US CO_2 Regulation and Competitiveness

Mun S. Ho

Resources for the Future

PIIE Workshop *A Transatlantic Perspective on the Role of Trade in Combating Climate Change*

March 4, 2009

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Outline

- Climate Bills in 110th Congress

  (RFF's *Assessing US Climate Policy Options*)

- Our short and long run estimates of effects of a carbon price on output and trade
- Other studies of output effects

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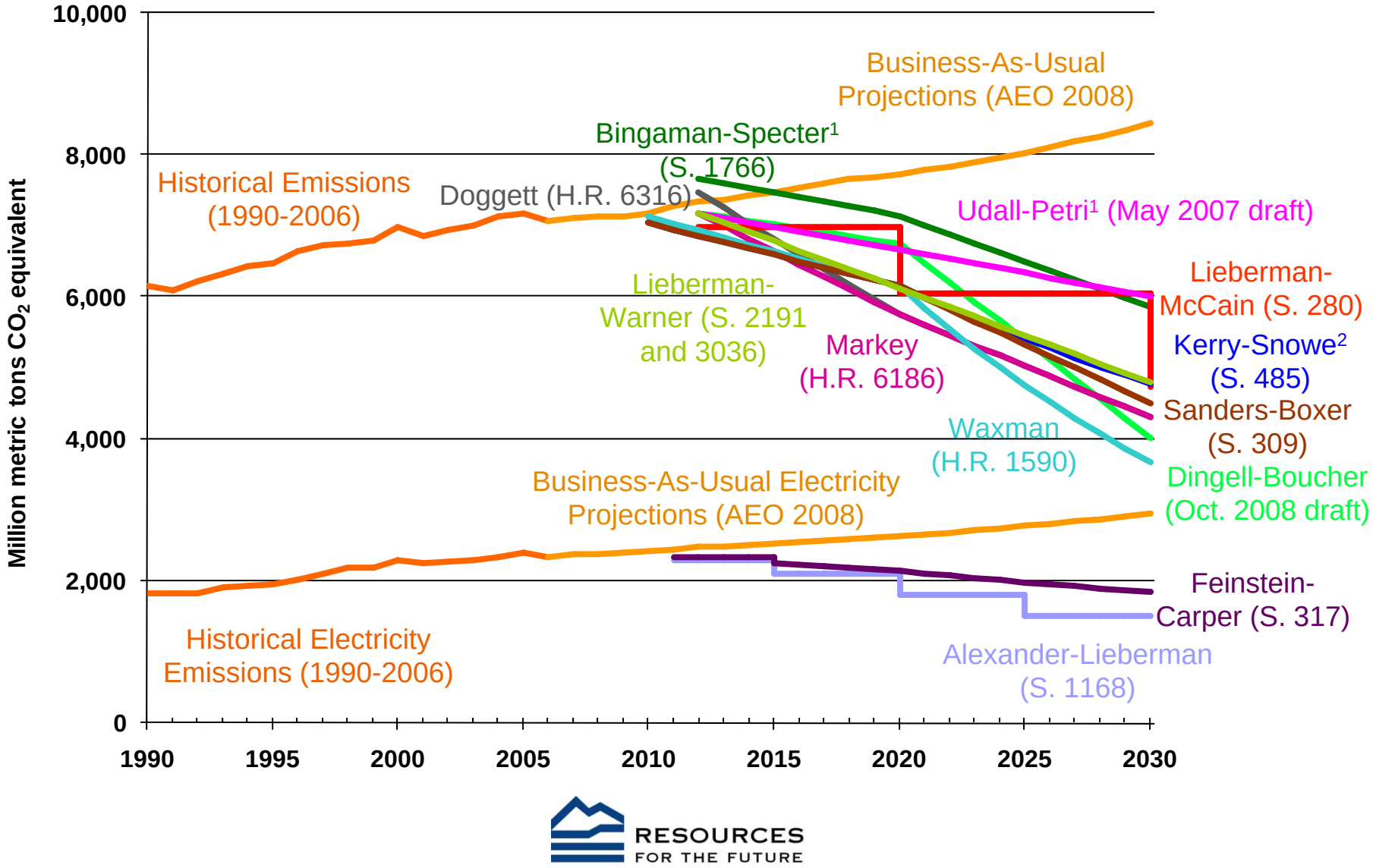
Comparison of Emission Reduction Goals in Legislative Proposals in the 110th Congress (www.rff.org/CPFreport)



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Summary of Market-Based Climate Change Bills

