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# THE REGULATION OF NATURAL MONOPOLIES



NOVEMBER 21, 2024

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**ECONWERKS**

# THE REGULATORY APPROACH

## CONVENTIONS:

Guided by Statutes and Rules

Just and Reasonable Standard

Public Interest Standard

Due Process

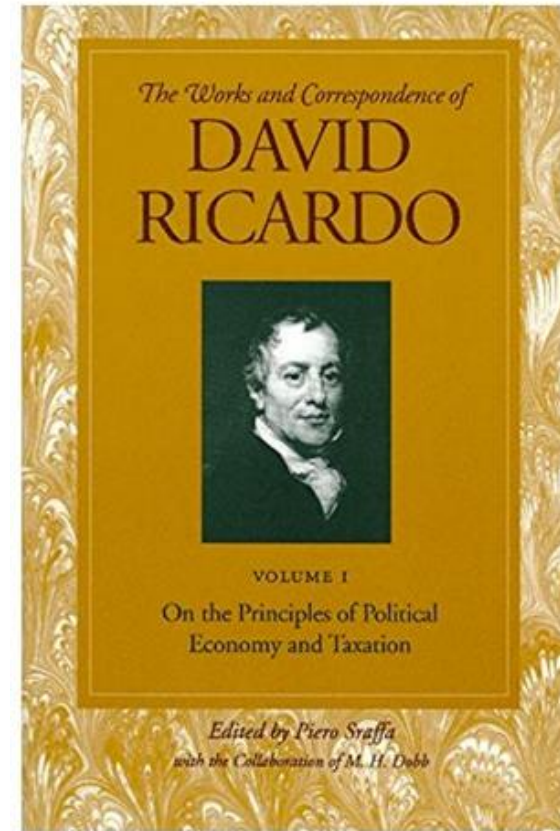
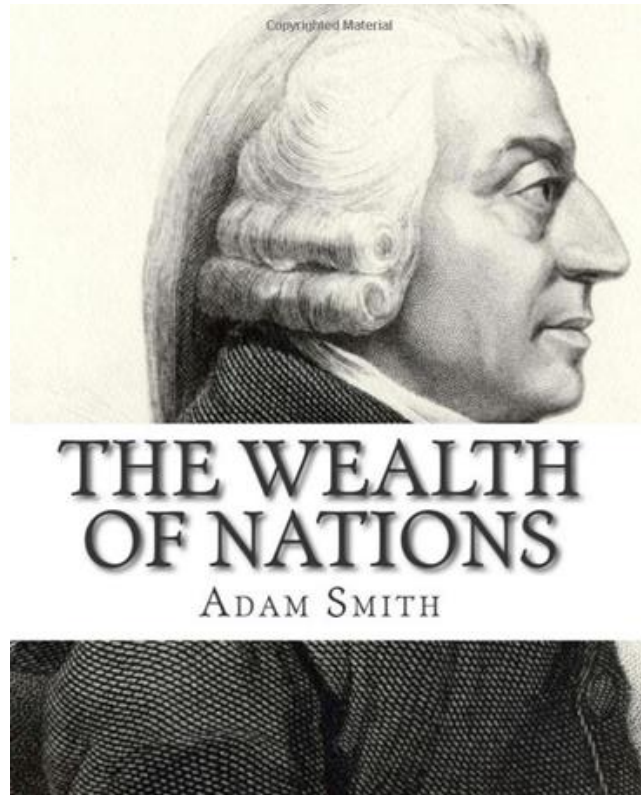
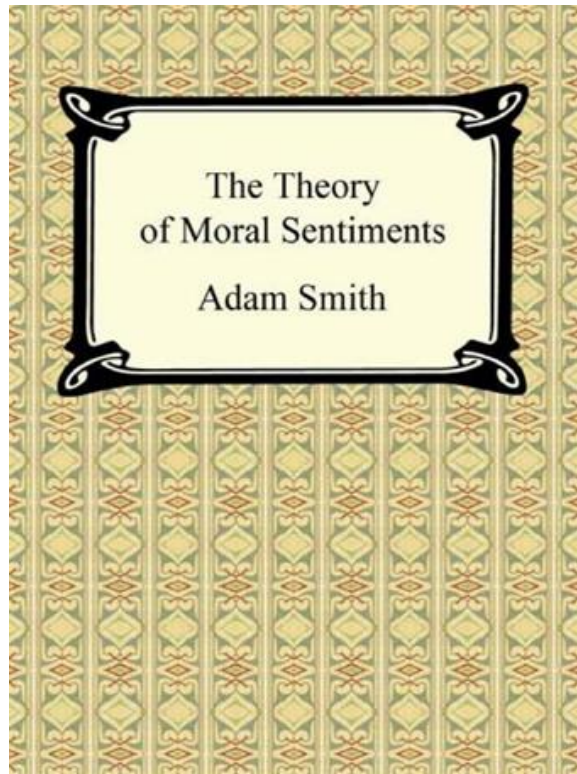
No Arbitrary and Capricious Acts

Balance Political Economy

Policy Adoption Following Elections

*How Does This Compare to Economics?*

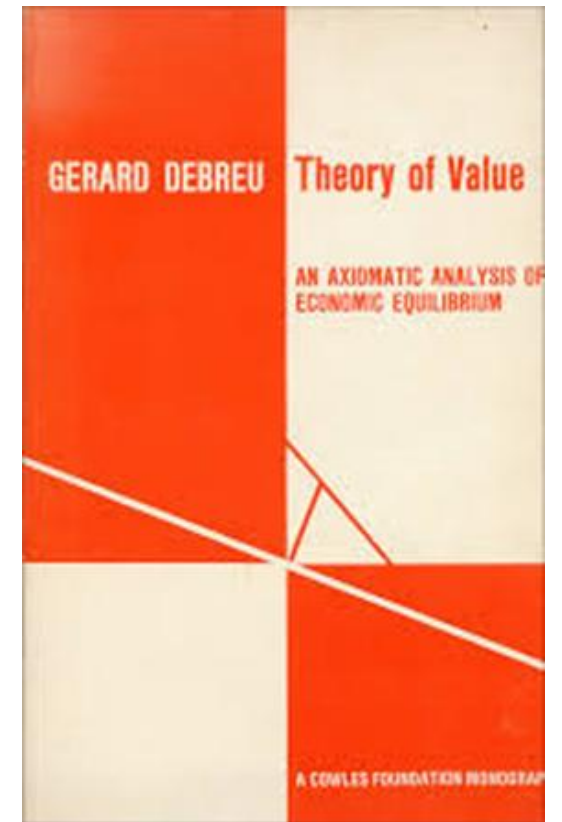
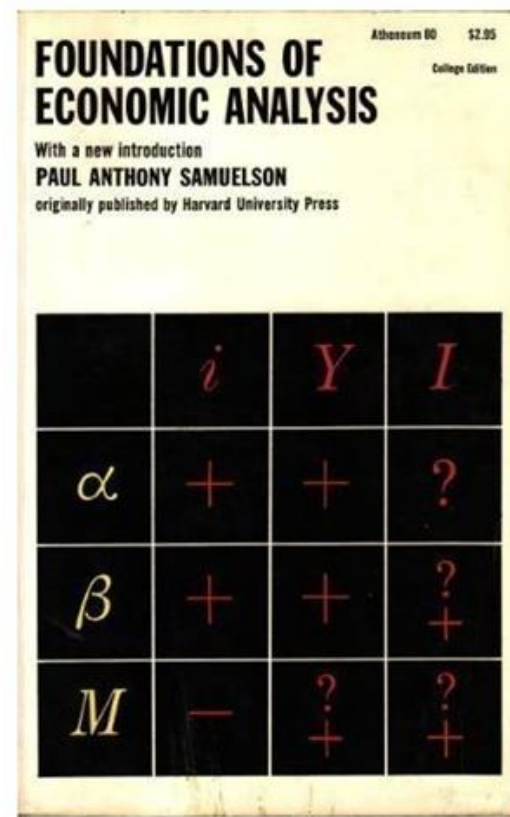
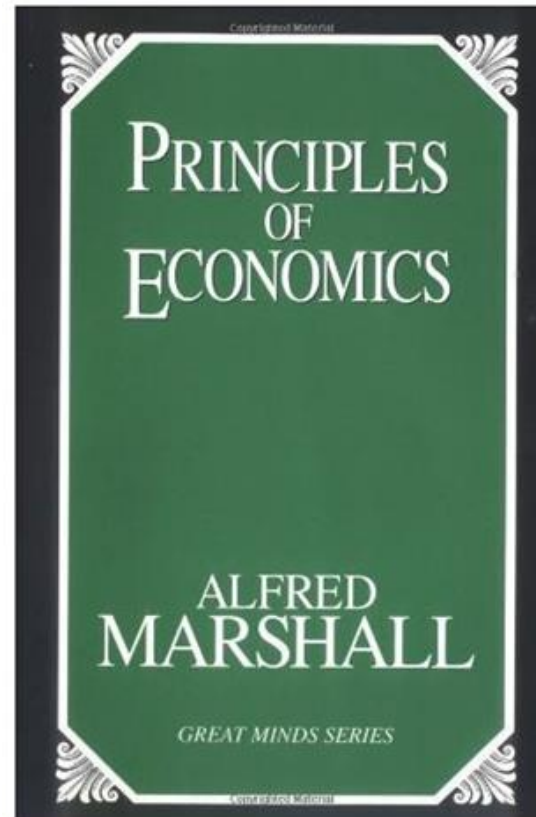
# NEOCLASSICAL ECONOMICS I



