

# **Trade-Offs in Allocating Allowances for CO<sub>2</sub> Emissions**

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The views expressed in this paper are those of the author and should not be interpreted as those of the Congressional Budget Office.

# Background

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- **Several cap-and-trade programs for CO<sub>2</sub> being considered. Each would:**
  - Establish cap on emissions
  - Determine who must hold emission rights (allowances)
    - E.g., fossil fuel suppliers
  - Distribute allowances
  - Allow trading
- **Efficiency advantage: equalizes MC of emission reductions:**
  - Across sources: E.g., businesses, governments, households
  - Across methods: E.g., energy efficiency improvements, use of renewables, fossil fuel switching
- **Approach used successfully in U.S. to help minimize the cost of reducing:**
  - Lead in gasoline
  - Emissions of SO<sub>2</sub> from utilities..

# Potential Effects of CO<sub>2</sub> Cap-and-Trade Program

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- **Reduce environmental and economic damages in the future. Based on latest IPCC reports:**
  - Likely temperature increase over next century: 0.3°C to 6.4°C.
  - Potential decline in global GDP from 4°C increase: 1-5%.
- **Impose costs on the economy in the near-term: Cap limits fossil fuel use, and raises prices:**
  - Consumers incur costs to reduce their use.
  - Some shareholders face decrease in stock values
    - E.g., coal (largest), petroleum refining, oil and gas suppliers, utilities.
    - Losses widely dispersed: small losses for large number of households.
  - Some workers may lose their jobs, particularly in coal sector.
    - Losses concentrated: small number of households incur large losses.
  - Price increases aggravate distortions from taxes on capital and labor
    - Costs in factor market costs could substantially exceed costs in fossil fuel markets.

# Potential Effects of CO<sub>2</sub> Cap-and-Trade Program (continued)

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- **Transfer income from bearers of allowance cost to recipients of allowance value**
  - \$50 to \$300 billion of transfers in 2020 (in 2007\$) for proposed legislation
  - Market forces would determine who bears the allowance cost
    - Primarily borne by consumers in form of price increases
      - Disproportionate burden on low-income households.
      - Free allocation to producers won't prevent price increases.
  - Policymakers would determine who receives the allowance value
    - Selling allowances → government captures value
      - Ultimate beneficiaries depend on revenue recycling decision
    - Free allocation → receiving firms capture value

# Consumer Price Increases are Regressive

*Illustrative Example Showing Increase in Average Household Costs from a 15 Percent Decrease in Carbon Emissions*

	Average for Income Quintile				
	Lowest	Second	Middle	Fourth	Highest
Cost Increase in 2000 Dollars	560	730	960	1,240	1,800
Cost Increase as a Percentage of Income	3.3	2.9	2.8	2.7	1.7

# Objectives of CBO Issue Brief on Allocating Allowances

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- **Examine evidence from existing studies about how allocation decisions could affect**
  - Overall cost to the economy
  - Distribution of policy gains and losses for households in five different income brackets
- **Estimate outcomes using six illustrative allocation scenarios.**
  - Selling allowances versus giving them away
  - Using government share of allowance value in one of three different ways