	Who's Regulated	...	Competitiveness
Lieberman-Warner (S. 2191)	Economywide cap: coal and process emissions at emitters; oil refiners, NG processors, and oil/NG importers; and F-gas producers and importers. HFC producers and importers have a separate cap.		Bulk, energy-intensive imports from countries w/o comparable policy require "int'l reserve" allowances" (essentially a border tax) after 2020.
S. 3036, L-W	Adds coverage of NG produced in federal waters of Alaska Outer Continental Shelf. Otherwise identical.		Allowances required starting in 2014. More imports covered, both primary products and manufactured goods.
Dingell-Boucher	Economywide cap: electric and industrial facilities at emitters; producers and importers of petroleum and F-gases; NG distributors.		Importers of emissions-intensive goods from countries w/o comparable policy must buy int'l reserve allowances.
Waxman	Economywide cap: point of regulation at discretion of EPA. (Coverage TBD by EPA.)		No provisions.
Markey	Economywide cap: electric and industrial facilities at emitters; producers and importers of petroleum and F-gases; NG distributors.		Importers of energy-intensive primary goods from countries w/o comparable policy must buy int'l reserve allowances.
Bingaman-Specter	Economywide cap: coal and some industrial emissions at emitters; oil refiners, NG processors, and oil or NG importers; and F-gas producers and importers.		Bulk, energy-intensive imports from countries w/o comparable policy require permits after 8 years.
Doggett	Economywide cap: coal and process emissions at emitters; oil refiners, NG processors, and oil/NG importers; and F-gas producers and importers.		Importers of emissions-intensive goods from countries w/o comparable policy must buy int'l reserve allowances from 2015.
Udall-Petri	Economywide cap: upstream fossil-fuel sources (e.g., producers and importers), along with industrial emissions.		Inaction by developing countries can justify delay in safety valve escalation.

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DISCUSSION PAPER

November 2008 ■ RFF DP 08-37

Impact of Carbon Price Policies on US Industry

Mun S. Ho, Richard Morgenstern, and Jhih-Shyang Shih

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Existing methodologies to estimate GHG policy effects

- ‘bottom-up’ models contain technology detail for narrowly defined industries, but do not explain prices/quantities as part of whole economy
- ‘top-down’ CGE models cover the whole economy, or even the world, and determine prices and quantities endogenously, but often do not have detailed industries.
- Short-run and long-run effects often not clearly distinguished.

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Our Study: Considers 4 different time horizons

I) Very Short Run: All quantities fixed

II) Short Run: Higher prices reduce sales and output

III) Medium Term: General Equilibrium Analysis;
Input substitution allowed; Capital Fixed

