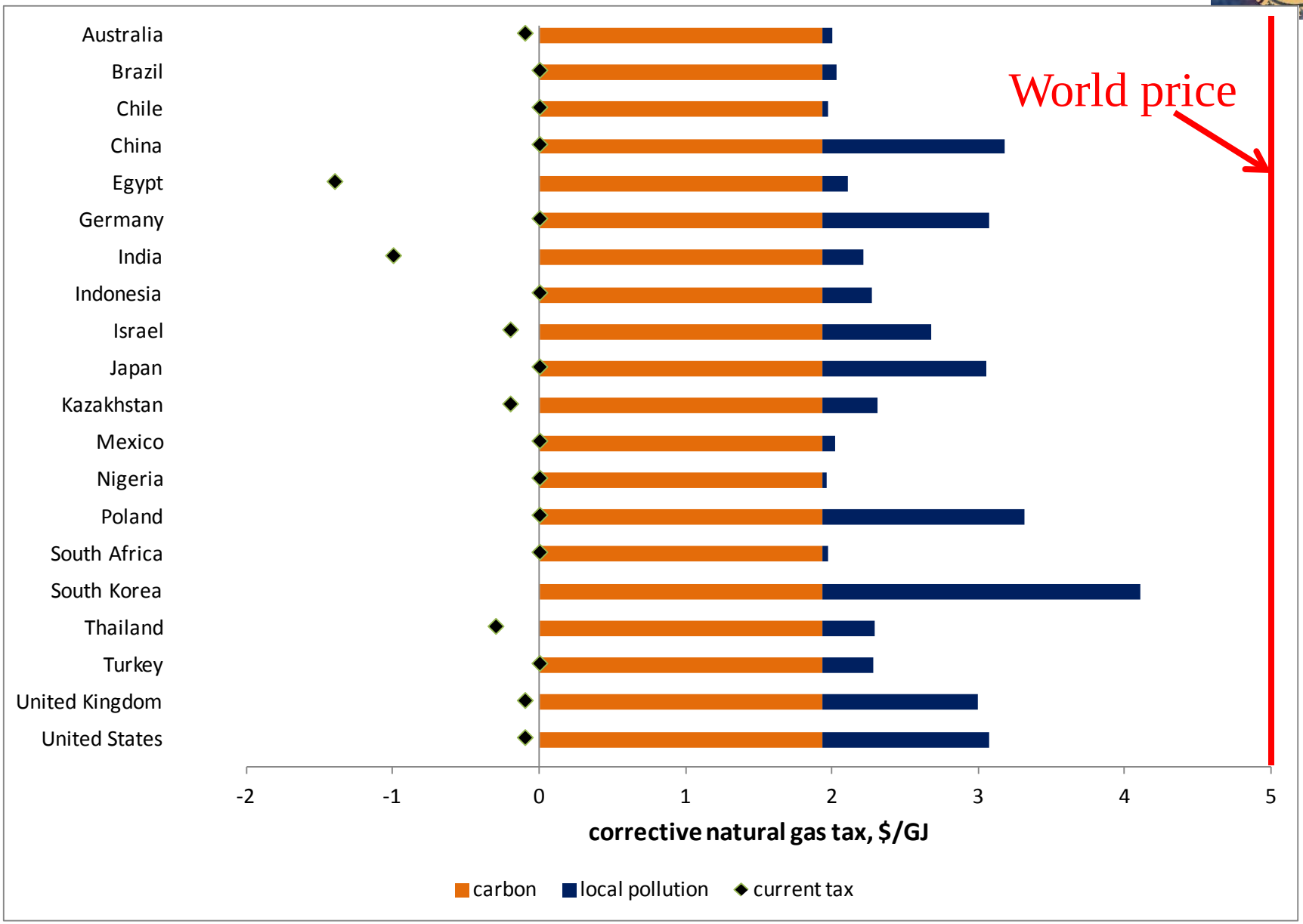
- Nationwide average travel delays extrapolated
  - city-level database → average delay = F( transportation indicators)
- Average delay → marginal delay
  - functional forms from transport engineering literature
- Monetize
  - value of time = 60 percent of market wage