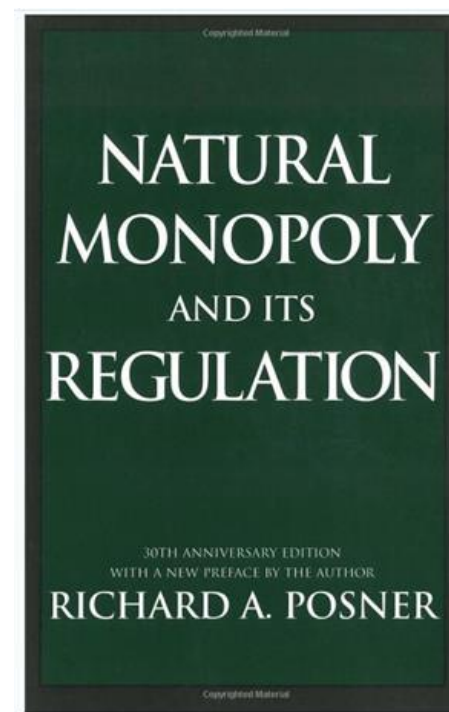
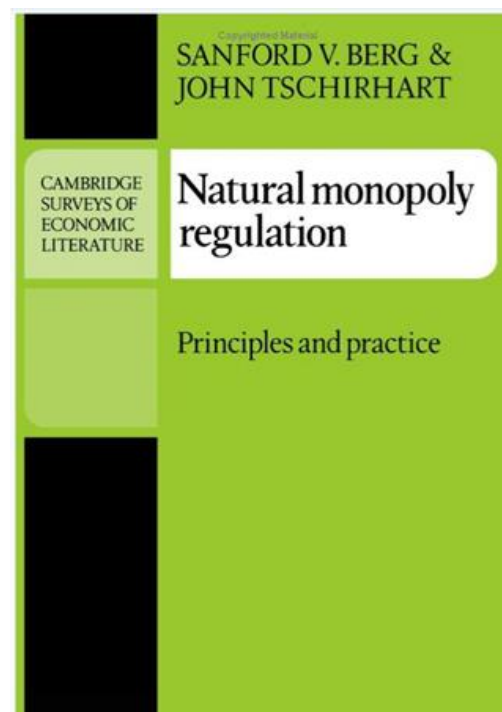
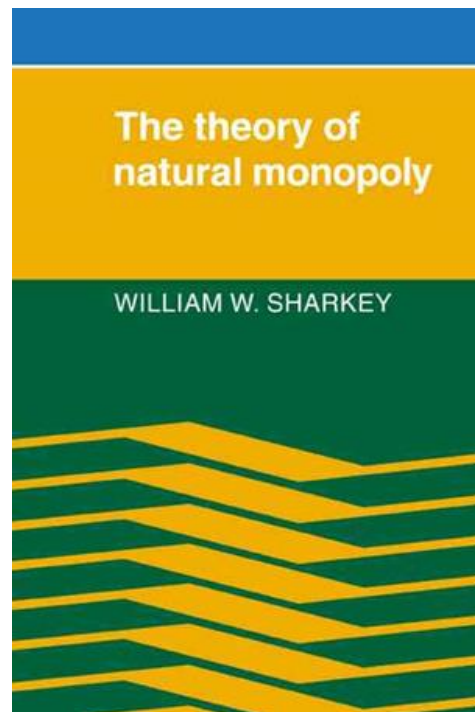
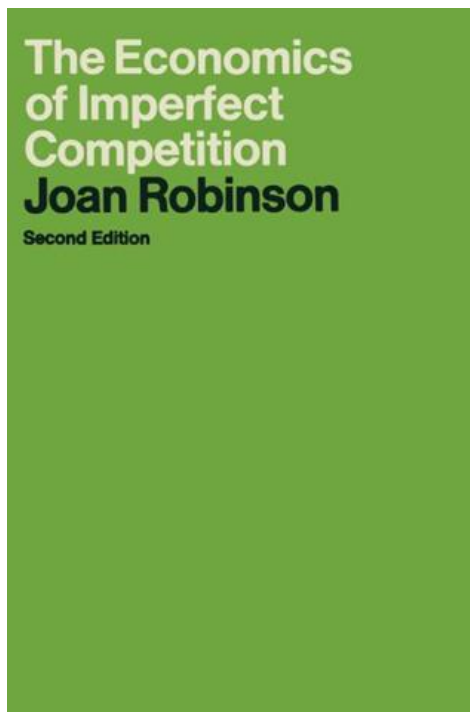
- Adam Smith 1759, 1776
- David Ricardo 1817

# NEOCLASSICAL ECONOMICS II

- Alfred Marshall 1890
- Paul Samuelson 1948
- Gerard Debreu 1959

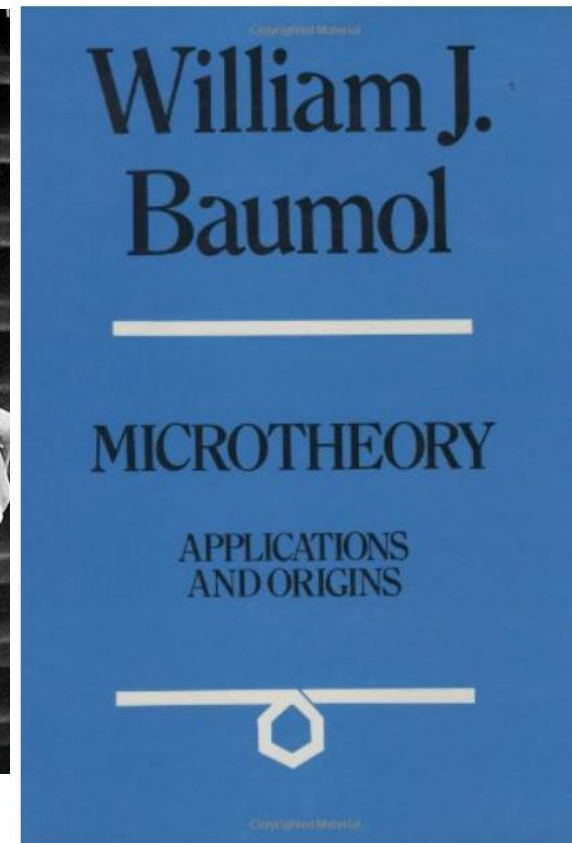
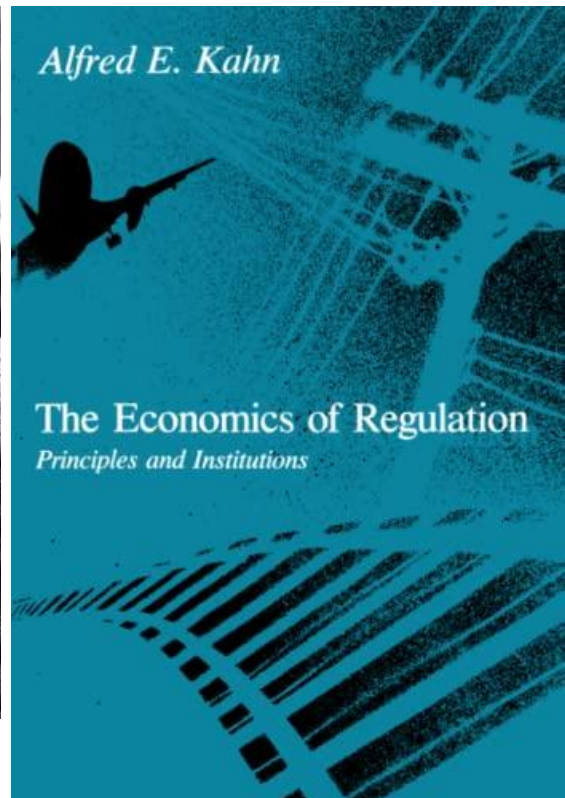
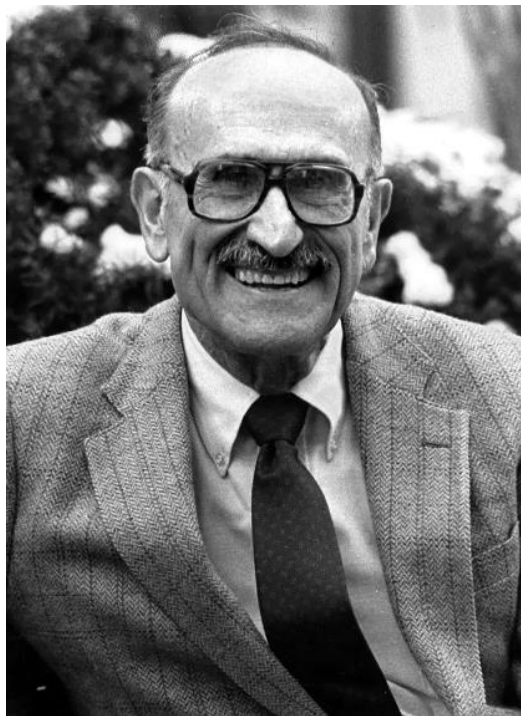


# IMPORTANT BOOKS IN NATURAL MONOPOLY ECONOMICS



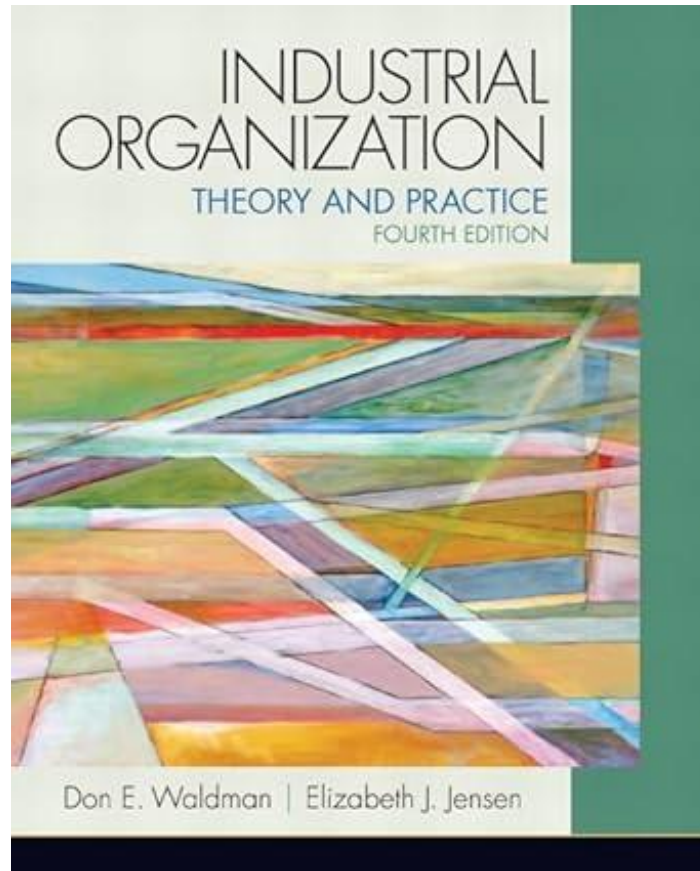
- Joan Robinson 1930s
- William Sharkey 1970s
- John Tschirhart, Sanford Berg 1980s
- Richard Posner 1980s

