Fiscal Interactions and Climate Change Policy
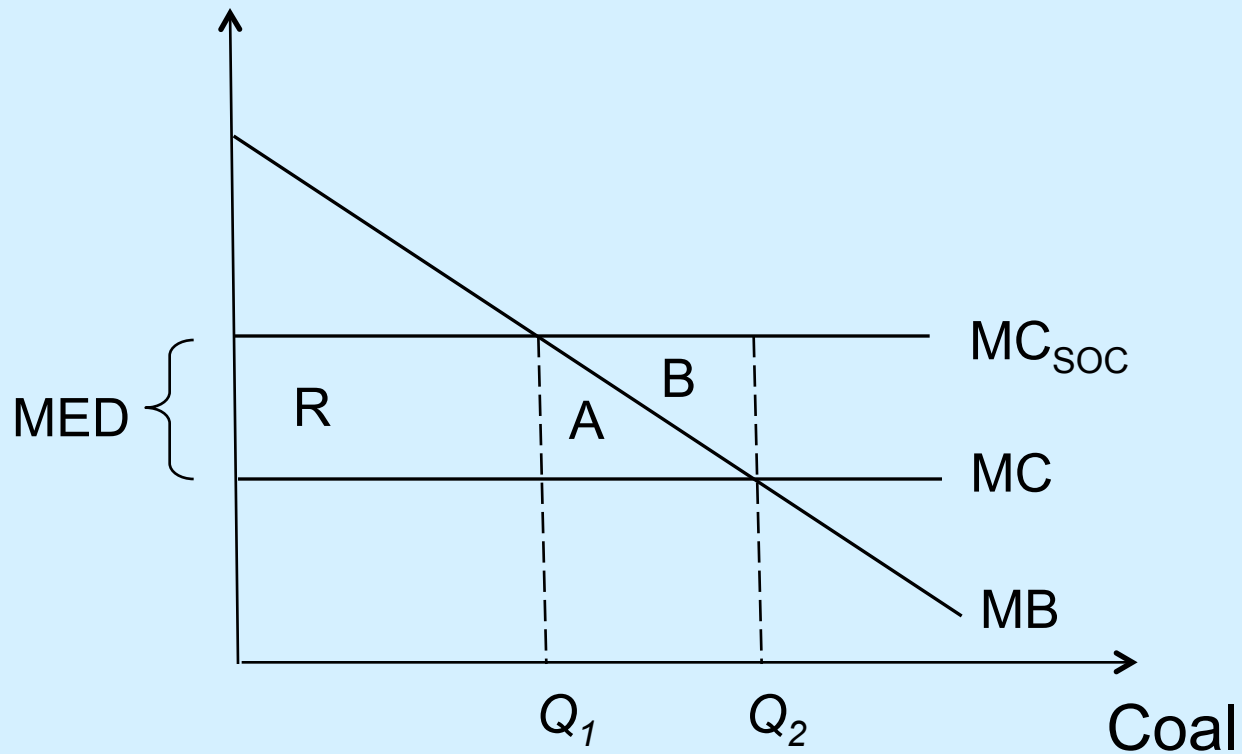
Lawrence H. Goulder