IV) Long run : General Equilibrium Analysis;
Reallocation of Capital allowed

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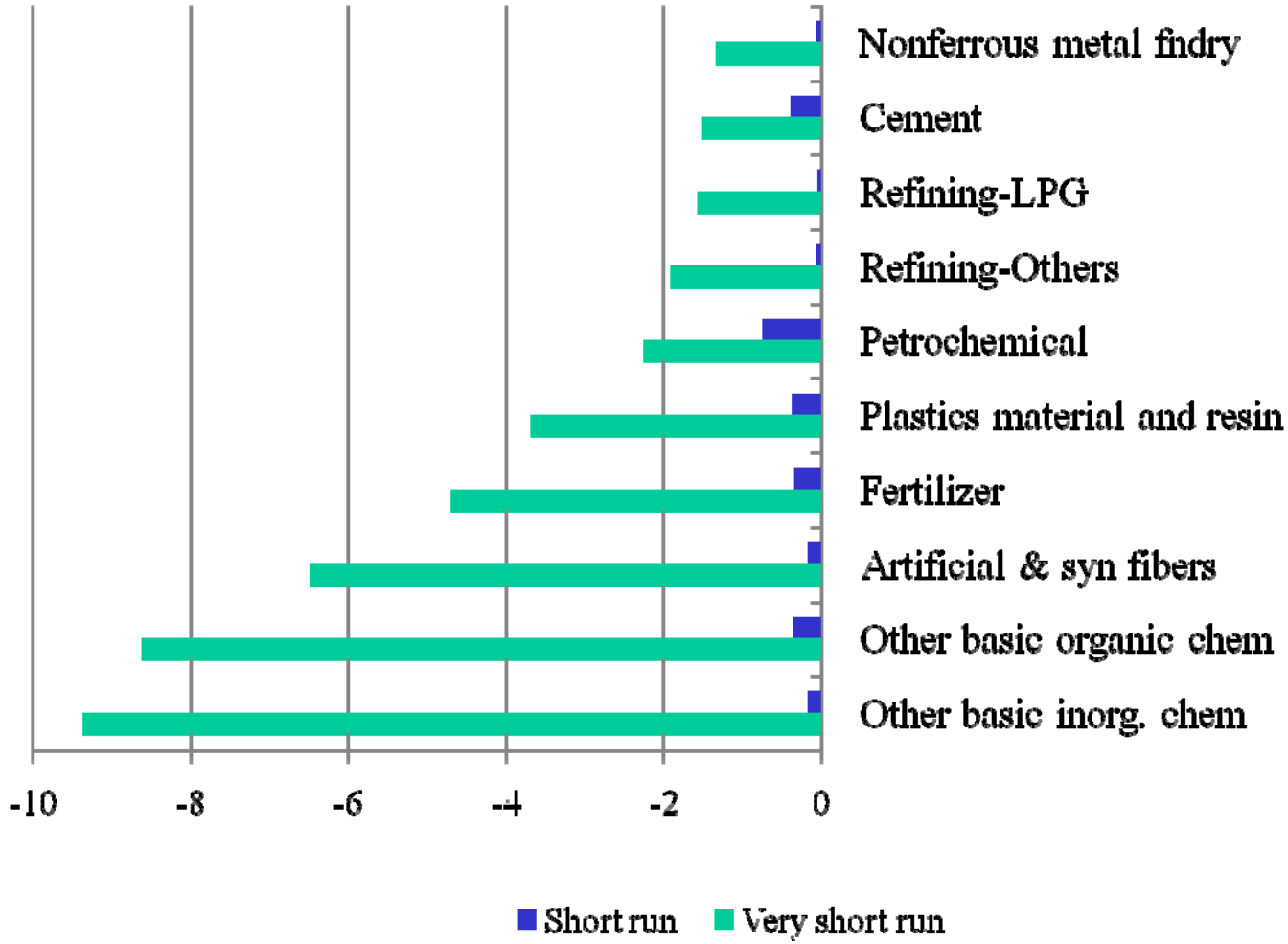
Effect on profits of $10/ton CO2



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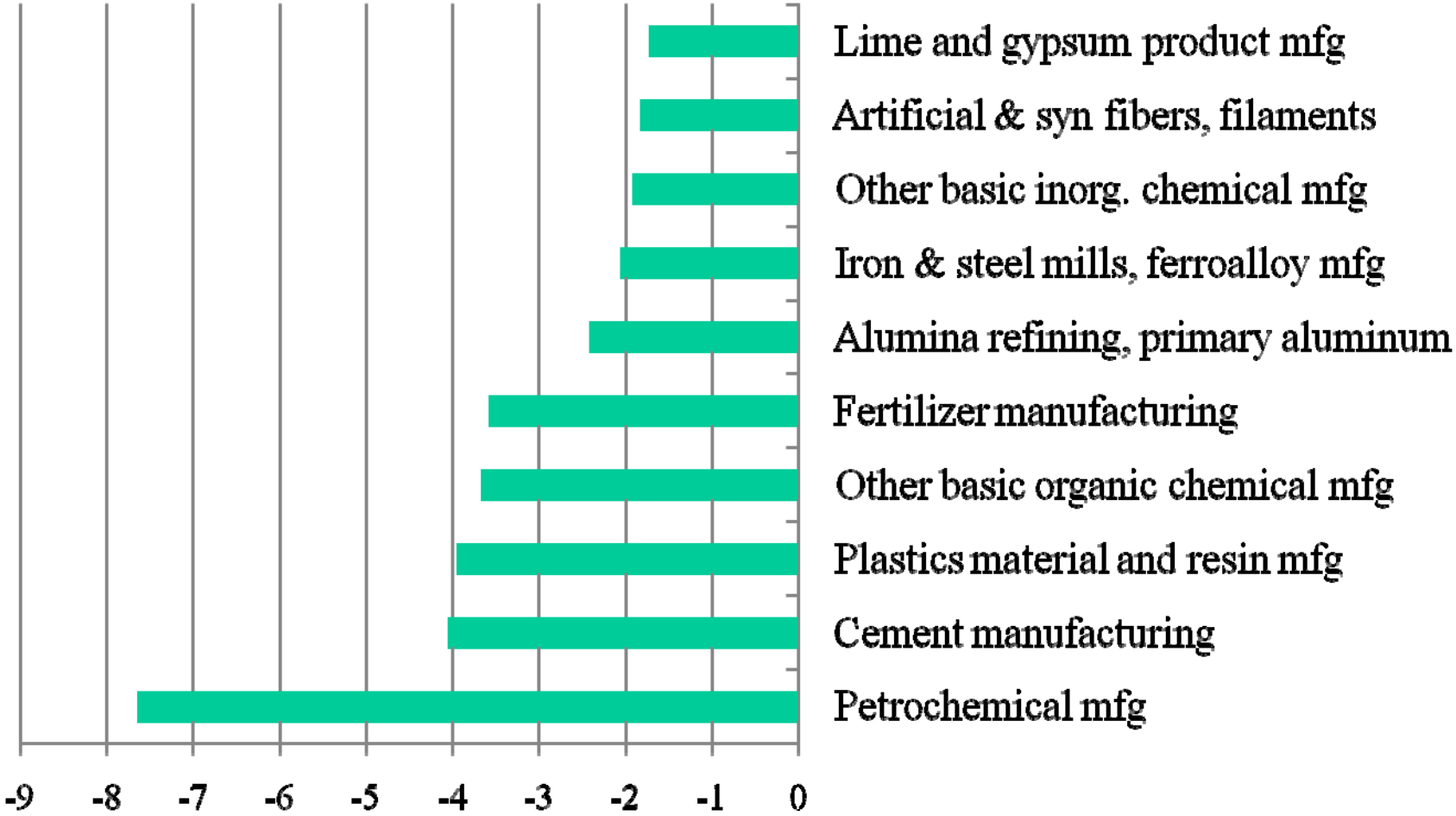
Short-run Output effects of $10/ton CO2 price (%change)