# SEMINAL BOOKS ON DEREGULATION OF MONOPOLIES



- Alfred Kahn 1970s,
- William Baumol 1980s

# GREAT OVERVIEW OF CONCEPTS



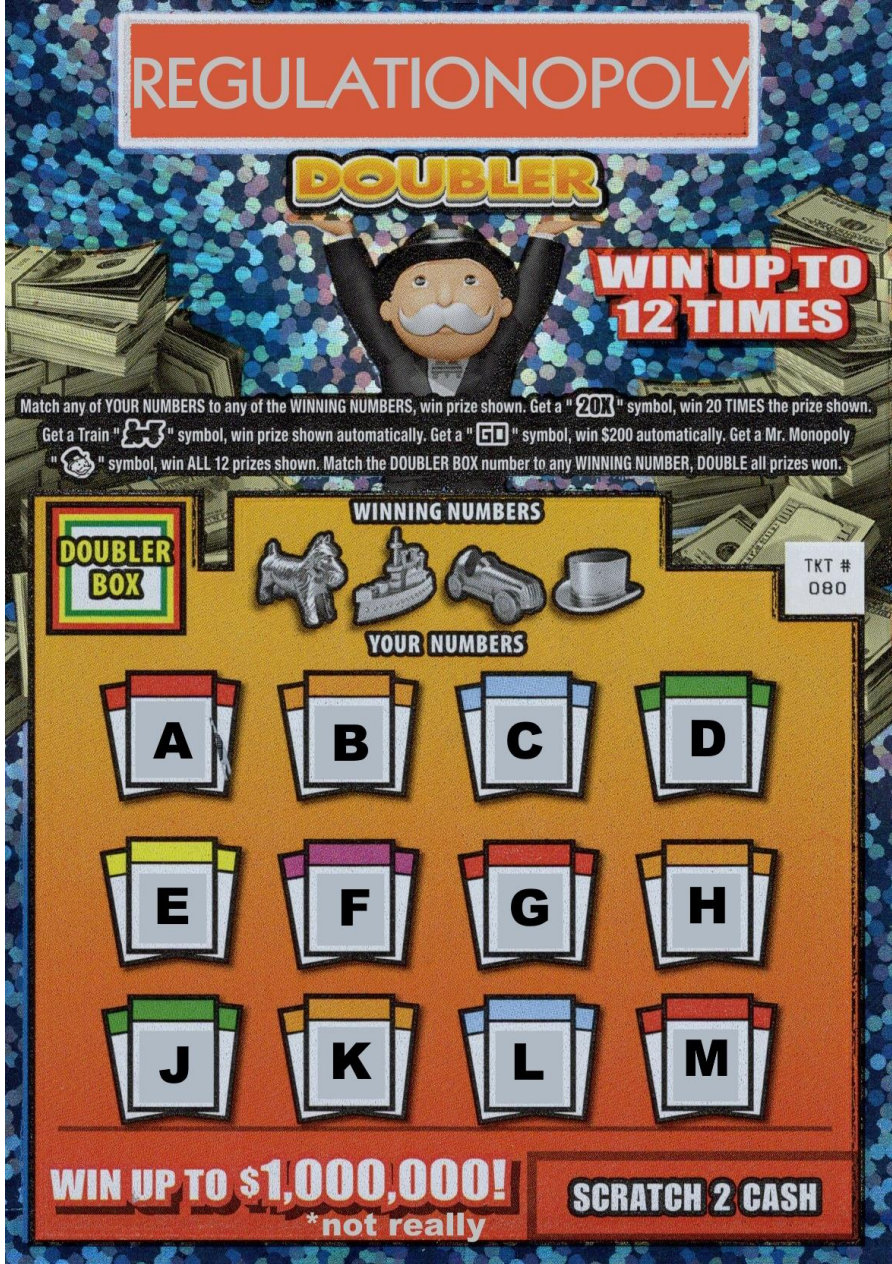
REPRINTS  
AVAILABLE

- Don Waldman &
- Elizabeth Jensen 2014-2019



# YOUR REGULATIONOPOLY GAME CARD

CHOOSE  
YOUR LETTER...



**REGULATIONOPOLY**

**DOUBLER**

**WIN UP TO 12 TIMES**

Match any of YOUR NUMBERS to any of the WINNING NUMBERS, win prize shown. Get a "20X" symbol, win 20 TIMES the prize shown. Get a Train "🚂" symbol, win prize shown automatically. Get a "🏠" symbol, win \$200 automatically. Get a Mr. Monopoly "👤" symbol, win ALL 12 prizes shown. Match the DOUBLER BOX number to any WINNING NUMBER, DOUBLE all prizes won.

**WINNING NUMBERS**

**YOUR NUMBERS**

TKT # 080

A	B	C	D
E	F	G	H
J	K	L	M

**WIN UP TO \$1,000,000!**  
\*not really

**SCRATCH 2 CASH**

## SIGNS OF NATURAL MONOPOLY

**HIGH FIXED COSTS**

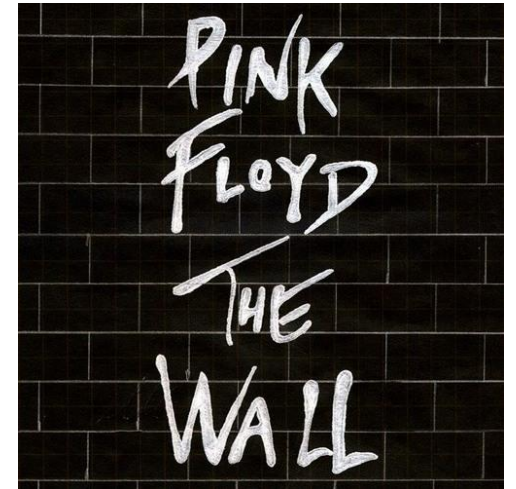
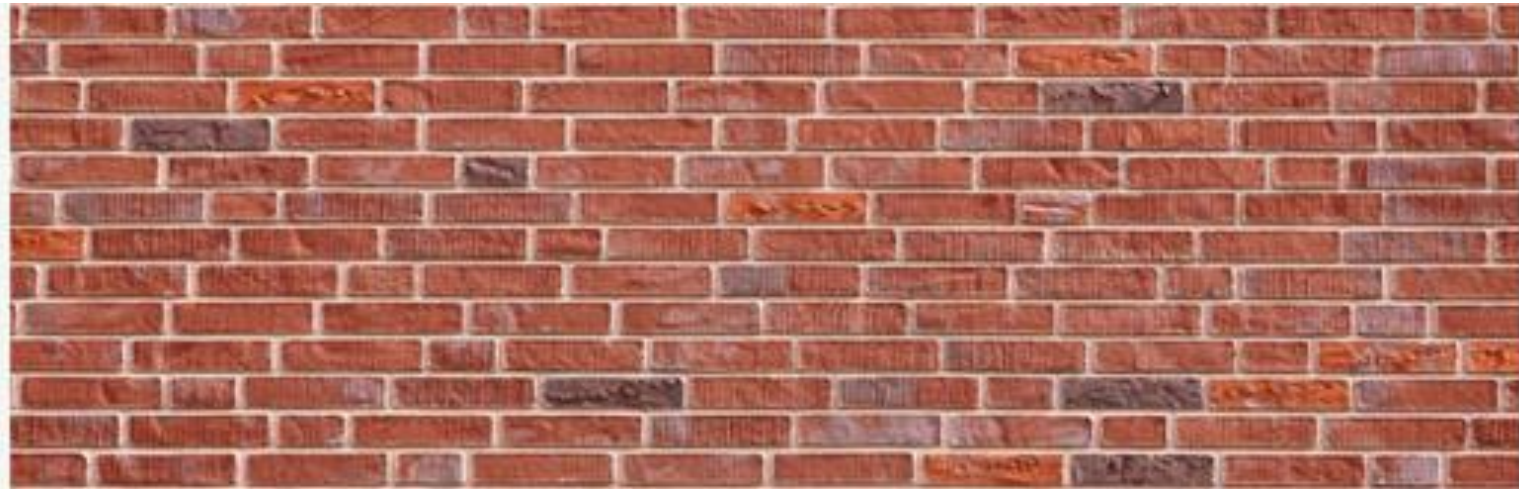
**SIGNIFICANT ENTRY BARRIERS**

**LOW MARGINAL COSTS**

**POSITIVE NETWORK EXTERNALITIES**

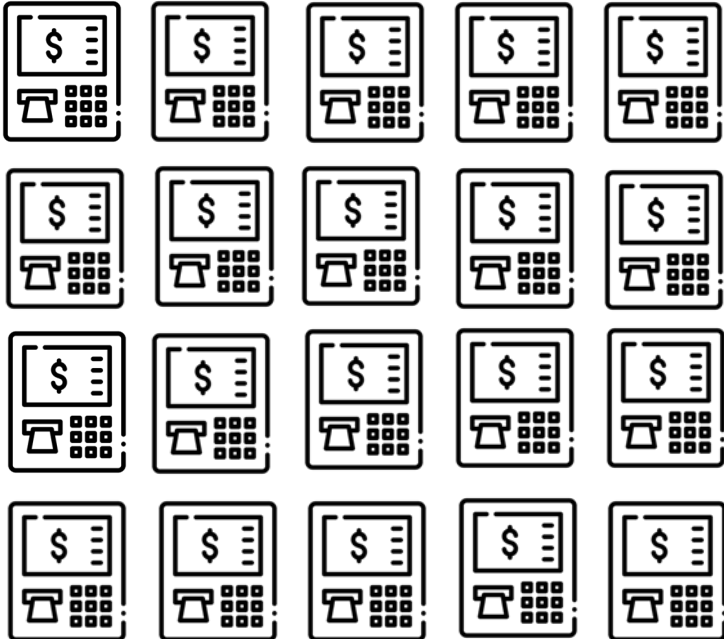
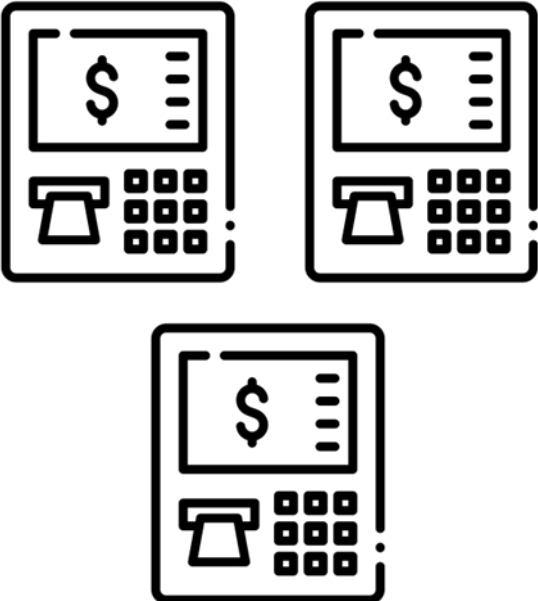
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# HIGH FIXED COSTS SIGNIFICANT ENTRY BARRIERS