Stanford University
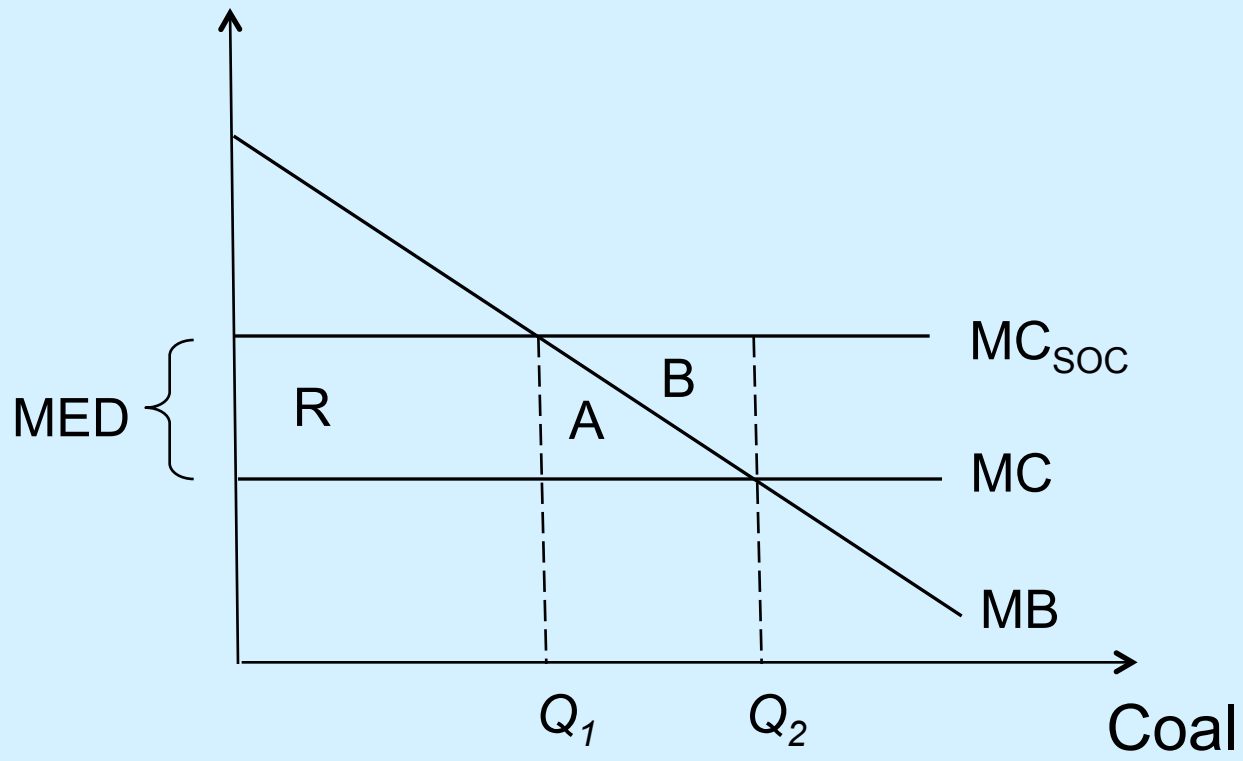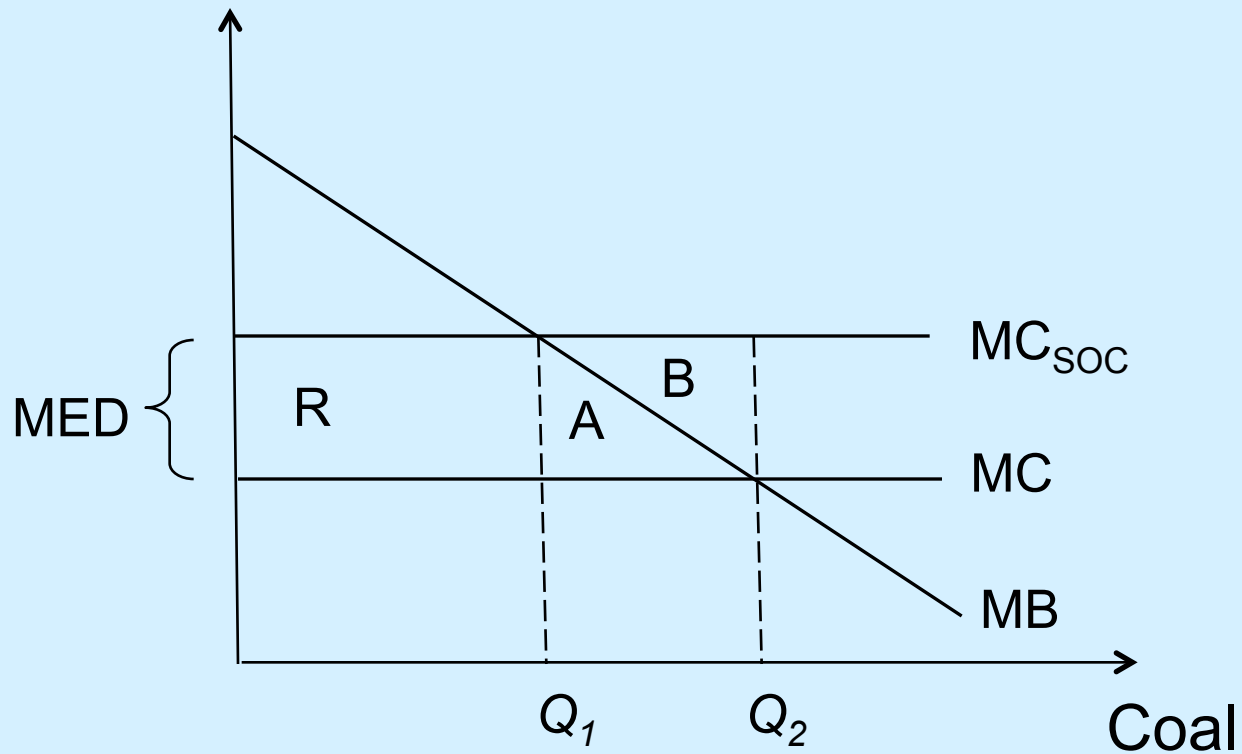
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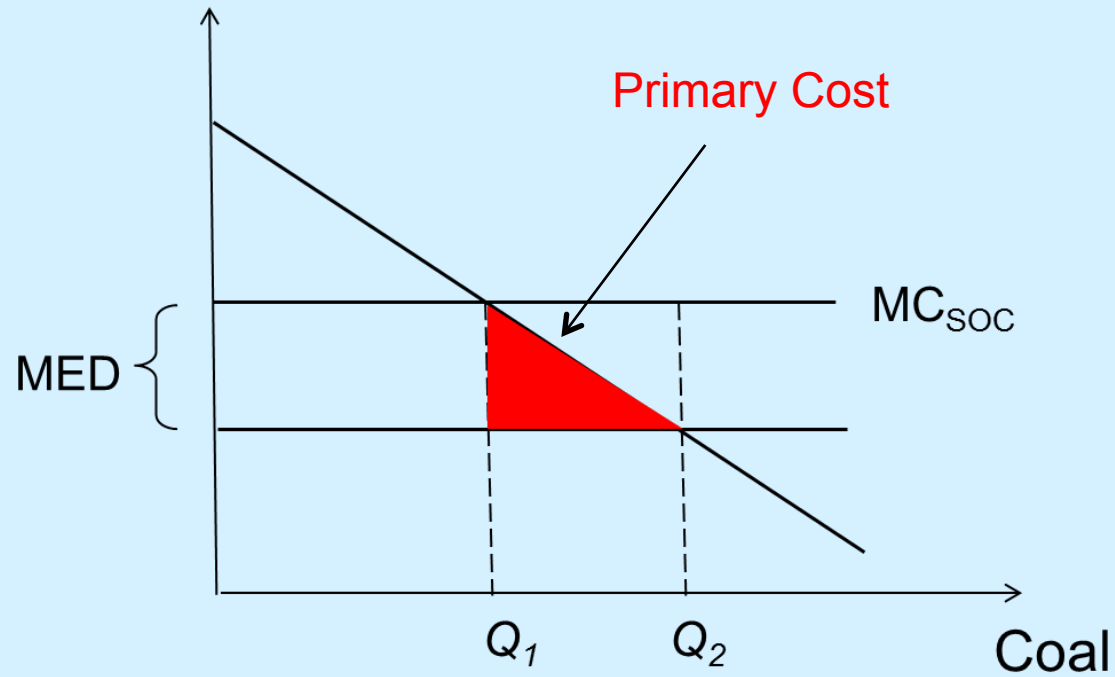2. Impact of *implicit* increase in factor taxes (*tax-interaction effect*)

Potential "Dividends" from a Revenue-Neutral Carbon Tax Policy

1. Mitigation of climate damages
2. Reduction in costs of the tax system (ignoring environmental benefits)

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Second Dividend if
Primary Cost + TI – RR < 0