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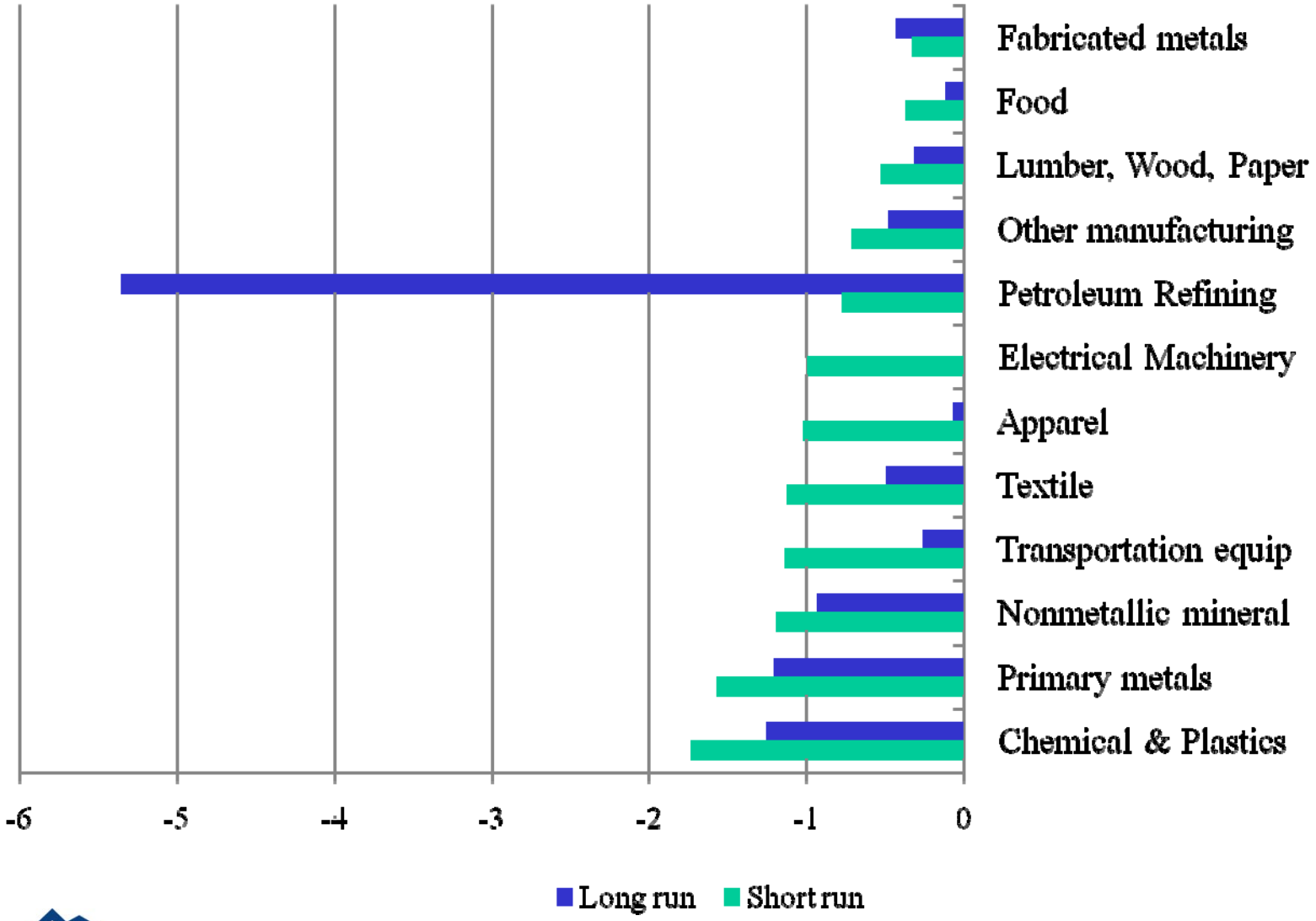
Effect on output of $10/ton CO2; aggregated industries