1979

# POSITIVE NETWORK EXTERNALITIES

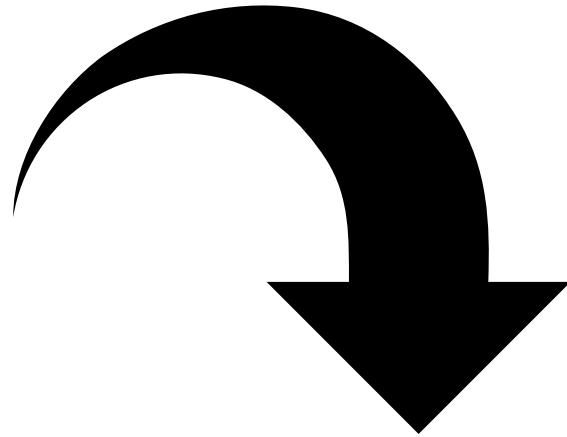


ATMs



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**LOW MARGINAL COSTS**



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## CLASSIC INDUSTRIES:

HOSPITALS 

AIRLINES 

RAILROADS 

ELECTRIC, GAS, & WATER UTILITIES  

TELECOMMUNICATIONS 

# NEWER POSSIBILITIES ??

IT OPERATING SYSTEMS



SEARCH ENGINES

89-95% Market Share



PHONE OS





## **DOJ asks court to force Google to divest Chrome browser**

The US government has urged a federal judge to force Google to divest its Chrome browser after a ruling found that Google holds a monopoly in the search market and violated US antitrust law.



IMPORTANT NATURAL MONOPOLY CONCEPTS

**ECONOMIES OF SCALE  
&  
SUB-ADDITIVITY**



“Hint--An Easy Test for Natural Monopoly:  
Assume One Firm, Add Another,  
If Prices Then Rise or the Two Become  
Unprofitable, Likely [Subadditivity] at Work”

Dr. C. EVERETT KOOP (Surgeon General) NBC Program 1991



# ECONOMIES OF SCALE



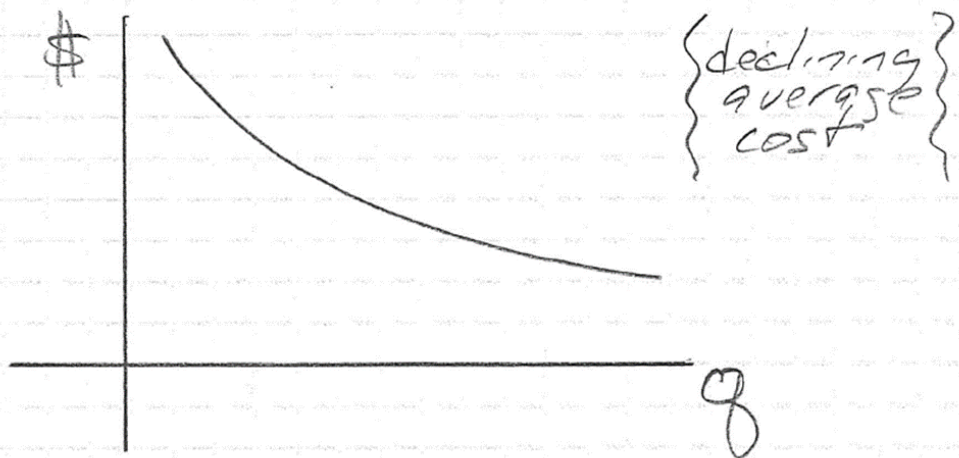
# THE MATH AND GEOMETRY OF NATURAL MONOPOLY

## MATH NATURAL MONOPOLY DEFIN

A)  $\frac{\text{Cost}(\lambda \cdot q)}{q} < \frac{\lambda \cdot \text{Cost}(q)}{q}$

Econ. of Scale      eg:  $\frac{1}{2}$        $\frac{1}{2}$

$\text{Cost}(15 \cdot 1) < 15 \cdot \text{Cost}(1)$

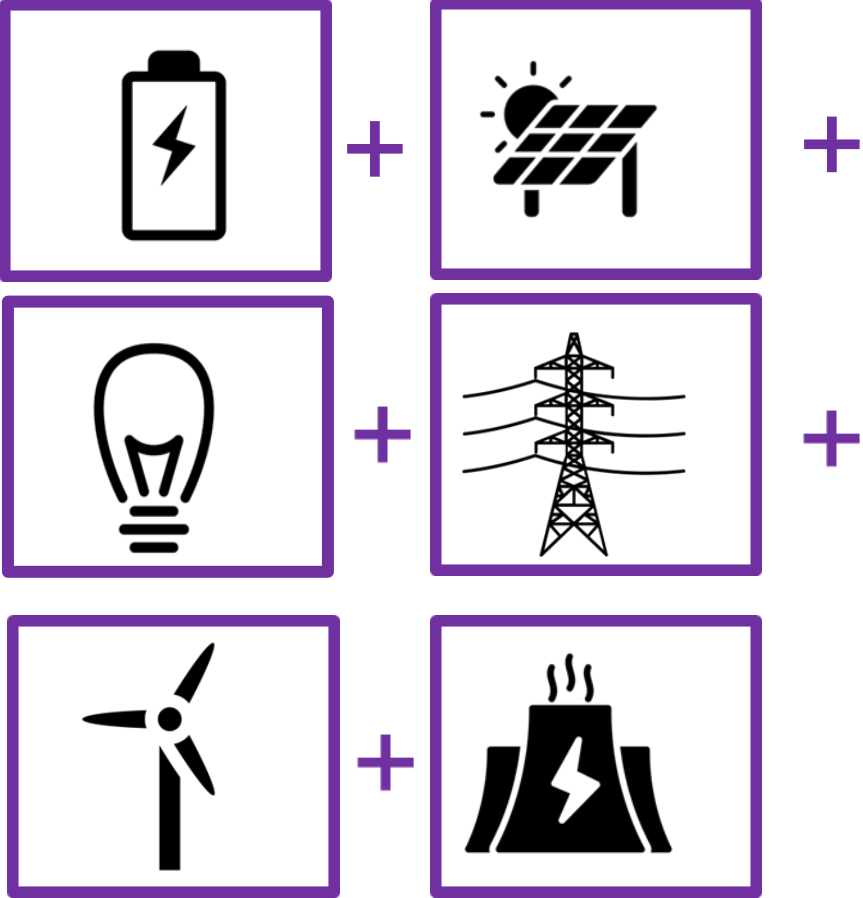
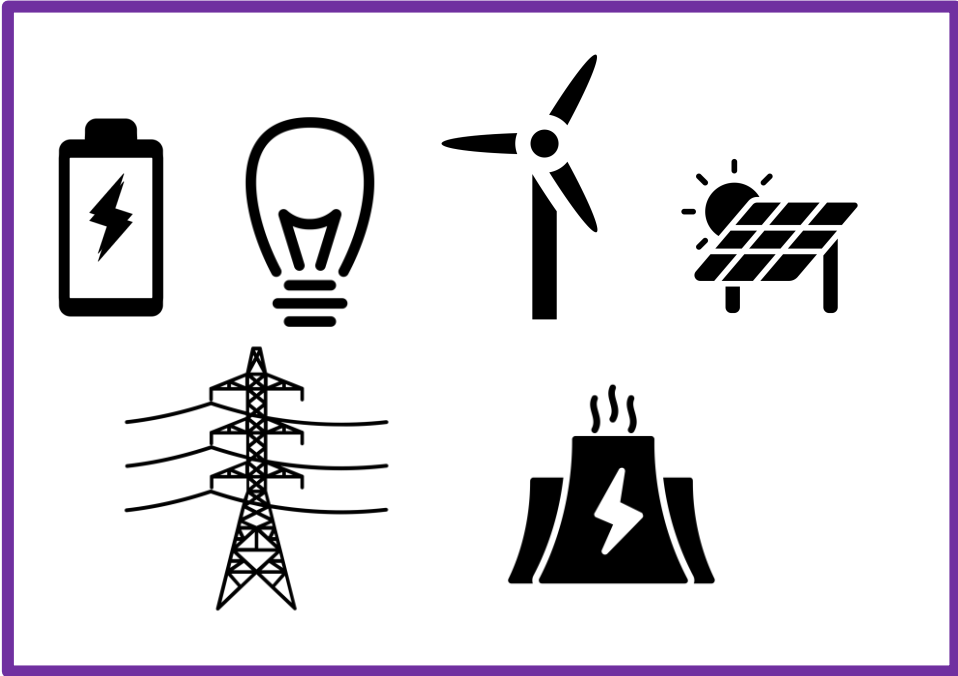


# SUB ADDITIVITY

COST (TOGETHER)