# Corrective Taxes

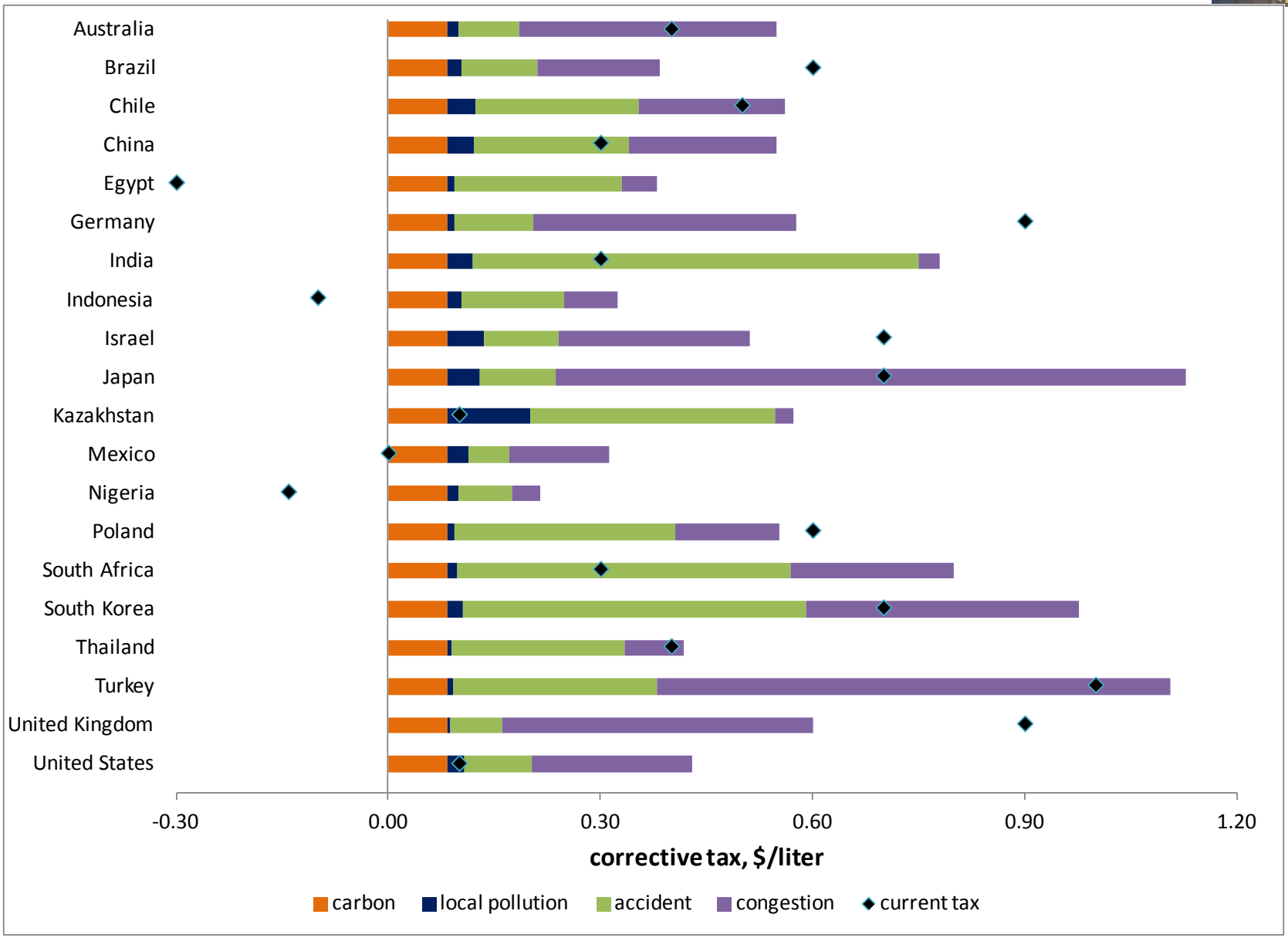
# Corrective Taxes on Coal, 2010



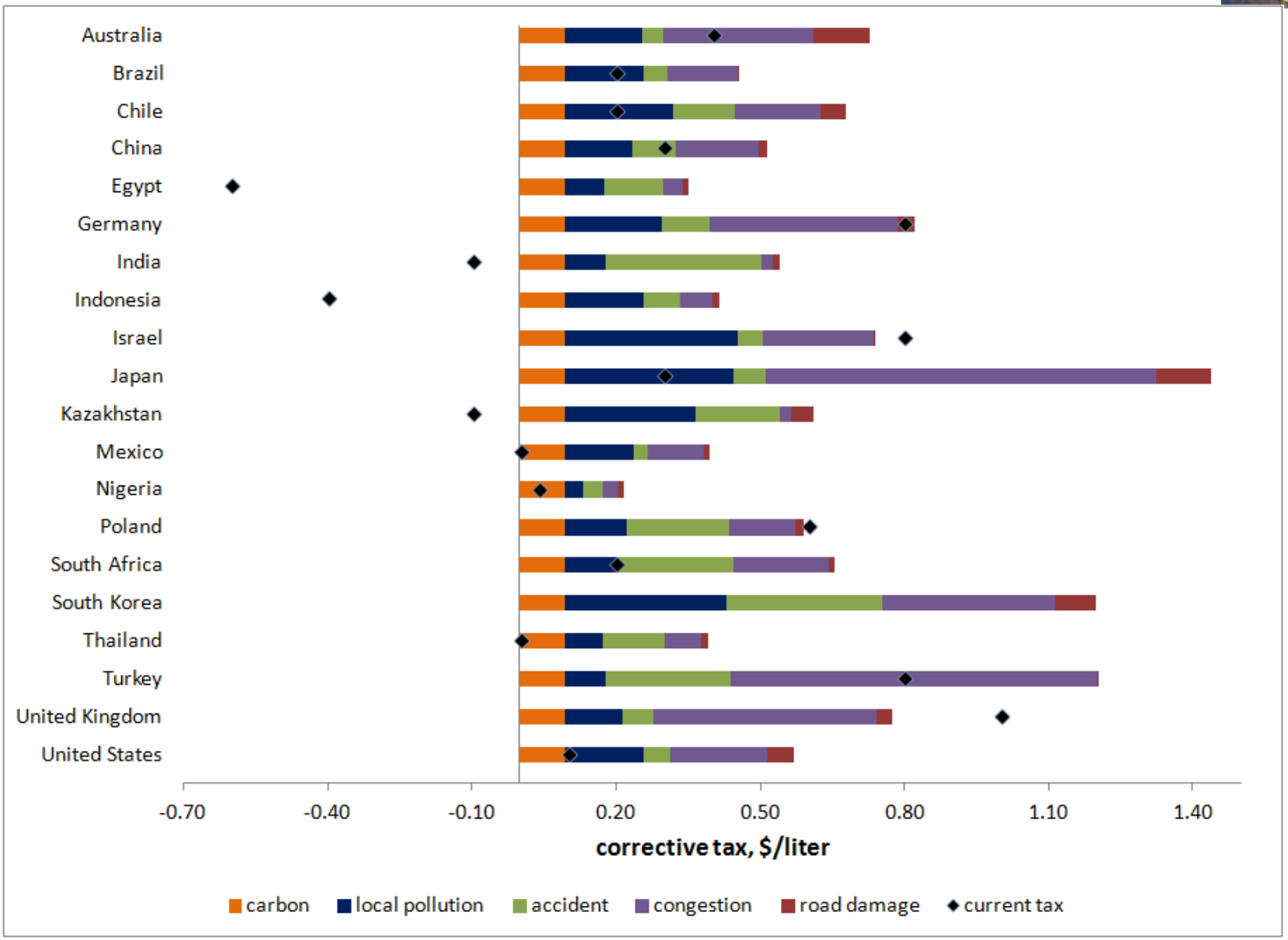
# Corrective Taxes on Natural Gas, 2010



# Corrective Taxes on Gasoline, 2010



# Corrective Taxes on Diesel, 2010



# Global Benefits from Getting Energy Prices Right

- Health
  - 63 percent reduction in air pollution deaths
- Climate
  - 23 percent reduction in $CO_2$ emissions
- Fiscal
  - 2.6 percent of GDP in new revenue