# General Conclusions

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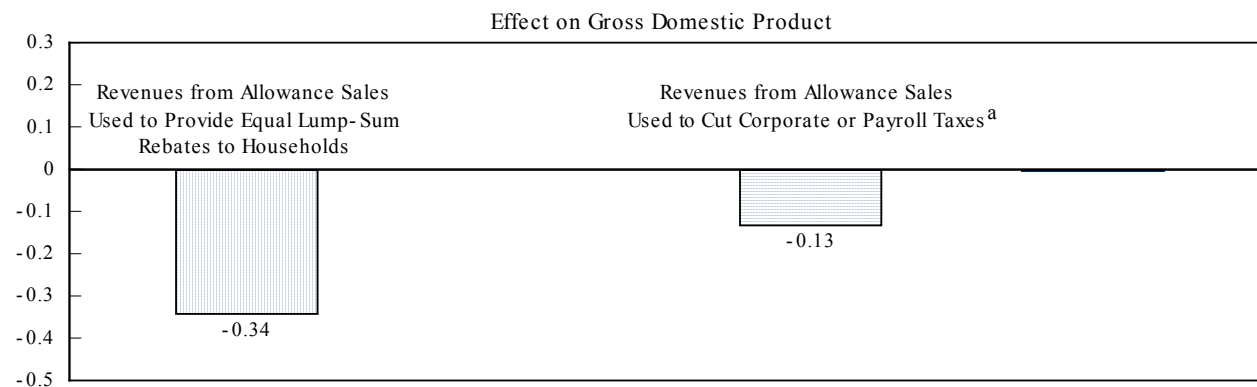
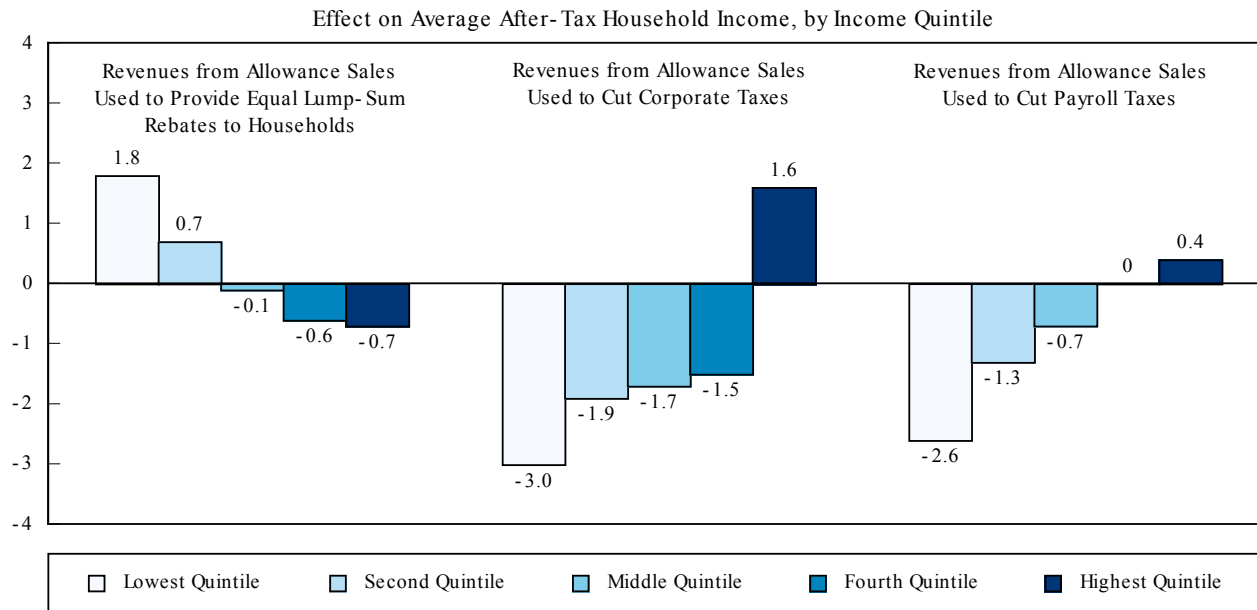
- **Policymakers' decisions about how to use the allowance value will:**
  - *Determine the ultimate distributional effects of the policy:*
    - Market forces determine who bears the initial costs
    - Policymakers determine who gets the allowance value
    - Ultimate distributional effect = net effect.
    - Initial costs primarily fall on lower-income households. Net costs could fall on lower-income or higher-income households.
  - *Substantially affect overall cost to economy.*
    - Using value to reduce taxes on capital and labor would lower cost
- **Policymakers may face equity-efficiency trade-offs.**
- **Giving away allowances to producers rates low from both equity and efficiency perspectives.**