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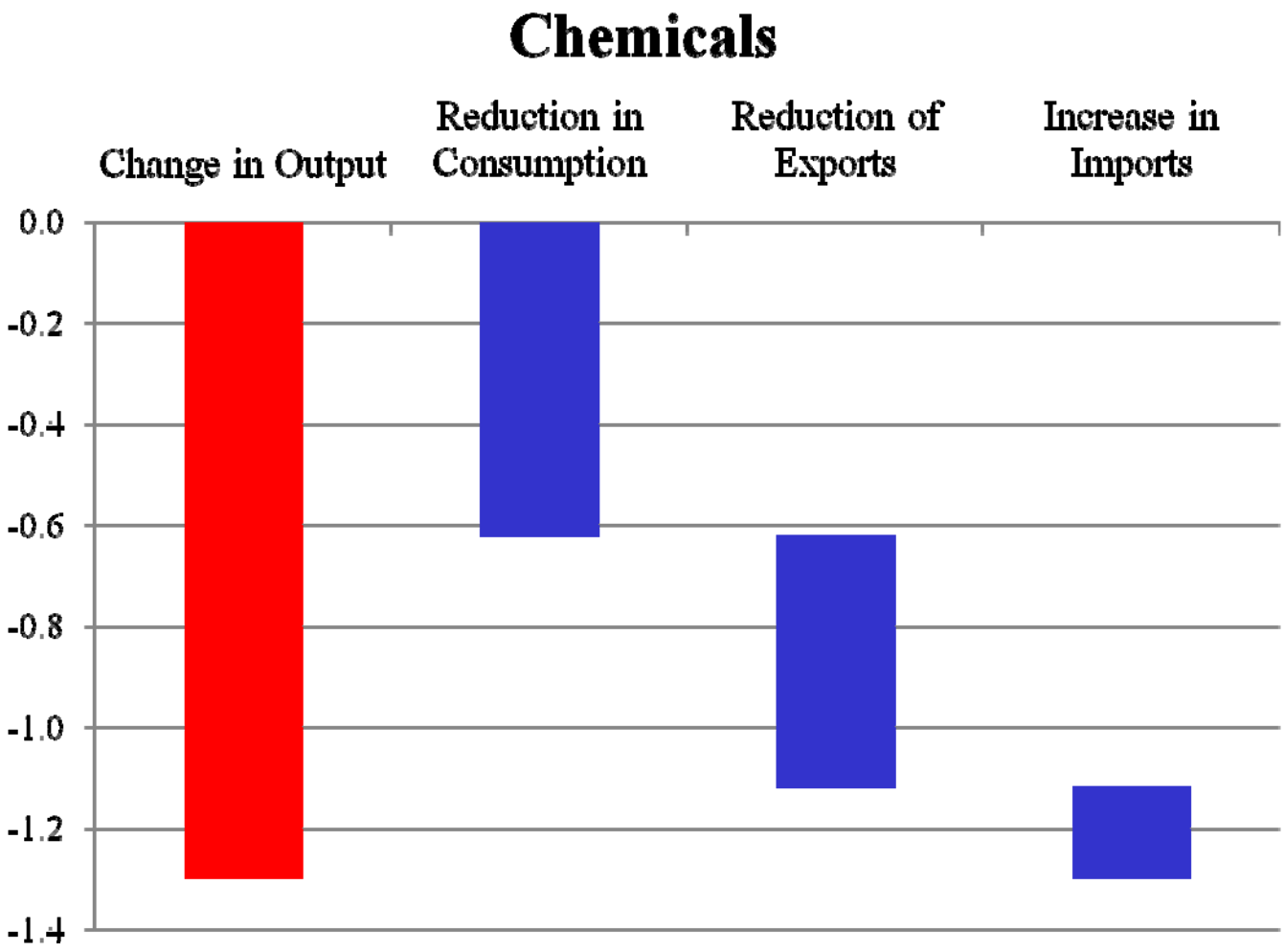
Trade Impact of $10/ton CO_2 price (%change)