Primary Cost

MC_{SOC}

MED {

Q_1 Q_2

Coal
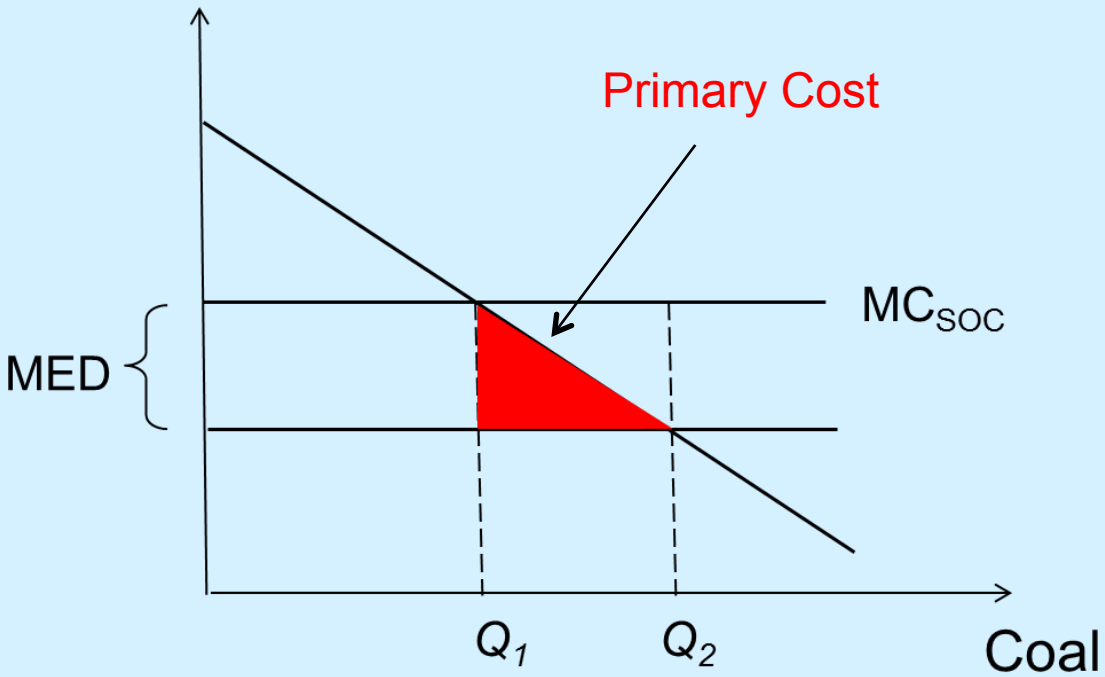
1. A "Double Dividend" Is Possible, But Not Automatic

Closed economy, labor as only primary input, static

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Scenario I: Introduce uniform tax on consumer goods, recycle revenue via cut in L tax

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Scenario II: Introduce tax on specific consumer good (e.g., gasoline), recycle revenue via cut in L tax

- Effects don't cancel; cost > 0

Possible Routes for a Zero-Cost Result:

- Inefficient relative taxation of capital and labor:
  Bovenberg and Goulder, *Natl Tax Journal* 1997

- Inefficiently light taxation of resource rents:
  Bento and Jacobsen, *JEEM* 2006

- Leisure a strong complement for environmental quality:
  Parry, *JEEM* 1995

- Labor productivity enhanced by improvement in environment:
  Williams, *JEEM* 2002

What's Possible in the U.S.?

- Zero cost result seems unlikely if recycling involves cuts in both K and L taxes

- Might come close to zero cost if recycling is oriented solely toward cuts in K taxes

How Elastic Is Factor Supply?

From meta-analysis by Michiel Eveers, Ruud de Mooij, and Daniel van Vuuren (*De Economist*, 2008)

Central value, uncompensated wage elasticity of labor supply:

men   0.1
women: 0.5

2. Climate Policy Instrument Choice Is Important, But the Design of Particular Policies Can Be Even More Important

Marginal Costs of Pollution Abatement with General Equilibrium Effects
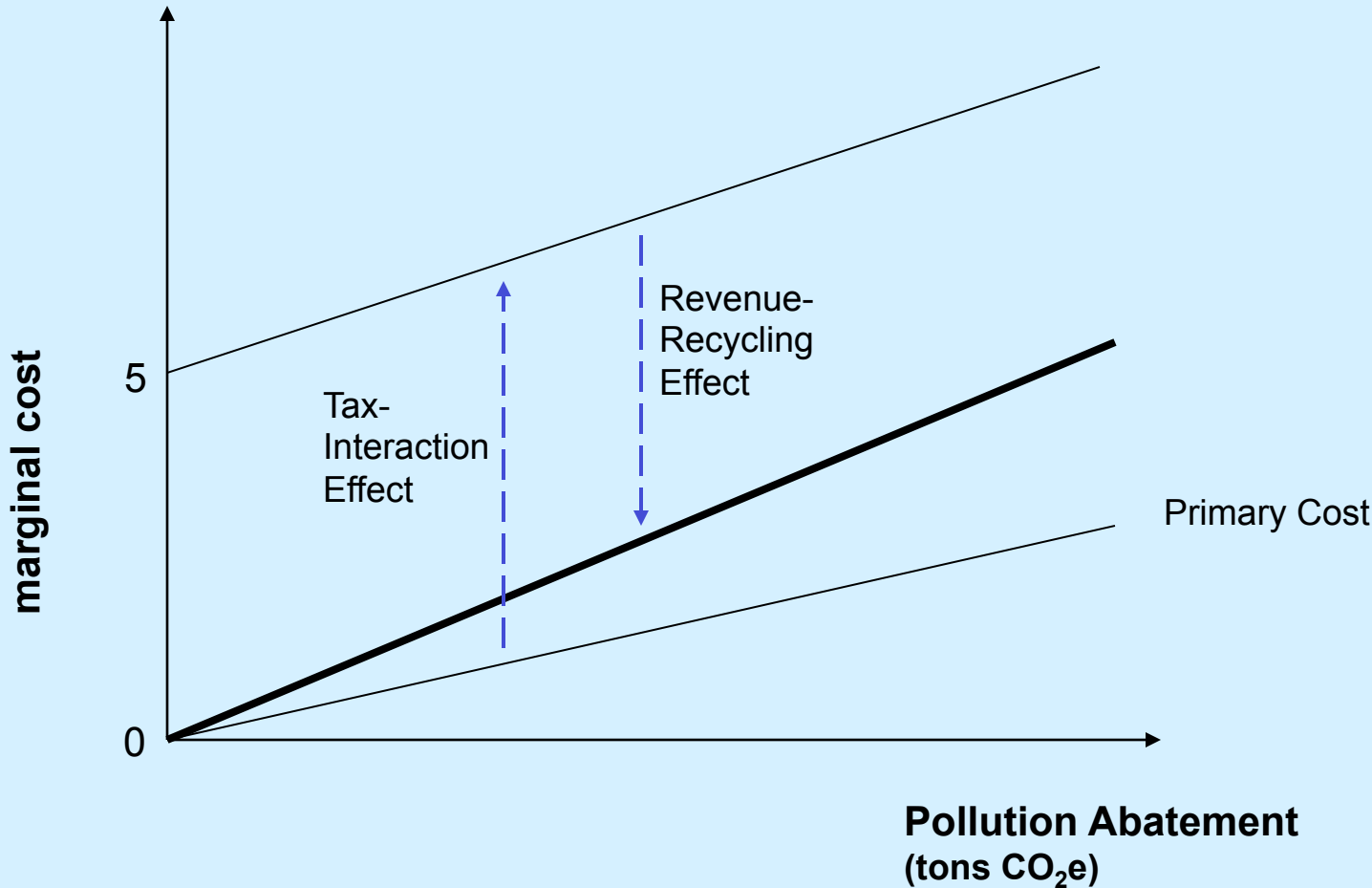
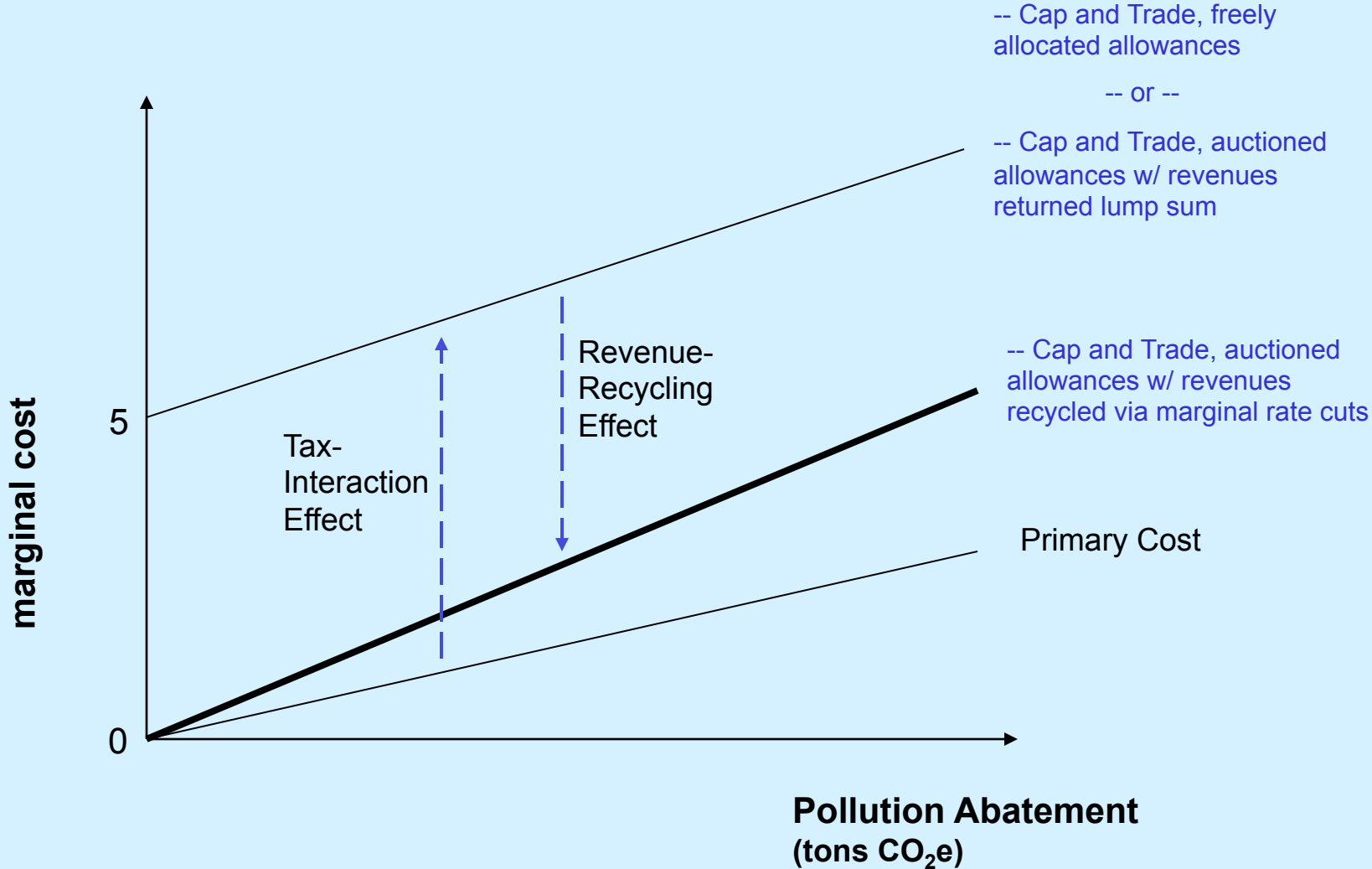# Marginal Costs of Pollution Abatement with General Equilibrium Effects

Table 3
Profit and GDP impacts under alternative allocation methods.[a]

Industry	100% auctioning		100% free allocation
	Marginal rate cuts	Lump-sum rebates	
Percentage change in profits[b]			
Coal mining	−28.7	−28.0	178.8
Coal-fired electricity generation	−28.4	−27.8	177.2
Petroleum refining	−4.7	−4.3	29.4
Chemicals	−3.2	−2.9	20.7
Primary metals	−3.5	−3.0	22.2
Railroads	−2.5	−2.0	15.6
Electric transmission/generation	−2.5	−2.0	15.5
Natural gas distribution	−2.8	−1.4	17.5
All industries above	−5.0	−4.5	31.6
All other industries	0.1	0.4	0.4
All industries	−0.2	0.0	2.7
GDP cost[c]	0.472	0.808	0.788

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Profit and GDP impacts under alternative allocation methods.[a]

Industry	100% auctioning		Profit-preserving free allocation				100% free allocation
	Marginal rate cuts	Lump-sum rebates	Marginal rate cuts		Lump-sum rebates		
Percentage change in profits[b]							
Coal mining	−28.7	−28.0	0	(3.2)	0	(3.2)	178.8
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Marginal Costs of Pollution Abatement with General Equilibrium Effects