# Putting it All Together: Examining the Distributional and Efficiency Consequences of a 15% Reduction in Emissions Under Alternative Allocation Scenarios

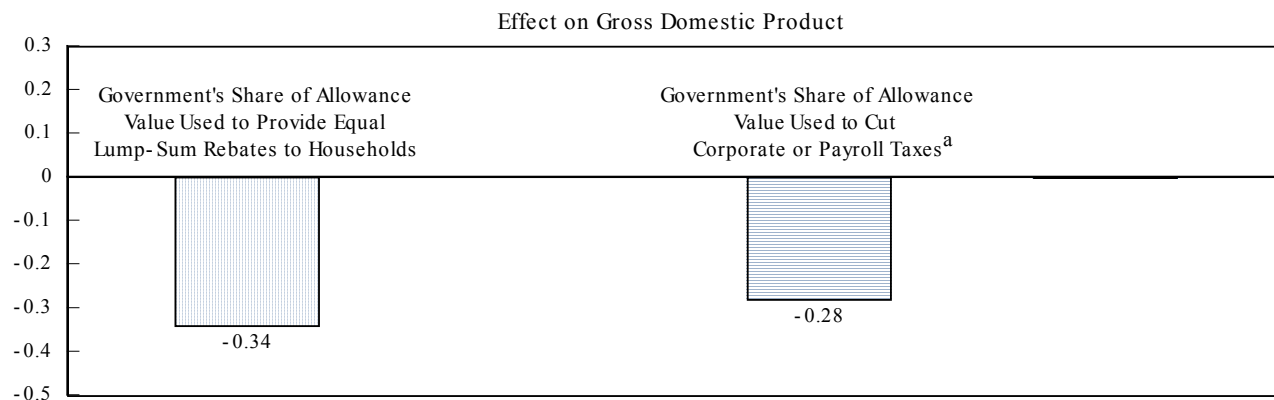
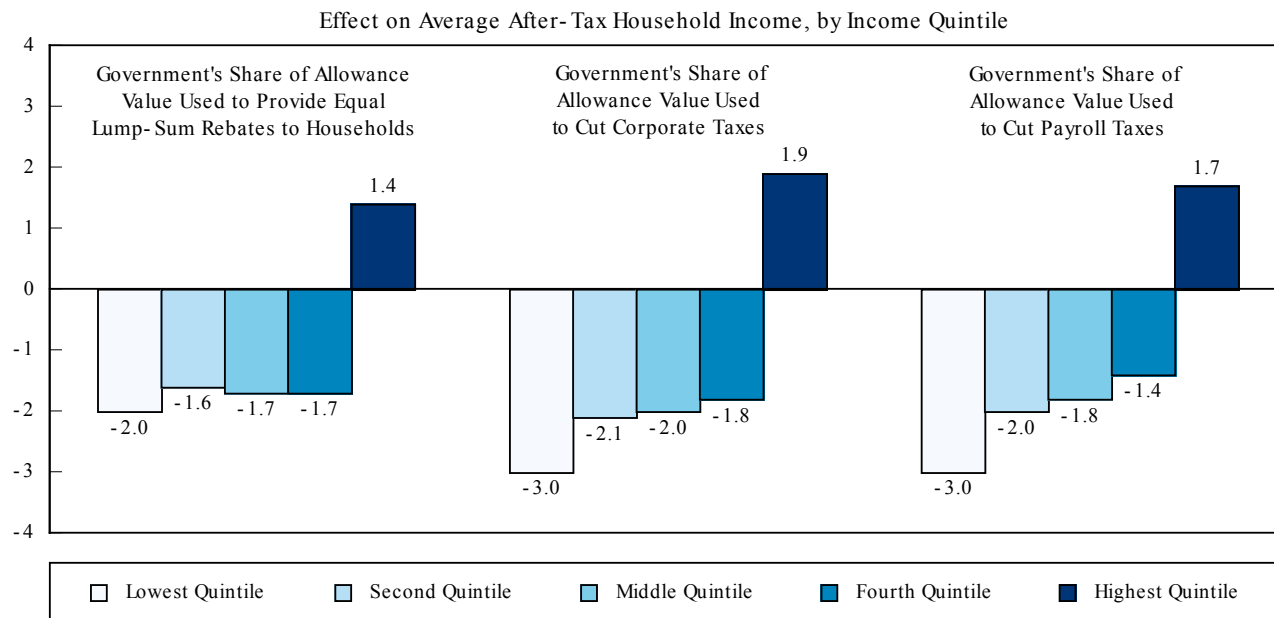
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- **Two allowance allocation strategies**
  - Free distribution
    - Historic precedent — cap-and-trade for SO<sub>2</sub> in US., CO<sub>2</sub> in EU
    - Government captures some of allowance value through taxes on company profits
  - Auction
    - Historic precedent — rights to electromagnetic spectrum
    - Government captures all of the allowance value
- **Three illustrative revenue recycling strategies**
  - Decrease corporate taxes
  - Decrease payroll taxes
  - Provide lump-sum rebate
- **Six different strategies**
  - Wide range of distributional effects
  - Equity-efficiency trade-off