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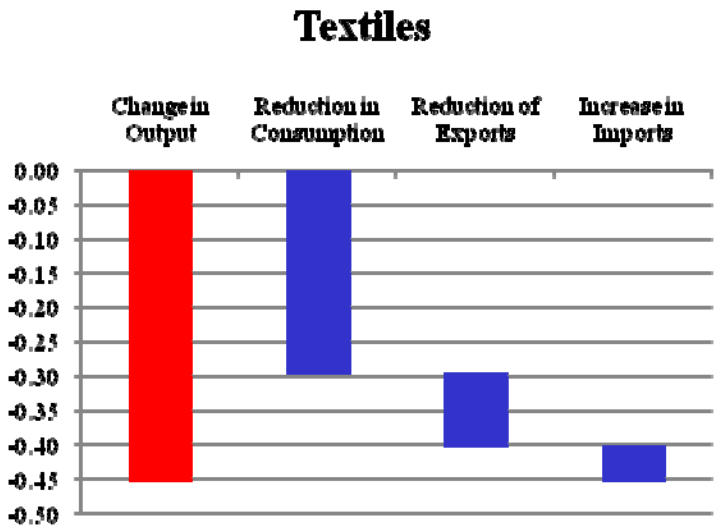
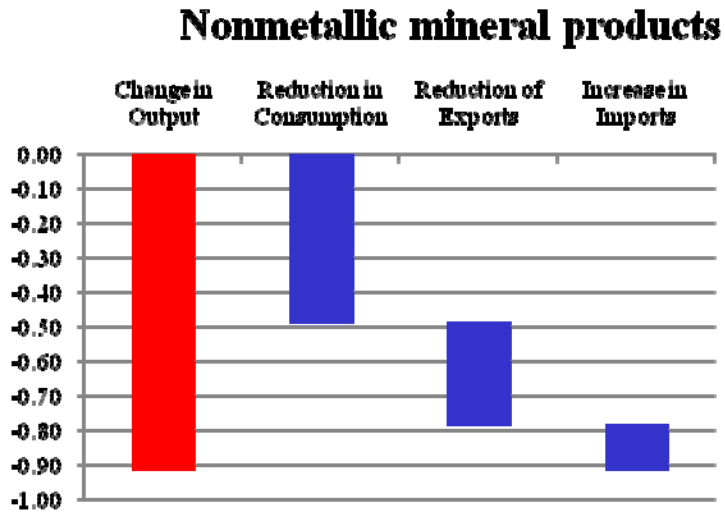
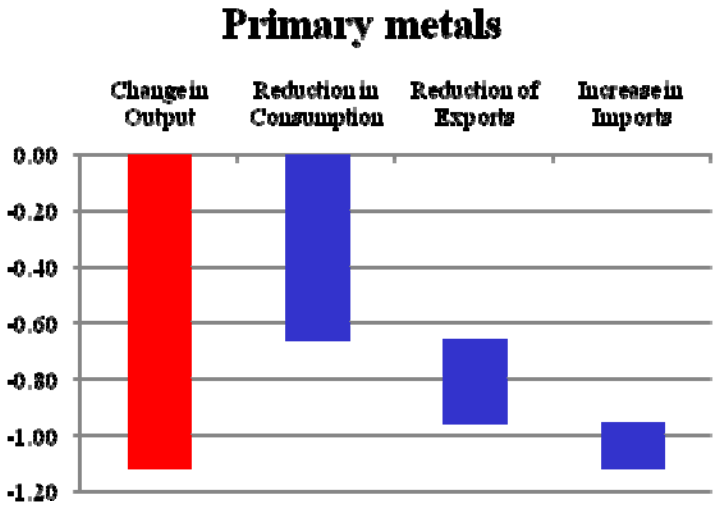
Trade Impacts, continued