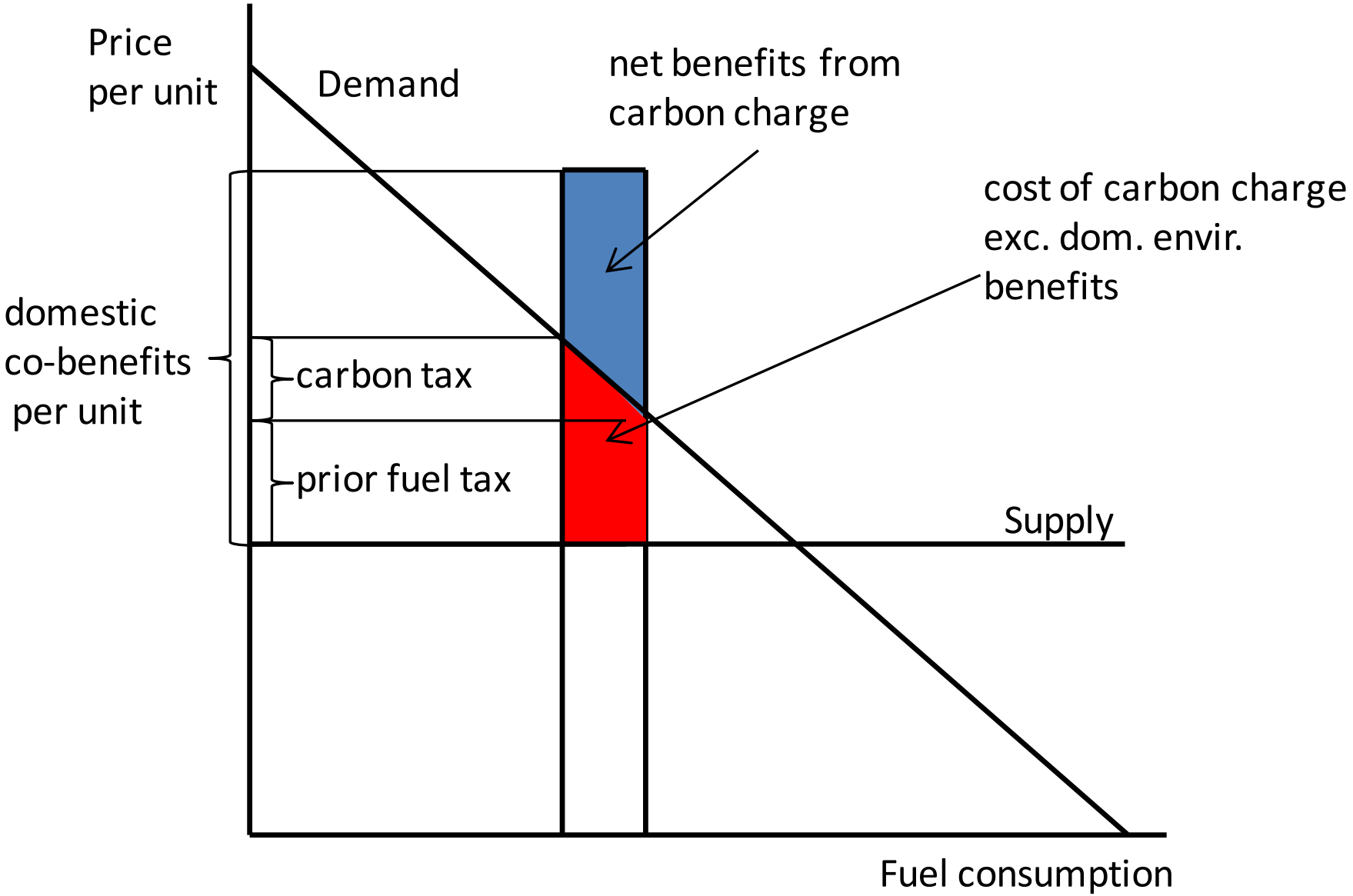
# Implications for Carbon Pricing

# If Inertia in Getting Energy Prices Right….

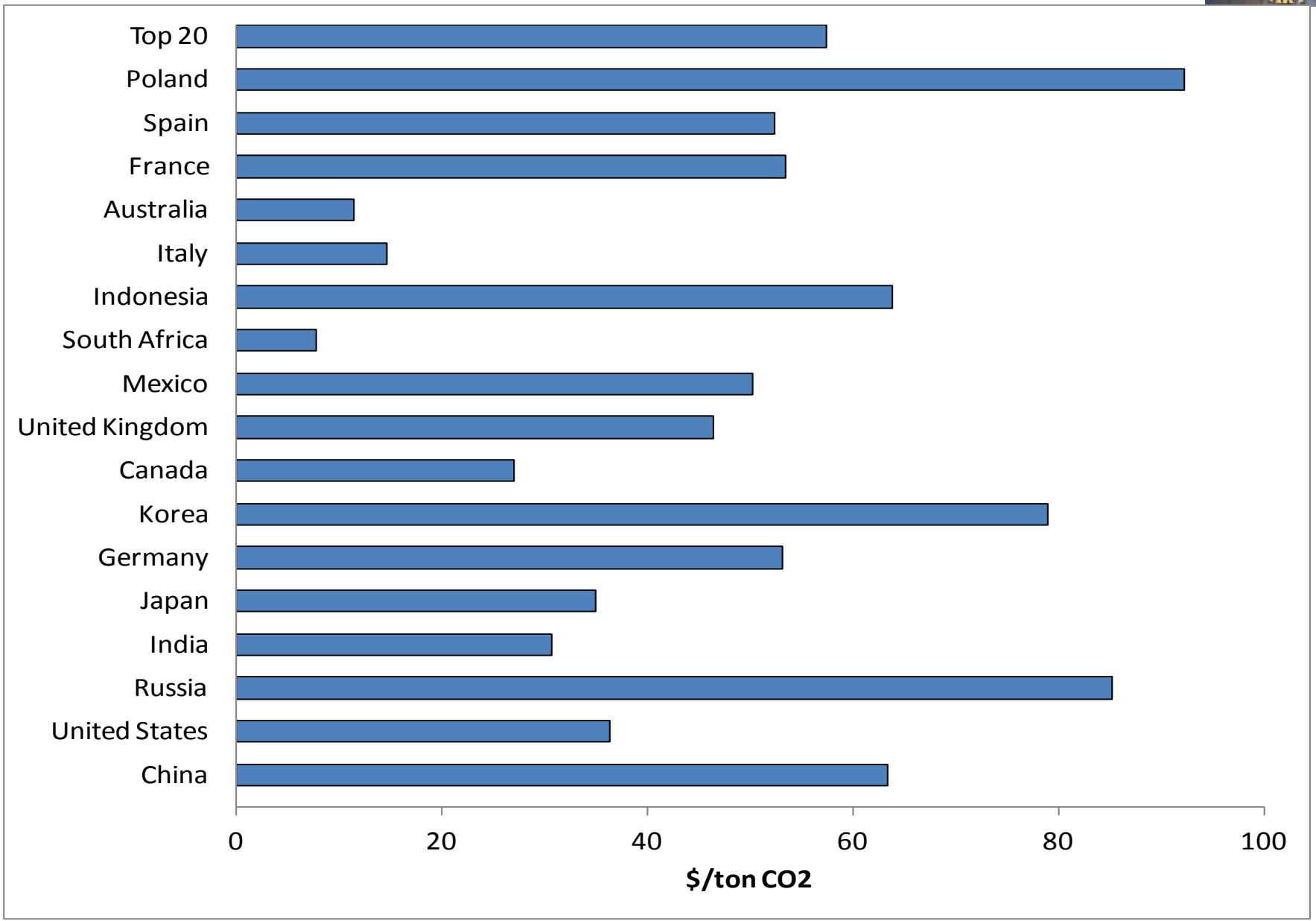
- Welfare gains from near term $CO_2$ pricing include
  - (non-internalized) domestic envir. co-benefits

- How much (second-best) carbon pricing is in countries' own national interests?

# Net Benefit from $CO_2$ Tax (Exc. Climate Benefit)



# Nationally Efficient $CO_2$ Prices from Co-Benefits



# Implications for International Agreements

- Raises questions about
  - free rider argument
  - need for international transfers for large developing country emitters
  - argument for uniform carbon pricing
  - welfare gains from differentiated vs. uniform pricing 23 percent greater
  - case for agreements over price *floors* not *levels*

# Concluding

- Finance ministries have key role
  - championing environmental taxes
  - administration
  - putting revenues to good use