<

COST (INDIVIDUALLY)  $\Sigma$



B)  
Sub  
Additivity

$$\text{Cost}\left(\sum_{i=1}^m g^i\right) < \sum_{i=1}^m \text{Cost}(g^i)$$

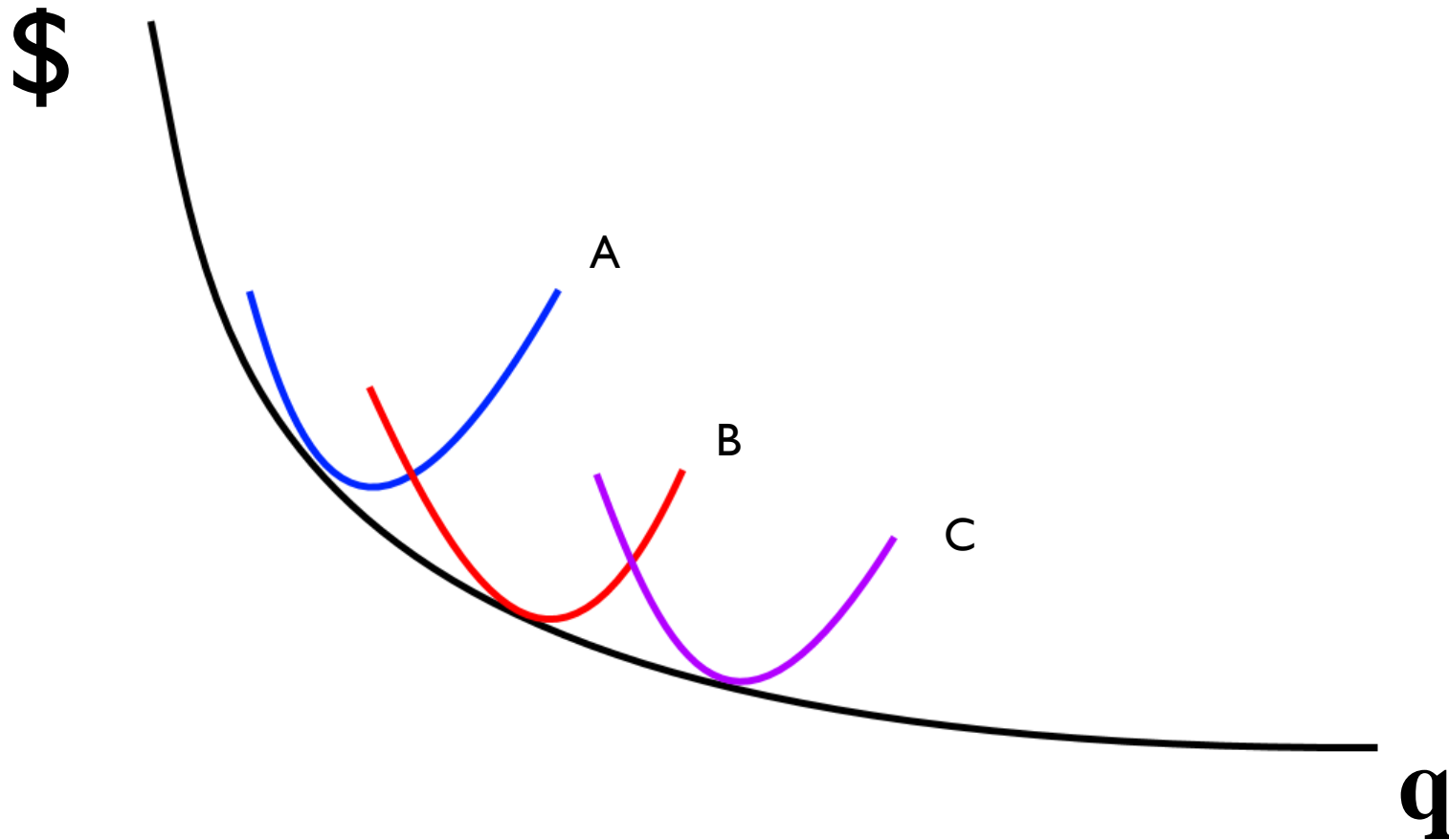
one supplier is best

necessary & sufficient  
conditions

Ⓐ → Strong Natural Monopoly

Ⓑ but not Ⓐ → Weak  
Nat.  
Monopoly

# NATURAL MONOPOLY THEORETIC: LOCAL VERSUS GLOBAL EQUILIBRIUM EXAMPLE ORIGINAL REASON FOR REGULATION ?



## Classic Examples

Electric, Gas, Water Utilities

Hospitals

Airlines

Railroads

Telecommunications

USE YOUR IMAGINATION™

# Blue Book

EXAMINATION BOOK

Box No. \_\_\_\_\_

NAME \_\_\_\_\_

SUBJECT \_\_\_\_\_

CLASS \_\_\_\_\_

SECTION \_\_\_\_\_

INSTRUCTOR \_\_\_\_\_

DATE \_\_\_\_\_

11" x 8.5" 12 LEAVES 24 PAGES

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**ECONWERKS**

**CONJECTURE  
OF NATURAL MONOPOLY  
IN AEROSPACE  
MANUFACTURE**

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EXAMPLE OF FINANCIAL INSTABILITY DYNAMIC

**AIRBUS**





THE WALL STREET JOURNAL.



# Boeing Is in Crisis. Airbus Is Struggling to Power Ahead.

World's biggest jet maker has had a frustrating change in fortunes, having been confident it could capitalize this year on a postpandemic surge in demand

By *Benjamin Katz*

August 13, 2024, 5:30 am EDT



BARRON'S



Shares of Boeing are down 46% this year. PHOTO: DREAMSTIME

AEROSPACE AND DEFENSE

## Boeing Stock Sale Was Supposed to Mark the Bottom. Shares Just Keep Dropping.

The plane maker's new CEO is making some progress on his turnaround goals.

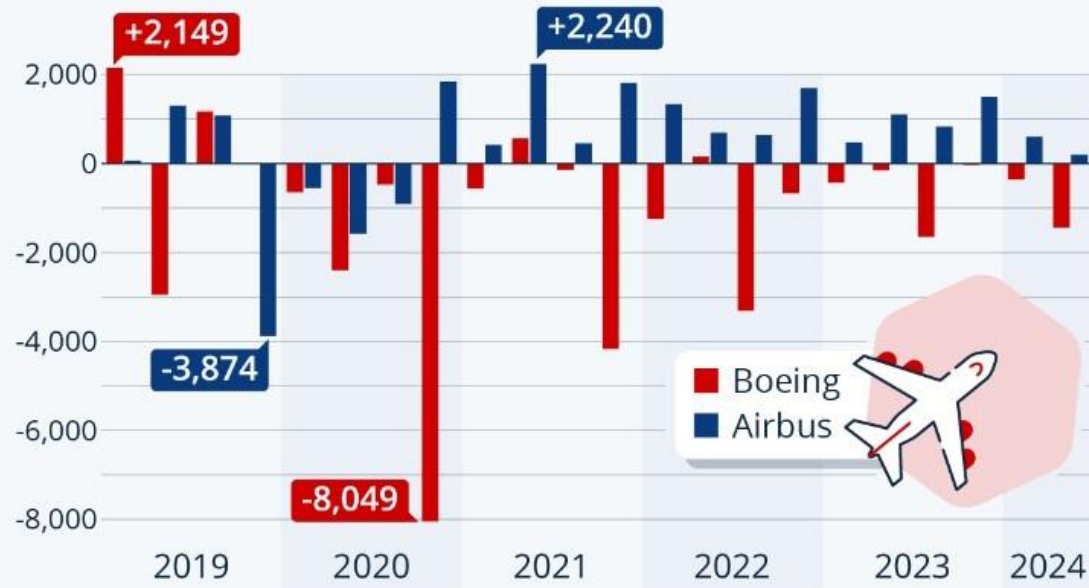
[Al Root](#)

Updated November 14, 2024, 4:15 pm EST

Original November 14, 2024, 10:35 am EST

# Boeing & Airbus: Making Money or Losing Money?

Quarterly net profit/loss of The Boeing Company and Airbus  
(in million U.S. dollars)



Airbus numbers converted from Euros using quarterly averages

Sources: The Boeing Company, Airbus



Yahoo Finance—August 2024

The Boeing Company (BA) ☆

NYSE - Nasdaq Real Time Price. Currency in USD

143.13 -2.95 (-2.02%)

As of 01:51PM EST. Market open.