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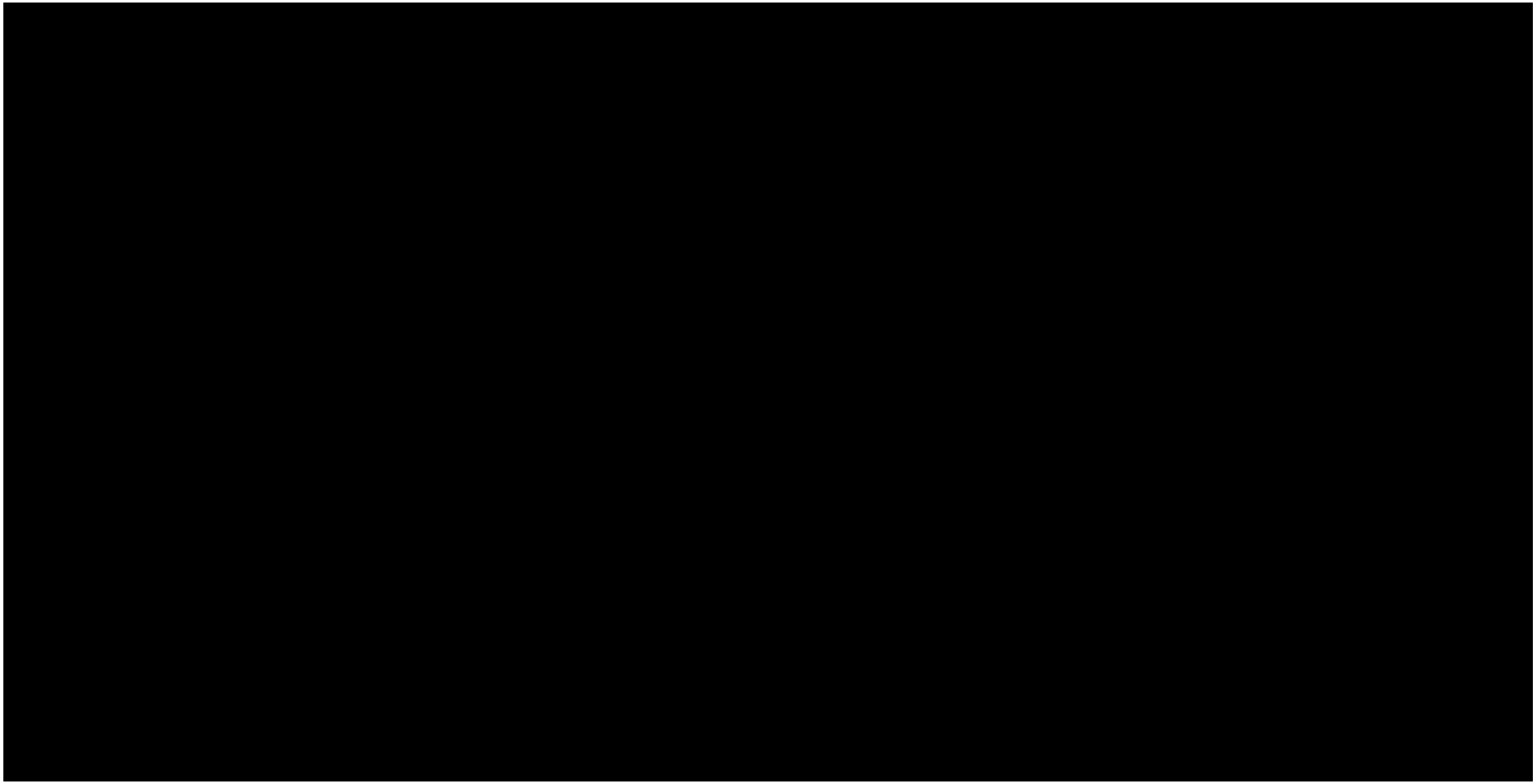

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- EU studies of output effects for disaggregated industries

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Table 1: Estimated cost increase under EU-ETS for various industries (% of total costs)

	1	2	3	4	5	6
	McKinsey ($10/tCO$_2$)			Reinaud/IEA ($10/tCO$_2$)		
Industry	Cost increase	Net of free allowances	Net of allowances and passthrough	Cost increase	Net of free allowances	Demand reduction
BOF Steel	6.2	1.0	0.6	5.9	0.6	0.8
EAF Steel	1.0	0.9	0.2	1.7	0.6	0.4
Cement	13.1	1.4	-0.6 to 1.4	14.5	1.8	0.3
Primary Aluminum	4.1	4.1	4.1	2.7	2.7	2.1
Secondary Aluminum	0.2	0.2	0.2			
Chemical Pulp/Paper	0.9	0.4	0.2 to 0.4			
Thermo-Mech. Pulp/Paper	2.7	2.2	1.7 to 2.2			
Average Process Petroleum Refining	7.4	0.9	-4.5 to -0.9			

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Model Results (1)

- With disaggregated analysis we find that losses concentrated in particular industry segments
- Most affected industries in medium/long run (broad categories): Petroleum refining, chemicals and plastics, primary metals, nonmetallic minerals
- Most affected industries in immediate/short term (narrower categories): petrochemicals, other organic chemicals, cement, artificial/synthetic fibers, plastics and resin, fertilizer, alumina refining, inorganic chemicals, iron and steel, lime/gypsum

Model Results (2)

- Although the short run output reductions are relatively large in some industries, several of them shrink over time as firms adjust inputs and adopt new technologies.