Parry-Williams-Goulder: minimal marg. envir. benefit value for efficiency gain

-- Cap and Trade, freely allocated allowances

-- or --

-- Cap and Trade, auctioned allowances w/ revenues returned lump sum

-- Cap and Trade, auctioned allowances w/ revenues recycled via marginal rate cuts

Revenue-Recycling Effect

Tax-Interaction Effect

Primary Cost

marginal cost

5

0

**Pollution Abatement**
(tons CO_2e)
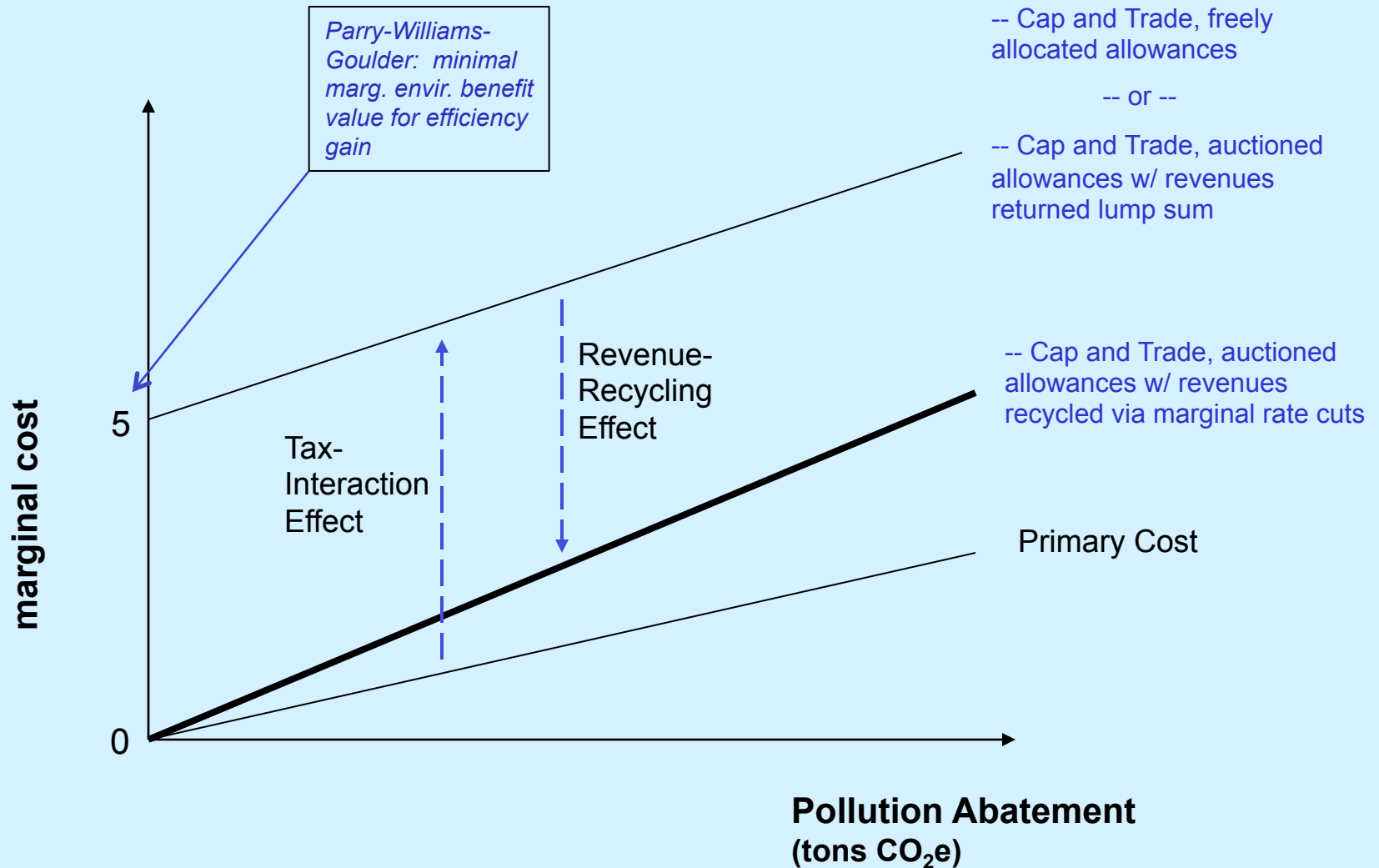
3.   Suppose the Government Needs to Raise Additional Revenue (No Recycling). How Good Are Carbon Taxes or Auctioned Emissions Allowances for this Purpose, Relative to Other Revenue Sources?
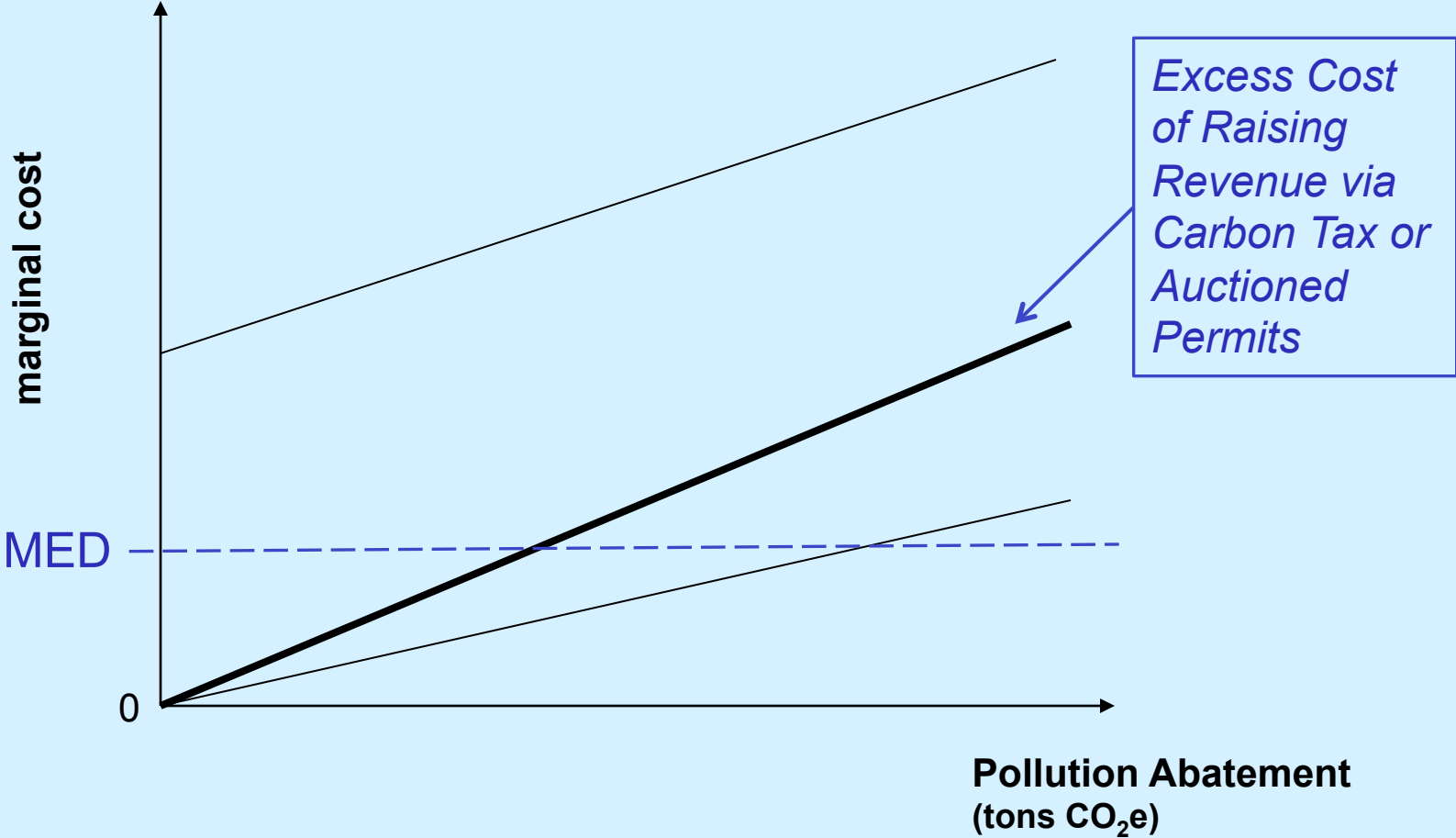
Are Revenue-Raising Carbon Pricing Policies an Efficient Way to Raise Additional Revenue?

