Environmental Economics

Dr. Daniel Sutter

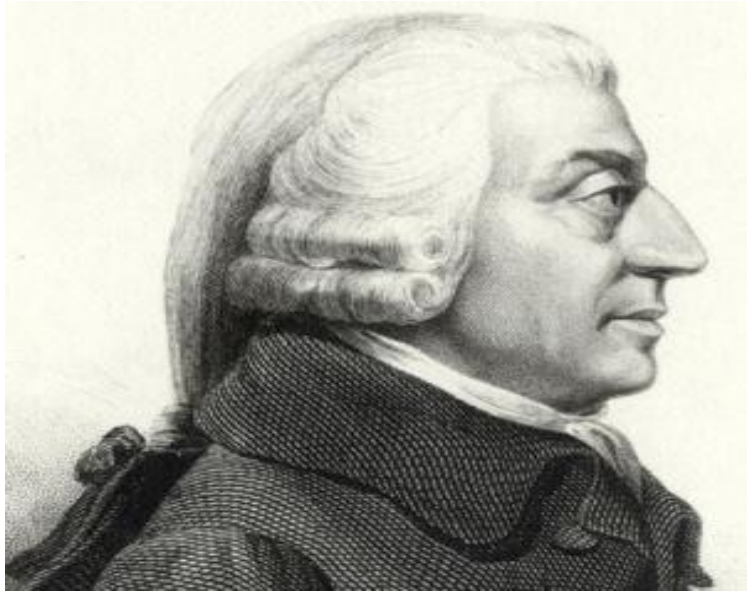
Charles G. Koch Professor of Economics

Manuel H. Johnson Center for Political Economy

Troy University

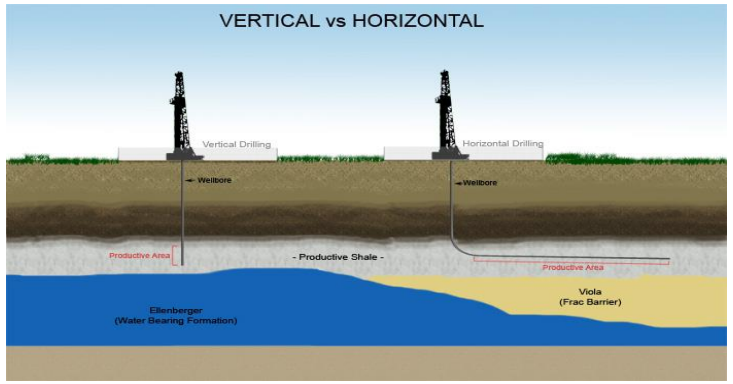
Scarcity and Choice

Markets Work, generally



Proposition 16.C.1: (*First Fundamental Theorem of Welfare Economics*) If preferences are locally nonsatiated, and if (x^*, y^*, p) is a price equilibrium with transfers, then the allocation (x^*, y^*) is Pareto optimal. In particular, any Walrasian equilibrium allocation is Pareto optimal.

Discovery in the Economy


VERTICAL vs HORIZONTAL
Vertical Drilling
Horizontal Drilling
Wellbore
Wellbore
Productive Area
- Productive Shale -
Productive Area
Viola
(Frac Barrier)
Ellenberger
(Water Bearing Formation)

Environmental Economics: More Alternatives

FIGURE 3.4

COMPARING COMPETITIVE AND EFFICIENT EQUILIBRIA USING MARGINAL BENEFIT AND MARGINAL COST: THE REFINED PETROLEUM MARKET IN THE PRESENCE OF A NEGATIVE EXTERNALITY

The MSC curve is found as the vertical sum of the *MEC* and the *MPC* curves. The intersection of *MSC* and *MSB* identifies the efficient equilibrium point at P_e = \$26 and Q_e = 128,000. Notice how this compares to the competitive equilibrium where P_c = \$22 and Q_c = 160,000, corresponding to the intersection of *MPC* and *MPB*. At Q_e, *MSB* is *below MSC*, which means that society is giving up more in scarce resources to produce petroleum than it gains in benefits from consuming it.