- Short term impacts on profits significant in some industries, but quickly decline as output prices rise.

- In the long term, emissions increases in the rest of the world are estimated to be about one-quarter of the reductions in US reductions. For the most energy intensive sectors, the leakage rate is higher

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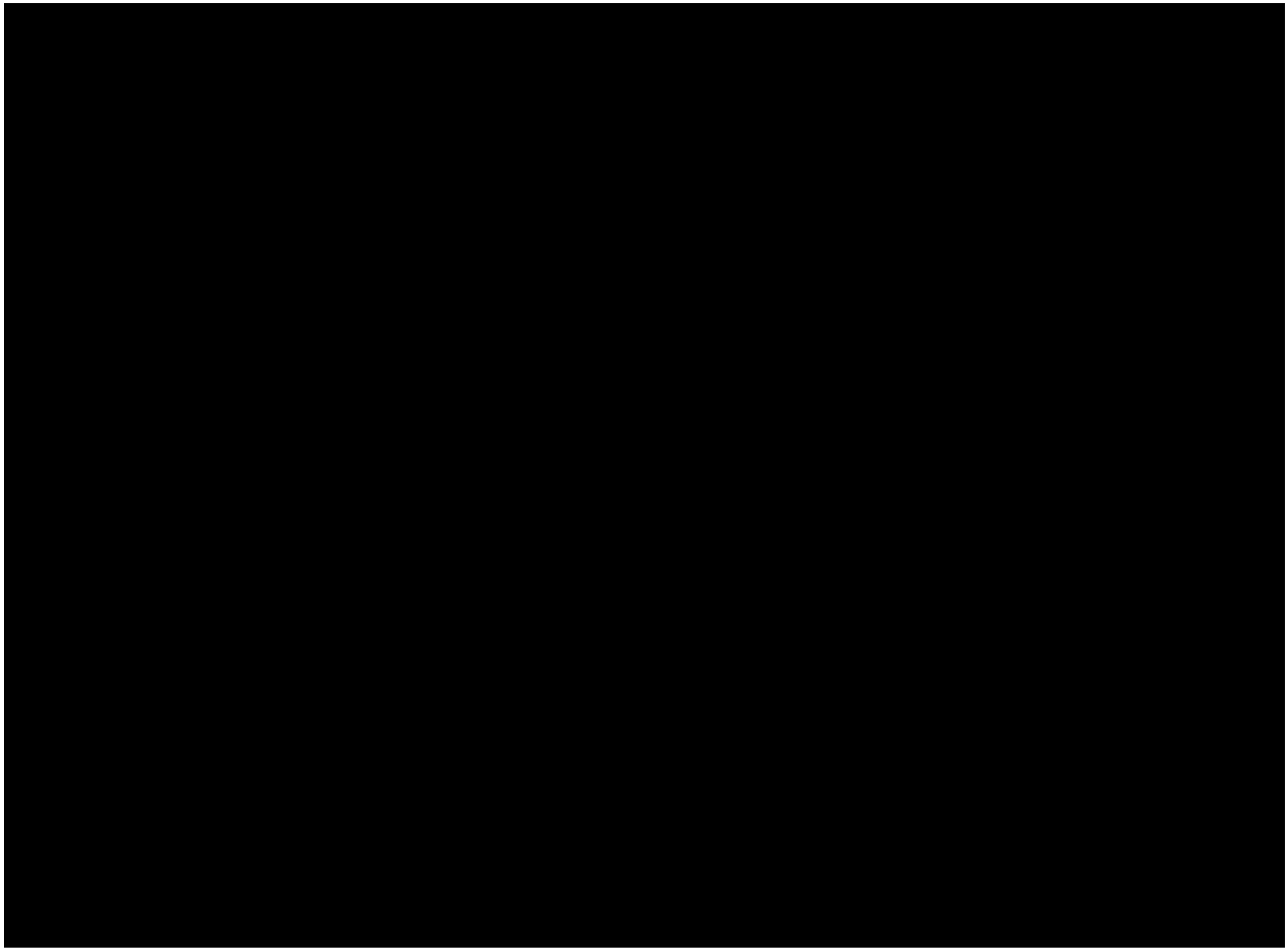

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