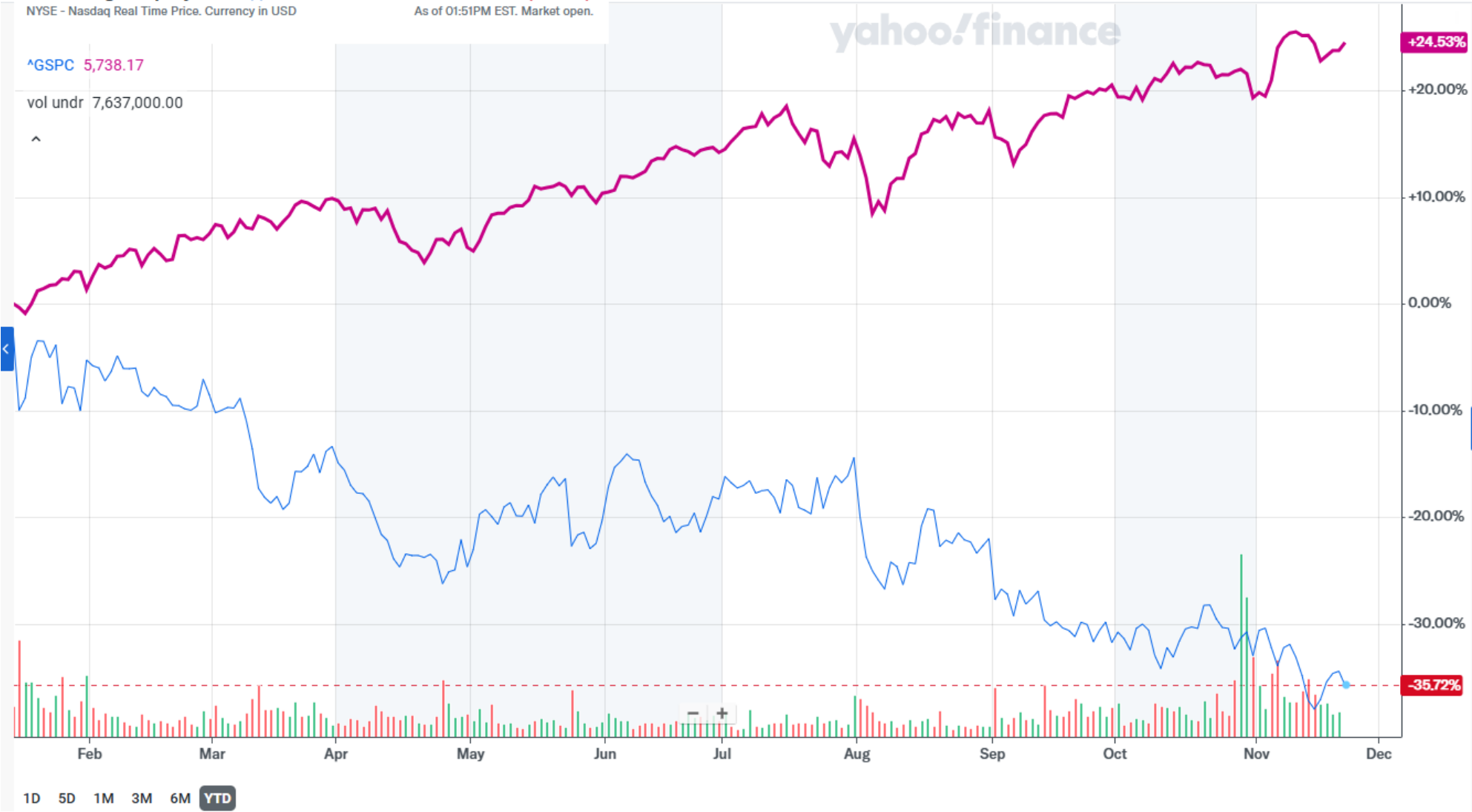
NOVEMBER 21, 2024

^GSPC 5,738.17

vol undr 7,637,000.00

^

yahoo!finance



1D 5D 1M 3M 6M YTD

+24.53%

+20.00%

+10.00%

0.00%

-10.00%

-20.00%

-30.00%

-35.72%

# KEY CHALLENGES FOR NATURAL MONOPOLIES

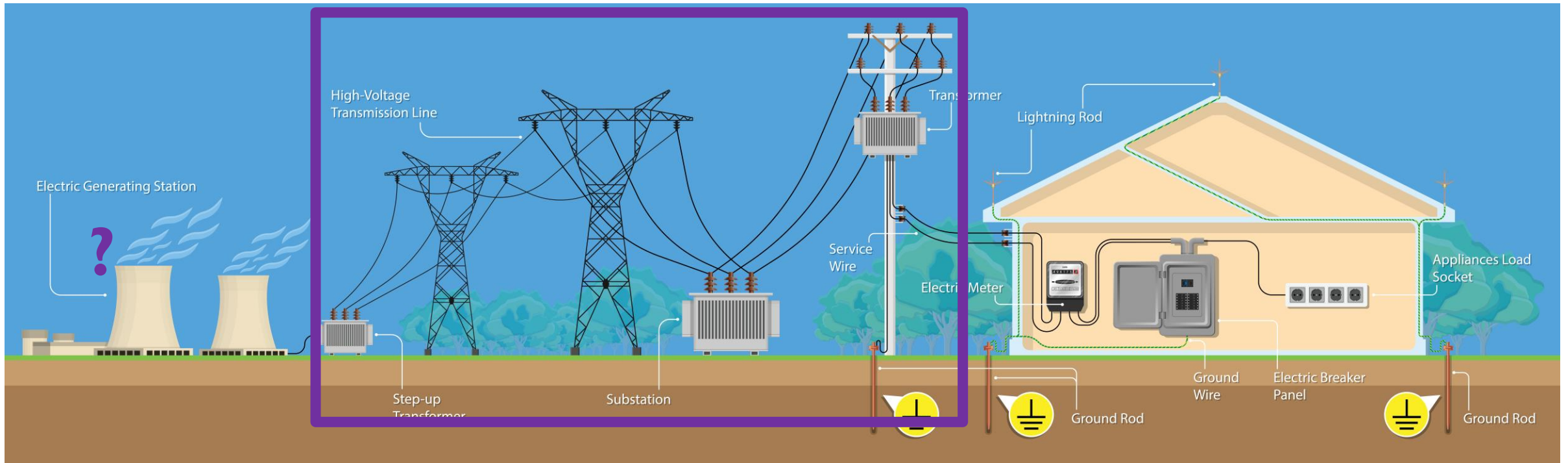
## COST CONTROL & FINANCIAL STABILITY





# ELECTRIC INDUSTRY OVERVIEW

# NATURAL MONOPOLY ELEMENTS



**Particularly Network Operations, Transmission Grid,  
& Utility-Scale Nuclear Generation**

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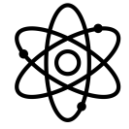
# CLEARLY NATURAL MONOPOLY



# CLEARLY NATURAL MONOPOLY



*MISO CONTROL ROOM*



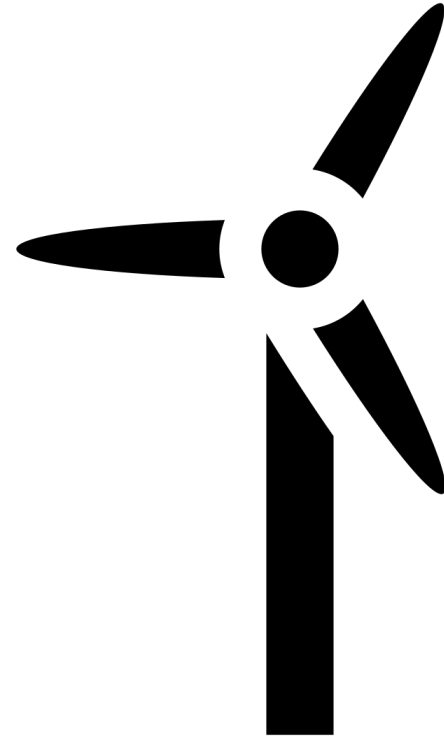
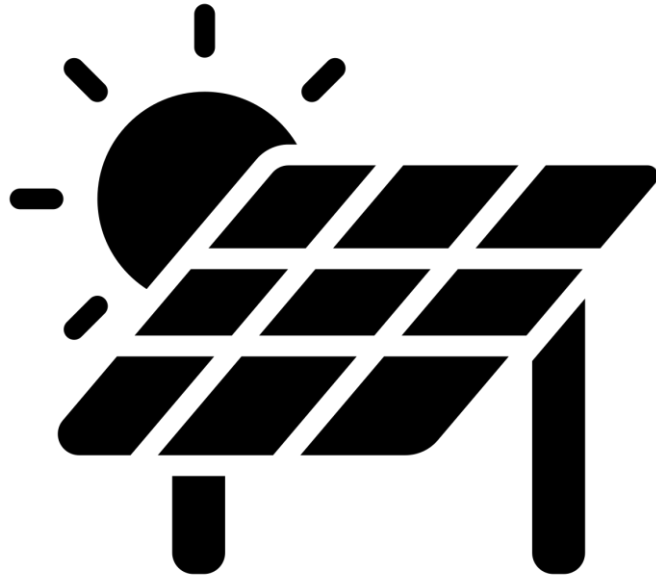
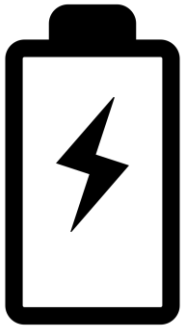
# ALSO NATURAL MONOPOLY



*March 2024 Georgia Power*

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# NOT NATURAL MONOPOLY !



DEMONSTRATED MERCHANT ACTIVITY

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# PRICE DETERMINATION



## THEORY OF THE FIRM

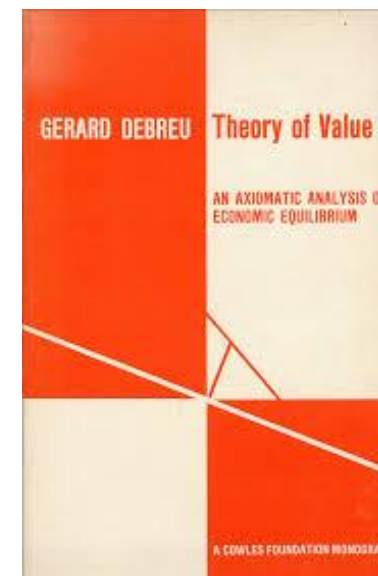
MAXIMIZE PROFIT

PROFIT = REVENUE - COST

From Calculus:

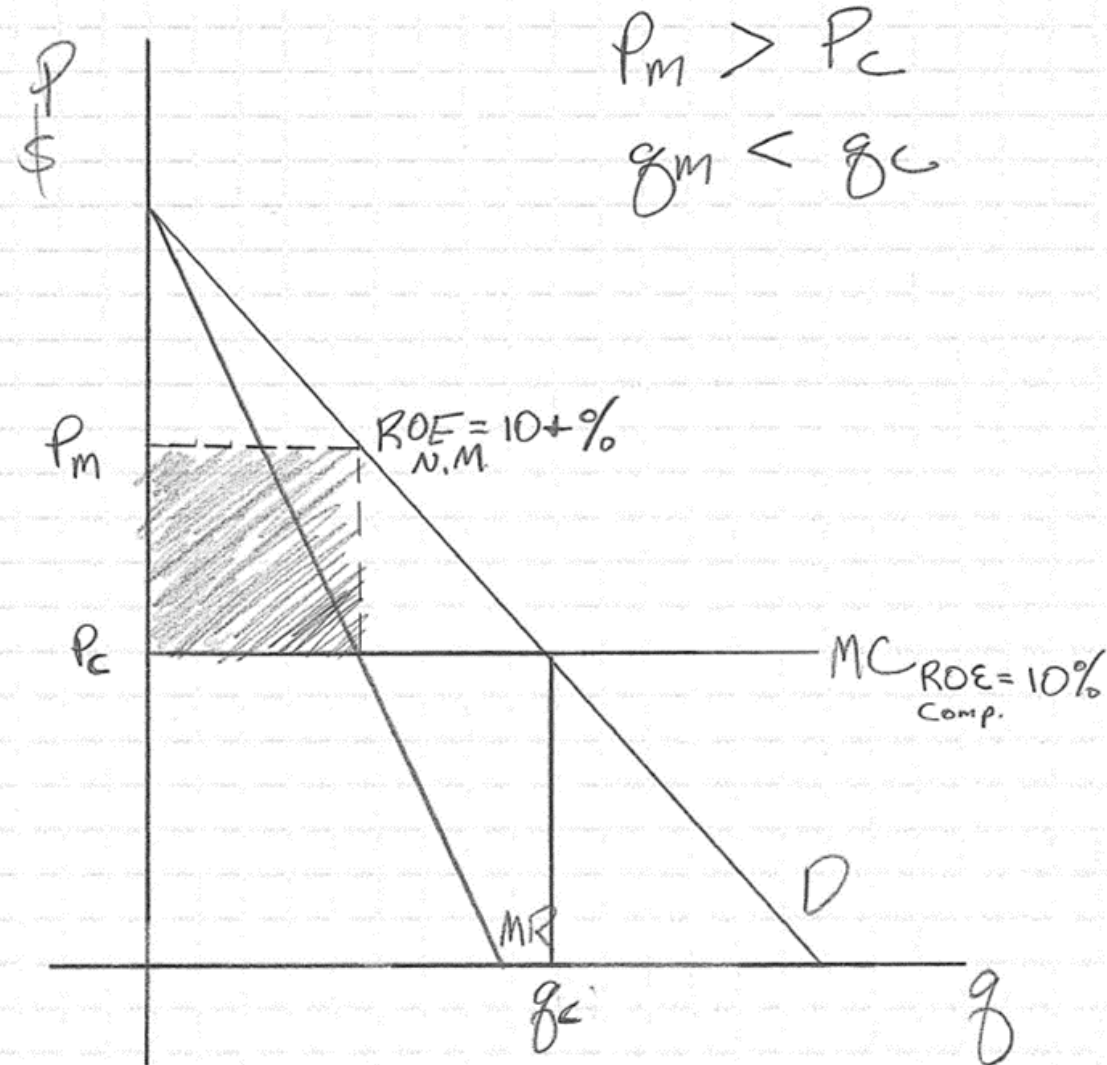
Marginal Revenue = Marginal Cost

$$MR = MC = \text{Price}$$





# NATURAL MONOPOLY VS COMPETITION



10% ROE  
Used for Illustration  
Purposes Only

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# UNCONSTRAINED NATURAL MONOPOLY RESULT






















**PRICE** [MONOPOLY]

>

**PRICE** [COMPETITION]

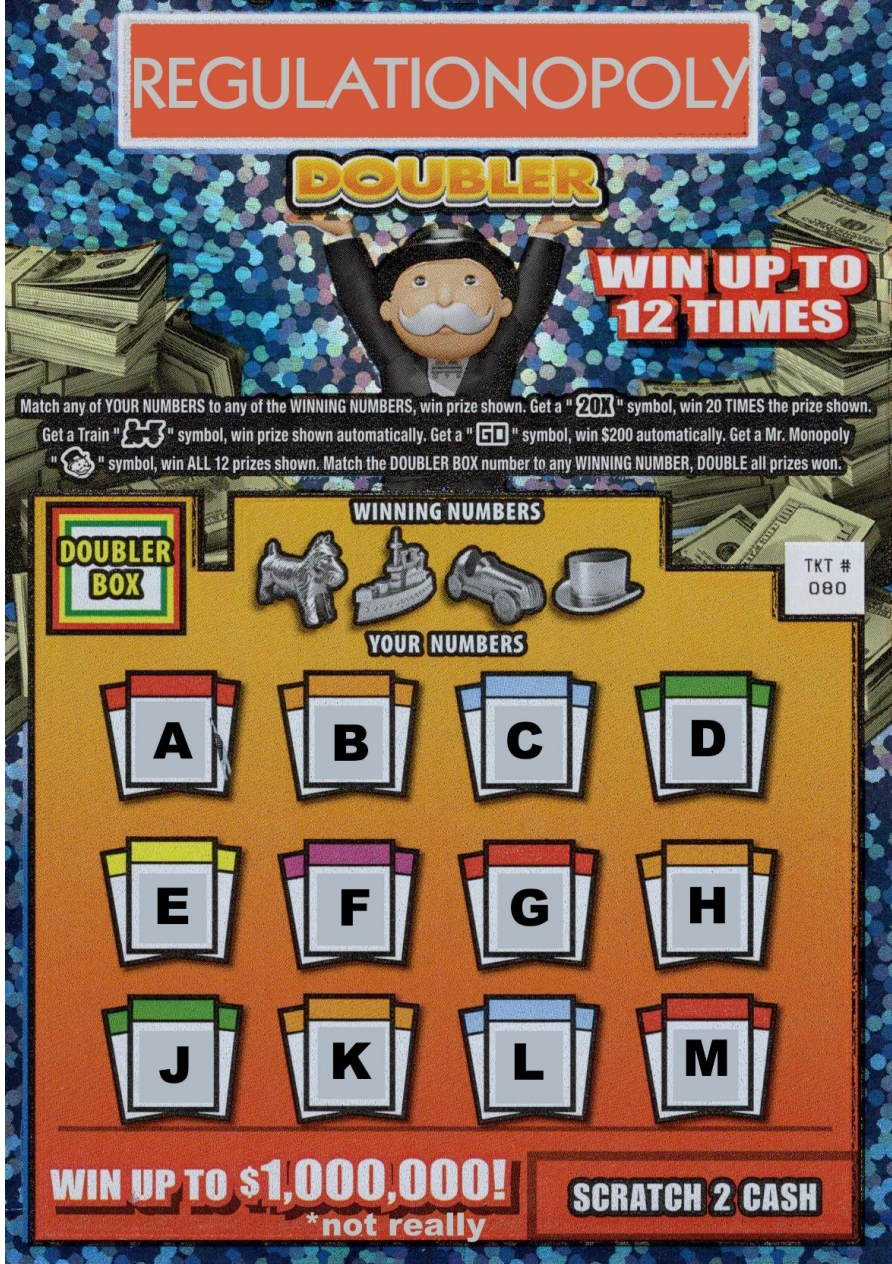


$$P_m > P_c \Rightarrow ROE_m > ROE_c$$

 <p>COMMISSION MEETING</p>	 <p>\$17B</p>	<p>RATES UP 10% GO</p>	 <p>\$21B</p>	 <p>\$23B</p>	<p>GO TO TECHNICAL HEARING</p> 
 <p>\$17B</p>		<p style="text-align: center;"><b>REGULATIONOPOLY</b></p>   <p>ELECTORAL LOTTO</p> <p>ELECTRICITY</p>  			 <p>BUY CAR MSRP \$45,990</p>
<p>DTE</p> <p>\$15B</p>					 <p>\$25B</p>
<p>RATES GO DOWN 5%</p>					<p>UTILITY GETS \$1B CPCN</p>
 <p>\$15B</p>					 <p>\$36B</p>
<p>PASSING THROUGH</p> 	 <p>\$14B</p>	 <p>\$14B</p>	<p>UTILITY GETS HIGHER ROE</p>	 <p>NARUC MTG</p>	<p>GO COLLECT \$1,000</p>  <p>PLAY ELECTORAL LOTTO</p>

# THE REGULATIONOPOLY GAME CARD

What Letter  
Did You Choose?...



**REGULATIONOPOLY**  
**DOUBLER**  
**WIN UP TO 12 TIMES**

Match any of YOUR NUMBERS to any of the WINNING NUMBERS, win prize shown. Get a "20X" symbol, win 20 TIMES the prize shown. Get a Train "🚂" symbol, win prize shown automatically. Get a "🏠" symbol, win \$200 automatically. Get a Mr. Monopoly "👤" symbol, win ALL 12 prizes shown. Match the DOUBLER BOX number to any WINNING NUMBER, DOUBLE all prizes won.

**WINNING NUMBERS**  
🐕 🚢 🚗 🍵

**YOUR NUMBERS**

<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>
<b>J</b>	<b>K</b>	<b>L</b>	<b>M</b>

**DOUBLER BOX** TKT # 080

**WIN UP TO \$1,000,000!**  
\*not really

**SCRATCH 2 CASH**

# Choice Key:

A—Stuck in Technical Hearing

B—Rates Increase 5%

C—Utility Proposes Merger

D—Rates Increase 10%

E—Go to Technical Hearing

F—Prepare More Testimony

G—Another ‘Go’ Payday

H—Utility Proposes T-Line

J—Another Power Plant CPCN

K—Vacation Day

L—Lucky Day, Win Tesla (matchbox version)