# Effects on Household Income and GDP from a 15 Percent Cut in CO<sub>2</sub> Emissions in 2010, with Allowances Sold and the Revenues Used in Alternative Ways



# Effects on Household Income and GDP from a 15 Percent Cut in CO<sub>2</sub> Emissions in 2010, with Allowances Given Away and the Government's Share of Their Value Used in Alternative Ways



# Conclusions

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- **Policy design has big implications for both overall cost to economy and distributional effects**
- **Policy-induced price increases would:**
  - Disproportionately burden low-income households.
  - Free allocations won't prevent price increases.
- **Auctioning the allowances would raise substantial revenue which could be used to reduce:**
  - Burdens on low-income in households or dislocated workers
  - Economy-wide cost of cap
- **Trade-offs may be necessary. E.g., using the allowance revenue to:**
  - Provide lump-sum rebates offsets regressivity, but does not reduce economy-wide costs
  - Reduce existing taxes lowers economy-wide costs, but doesn't offset regressivity of price increases
- **Free distribution to producers rates low according to both efficiency and equity criteria.**

# Other Topics Addressed in Previous CBO Climate Change Studies

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- **The following topics are also addressed in papers available under special collections for climate on CBO's web site at:**  
[www.cbo.gov/publications/collections/climatechange.cfm](http://www.cbo.gov/publications/collections/climatechange.cfm)
  - Primer on science and economics
  - Implications of uncertainty for policy design
  - Evidence on the efficient roles of funding R&D and pricing carbon emissions
  - Efficiency implications of a tax vs. a cap
  - Trade-offs in policy design for cap-and trade programs:
    - Point of regulation
    - Inclusion of cost cap (safety valve)
    - Methods of allocating allowances

# Where Can You Find More Information on Effects of Alternative Allowance Allocations?

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- **The following CBO studies are available under special collections for climate on CBO's web site at:**  
[www.cbo.gov/publications/collections/climatechange.cfm](http://www.cbo.gov/publications/collections/climatechange.cfm)
  - *Trade-offs in Allocating Allowances for CO<sub>2</sub> Emissions* (April 2007)
  - *Shifting the Cost Burden of a Carbon Cap-and-Trade Program* (July 2003)
  - *An Evaluation of Cap-and-Trade Programs for Reducing Carbon Emissions* (June 2001)
  - *Who Gains and Who Pays Under Carbon Allowance Trading? The Distributional Effects of Alternative Policy Designs* (June 2000)
- **The same site has publications on several other issues relevant to climate change policy design.**