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marginal cost

Excess Cost of Raising Revenue via Carbon Tax or Auctioned Permits

0

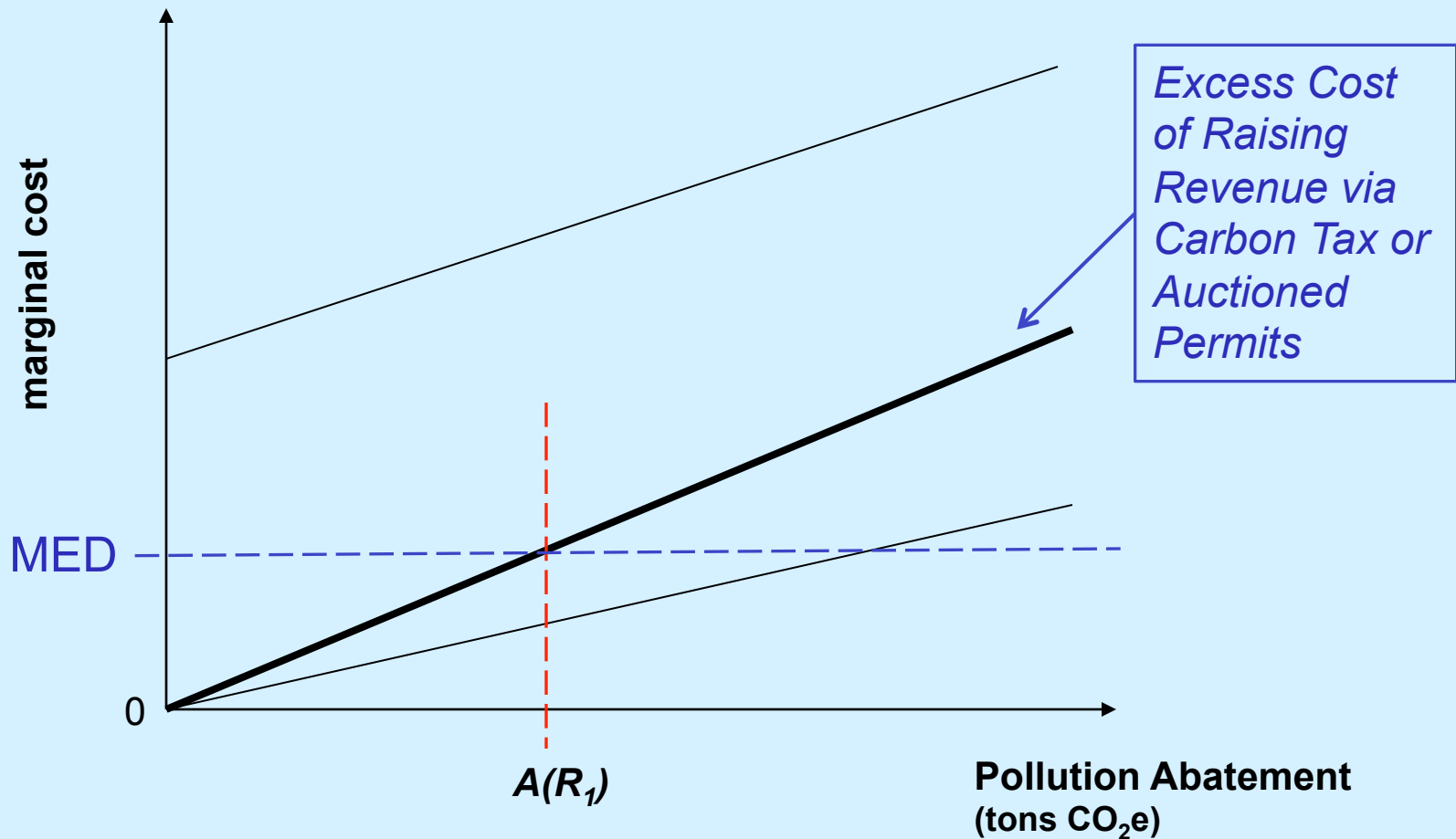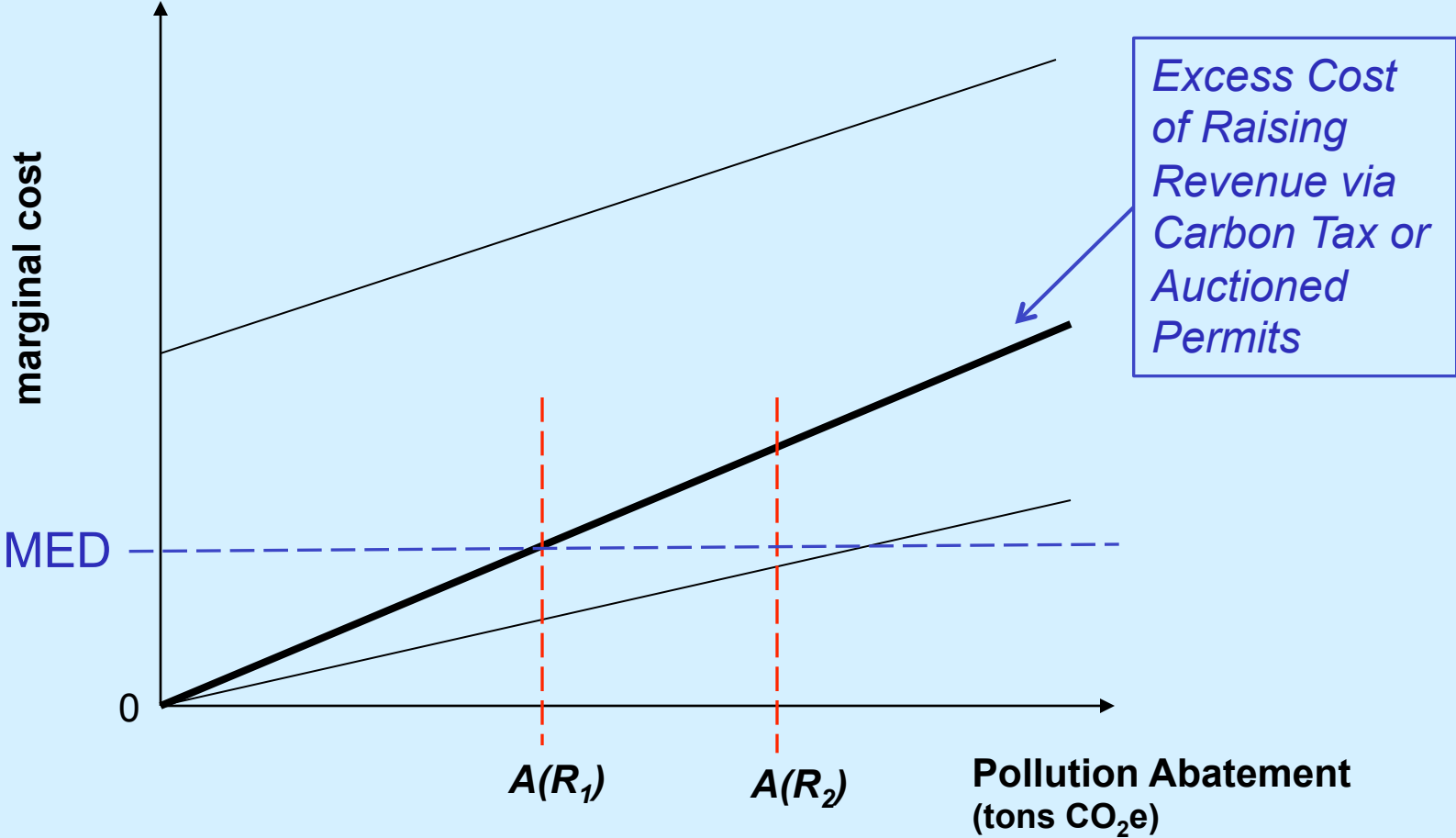**Pollution Abatement**
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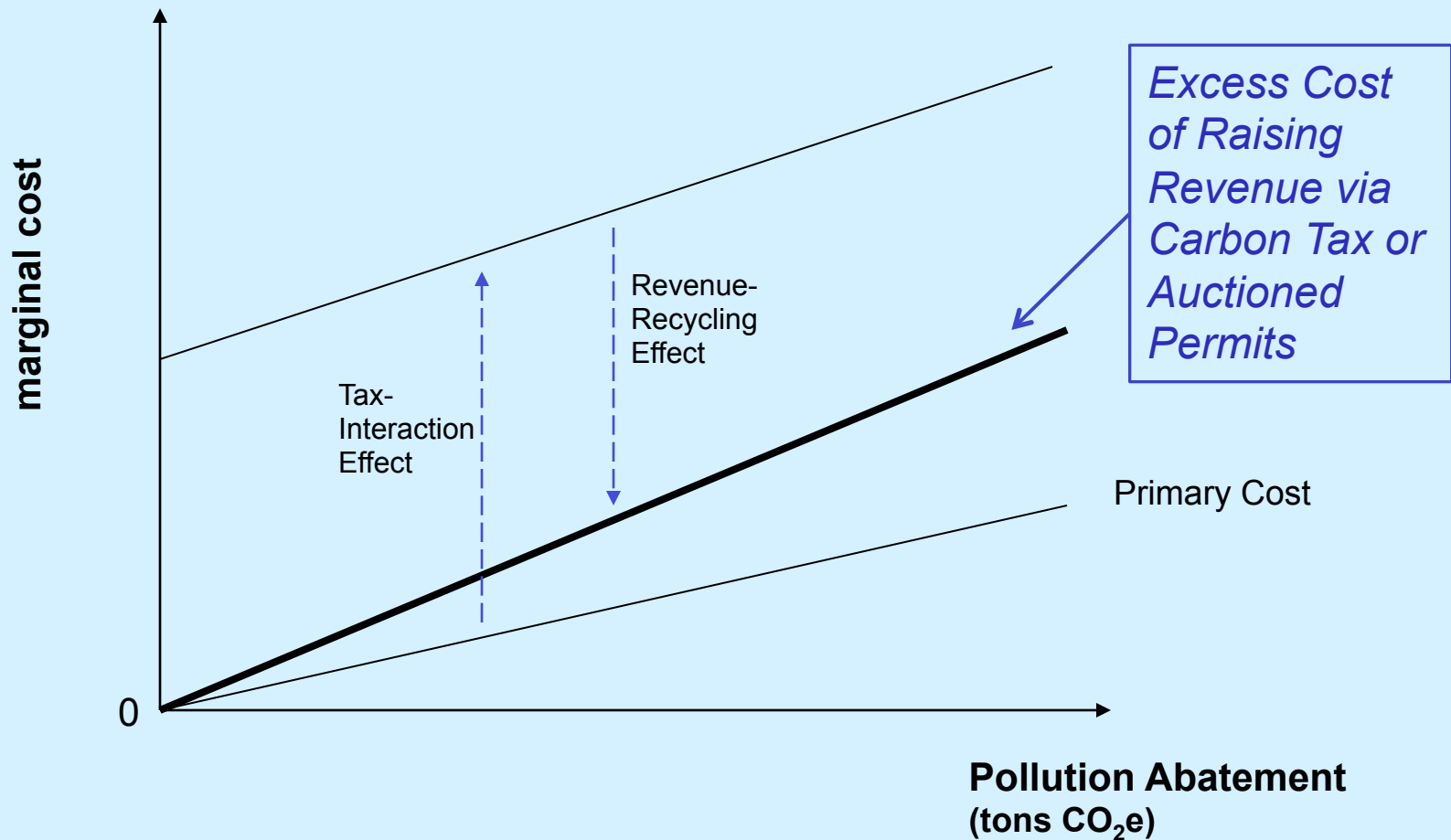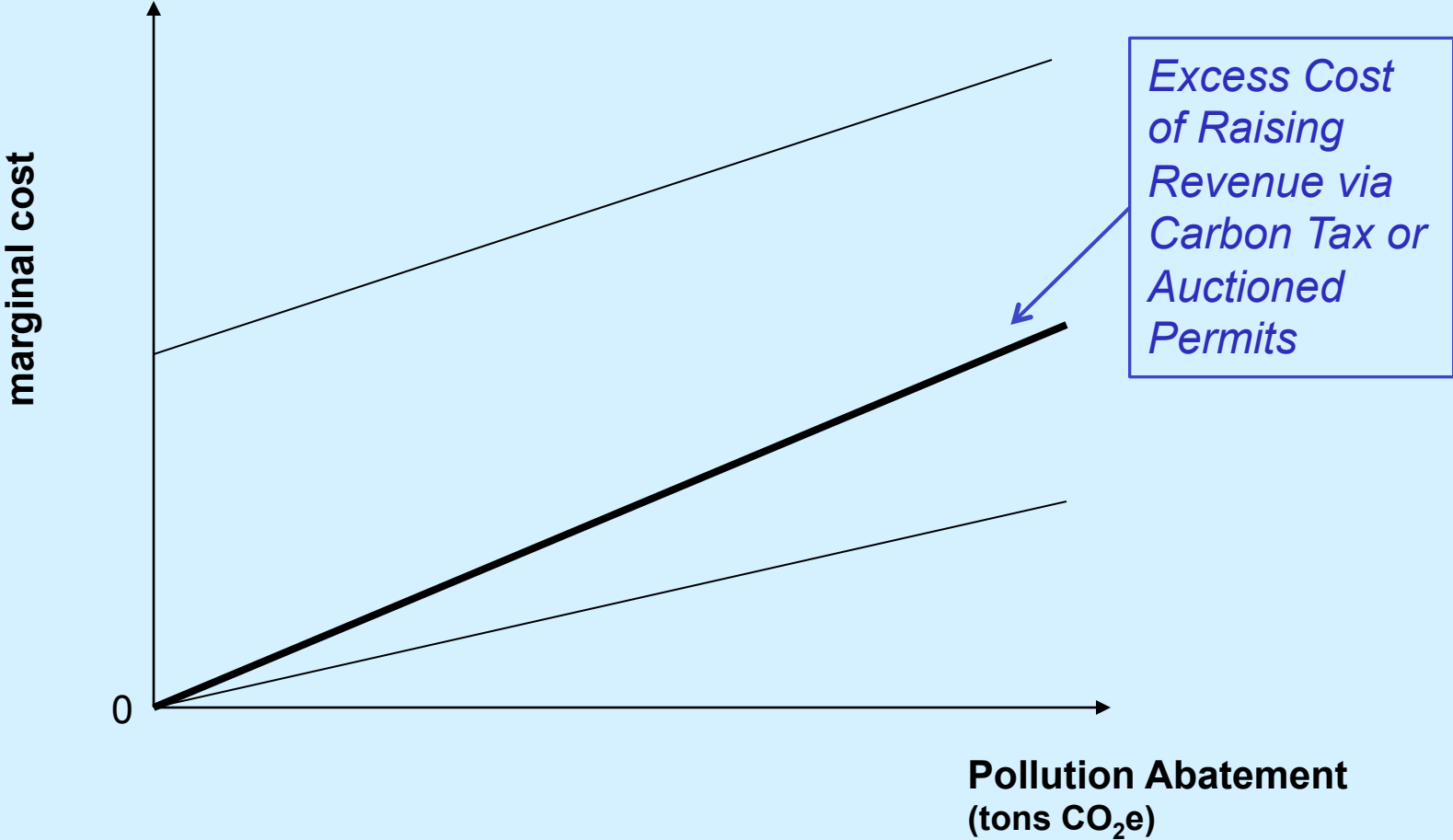
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How do these net out?

	TI effect	RR effect
Cap and trade with auctioning and marg tax rate recycling	Y	Y
Renewable Portfolio Stnd	Y (but smaller)	N
Cap and trade with free allocation	Y	N

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Annualized Equivalent Income Loss from CO_2 Abatement Policies
63% Renewable Portfolio Standard* vs. Identical Reductions under Cap and Trade
(billions of 2010 U.S. dollars)

	Renewable Portfolio Standard	Cap and Trade (auctioned allowances)
Recycling via Cuts In L and K taxes	20.16	22.42
Recycling via Cuts In K taxes only	20.23	18.41

* The standard requires the ratio of "clean" to total MWh increase to 63% by 2035. The ratio under business as usual is 38% in the initial year, 2010. Electricity from natural gas is given half credit under this standard.

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1. The double dividend is possible, but requires that the revenue-neutral carbon pricing policy <u>substantially</u> reduce pre-existing non-environment-related distortions in the tax system.

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6. Fiscal interactions give a boost to certain non-price environmental policies – in particular, policies with lower tax-interaction effects.