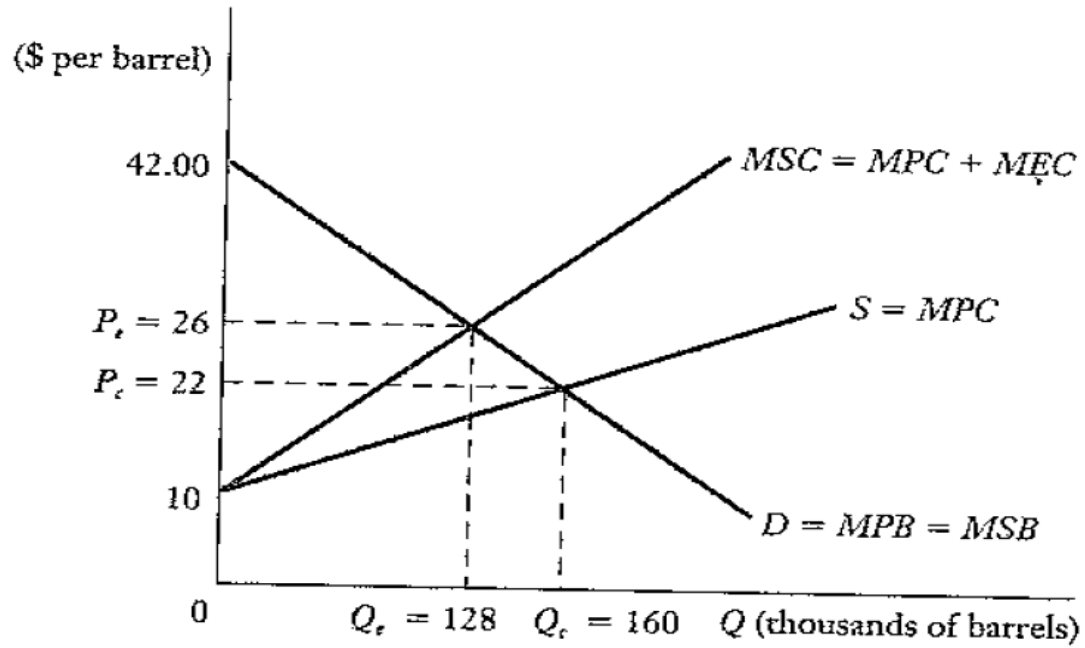


Table 2 EPA's costs, benefits, and net benefits of the CAFE rule

Input	Value (2009$, billions)
Costs	
Technology costs	140.0
Accidents, congestion, and noise costs[a]	52.0
Total costs	192.0
Benefits	
Lifetime fuel savings	444.0
Consumer surplus from additional driving	70.9
Refueling time value	19.5
Energy security benefits	24.2
CO_2	46.4
Non-CO_2 greenhouse-gas impacts	n/a
$PM_{2.5}$-related impacts	8.0
Total benefits	613.0
Net total benefits	421.0

Source EPA and DOT (2011a, Table III-82) and EPA (2011a, Table 1)

[a] These were included as negative benefits in EPA's tables. Estimates are for combined passenger cars and light trucks, 3 % discount rate, billions of 2009$

Source: Ted Gayer and W. Kip Viscusi, "Overriding Consumer Preferences with Energy Regulations," *Journal of Regulatory Economics*, 2013

Table 6. Comparison of compliance strategies estimates

Compliance Strategy	GAO (94)	Rico (95)	EIA (94)
Switch and/or Blend Coals	55%	63%	59%
Purchase Allowances[a]	3%	9%	15%
Install Scrubbers	16%	11%	10%
Pre-Phase I Compliance[b]	18%	15%	10%
Switch to Natural Gas/Oil	5%	1%	3%
Retire Plants/Repowering	3%	1%	2%
Total	100%	100%	99%

[a] The EIA find that 15 percent of utilities are using allowances in combination with other strategies.

[b] For Rico (1995) and GAO (1994), this includes reduced utilization, and substitution of Phase II sources.

Source: Dallas Burtraw, “Cost Savings Sans Allowance Trades? Evaluating the SO2 Emission Trading Program to Date,” Resources for the Future Discussion Paper 95-30-REV

What to do about climate change is inevitably an economic question