M—Governor picks New Commissioner



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# REGULATORY PARADIGMS

- PUBLIC ENTERPRISE 
- MUNICIPALIZE 
- INVESTOR-OWNED UTILITY

# TEN LARGEST ELECTRIC UTILITY OPERATIONS

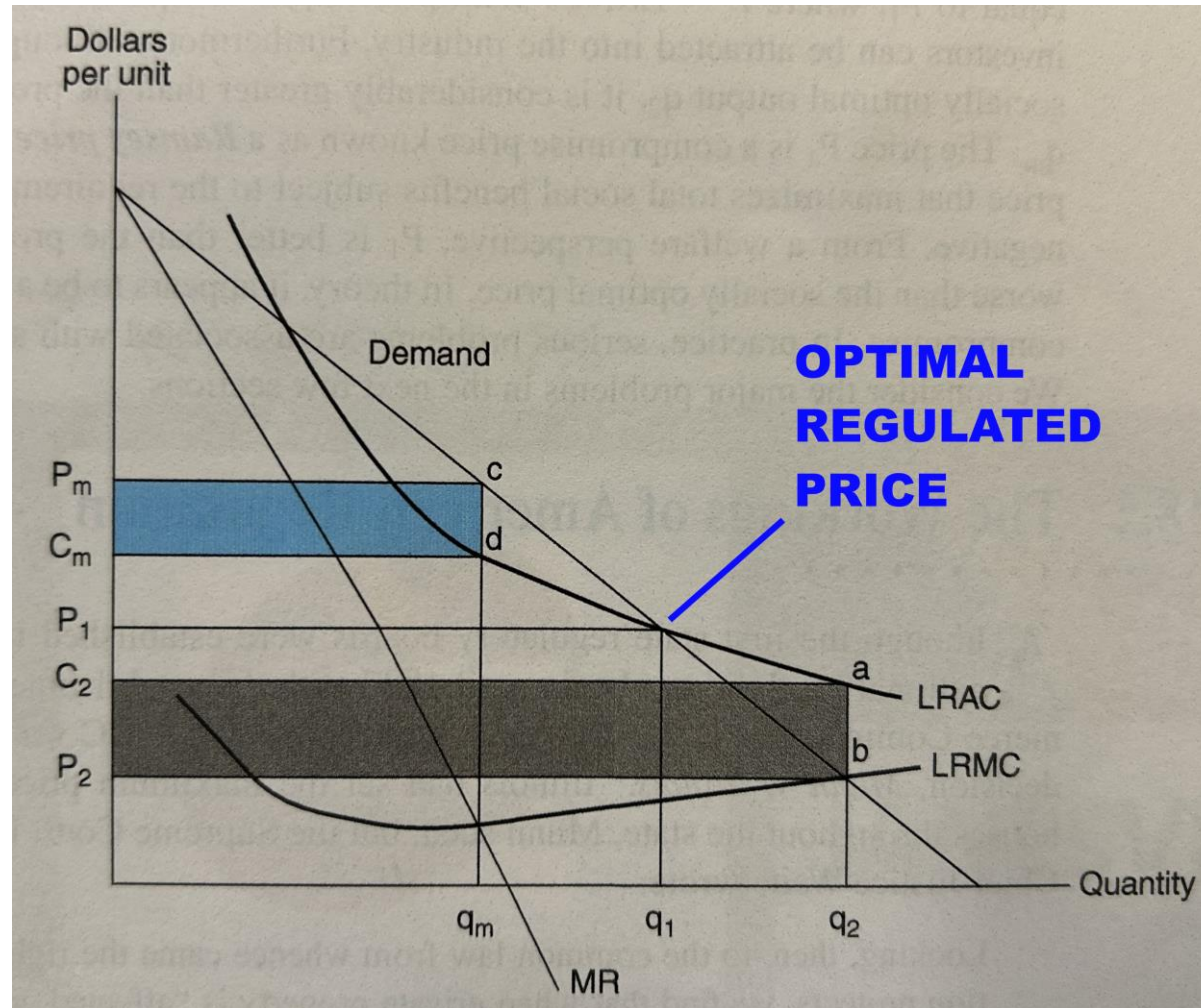


Southern  
Company





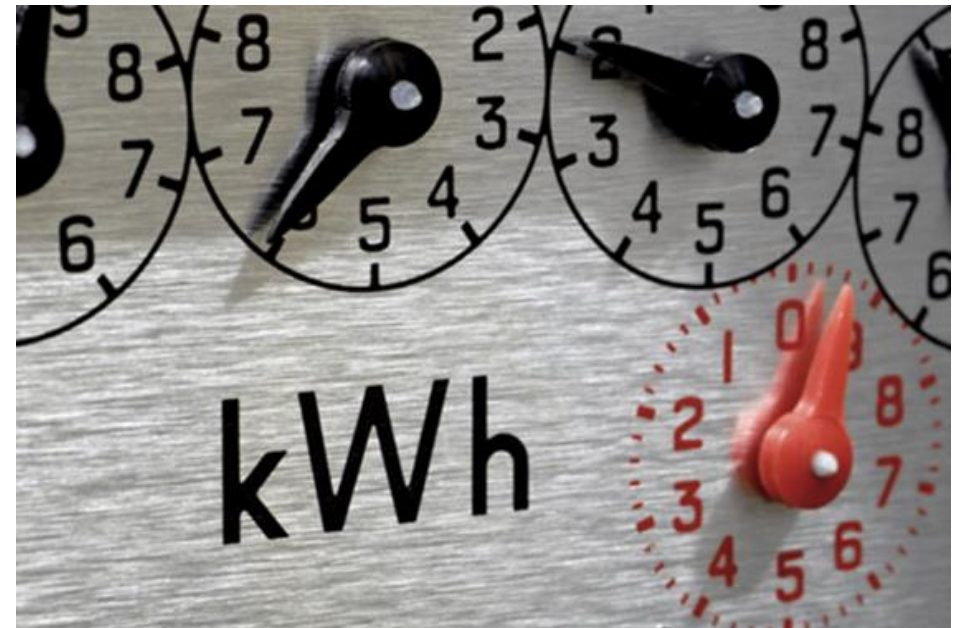
# MONOPOLY PRICE REGULATION



FROM THE WALDMAN TEXTBOOK

# PRICE REGULATION METHODS

- SET PRICE = AVG TOTAL COST
- UTILIZE TWO-PART PRICING
  - DEMAND CHARGE
  - ENERGY CHARGE
- RAMSEY PRICING
  - INVERSE ELASTICITY  
(Yield Management)



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# REGULATORY METHODS

- 1 PRICE-QUANTITY REGULATION
- 2 CONTESTABILITY & TRADE
- 3 TECHNOLOGICAL CHANGE
- 4 EXCESS PROFITS TAX
- 5 FEE & FRANCHISE PAYMENTS
- 6 NONE

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# REGULATORY METHODS #1

## PRICE-QUANTITY REGULATION

YARDSTICK

TRADITIONAL

PERFORMANCE-BASED

INCENTIVES

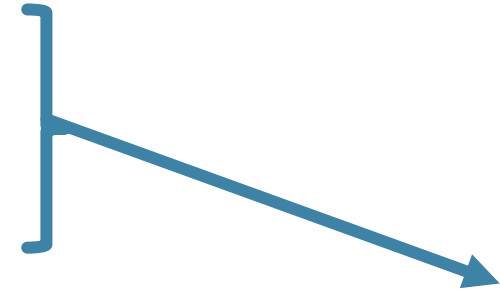
AUDIT & FINANCE ROE

REGULATORY LAG

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# REGULATORY METHODS #2 & #3

CONTESTABILITY & TRADE  
TECHNOLOGICAL CHANGE



MODERN  
APPROACH

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# REGULATORY METHODS #4, #5 & #6

EXCESS PROFITS TAX  
FEE & FRANCHISE PAYMENTS

**NONE !**

When Government Regulatory Inefficiency > Natural Monopoly Price Distortion  
*Joskow 2007*

# ECONOMIC THEORY VERSUS THE REGULATORY APPROACH

## Economics:

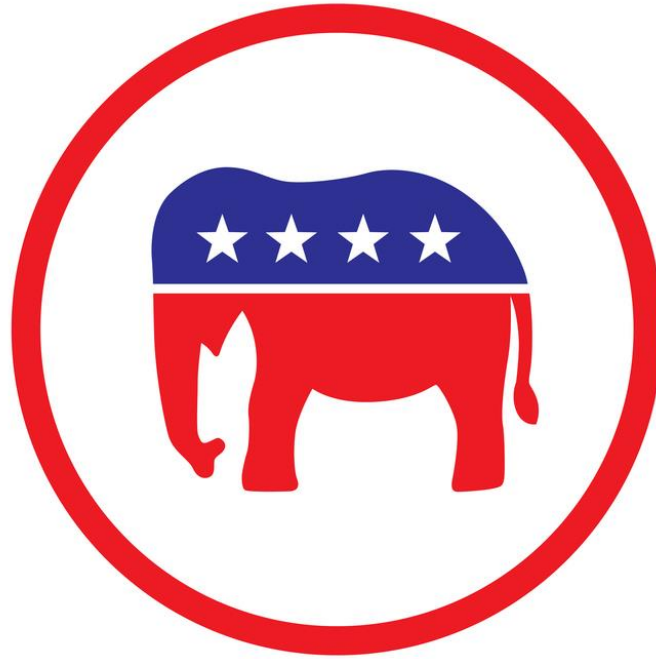
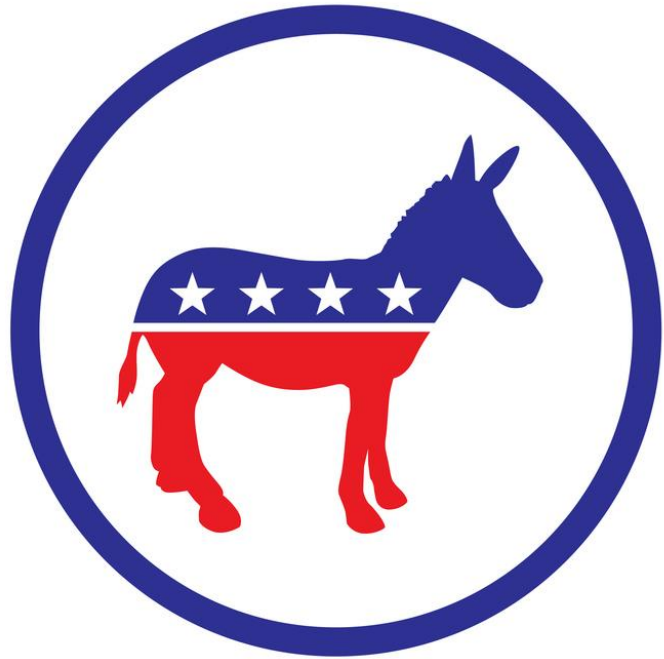
Replicate or Proxy Competition  
Emphasize Lowest Average Total Cost  
Utilize Marginal Valuation  
Create Contestability Conditions  
Foster Technological Adoption  
Transparent Information  
Economics and Engineering Foremost  
Consumers Preferences are Fickle

## Regulatory Practices:

Guided by Statutes and Rules  
Just and Reasonable Standard  
Public Interest Standard  
Due Process  
No Arbitrary and Capricious Acts  
Balance Political Economy  
Policy Adoption Following Elections

*These Are Definitely Not The Same !*

# ROLE OF ELECTORAL PROCESS





## NECESSARY STEPS

# PROPER COST AUDIT RIGOROUS FINANCIAL SCRUTINY & CONTESTABILITY



# QUESTIONS OR OBSERVATIONS ??



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THANK YOU



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Markets Strategist  
ECONWERKS LLC  
[randal@econwerks.com](mailto:randal@econwerks.com)  
608-845-8449

## POSTSCRIPT

**Thomas Sowell:**

*“The first lesson of economics is scarcity:  
There is never enough of anything to satisfy all those  
who want it. the first lesson of politics is to disregard  
the first lesson of economics.”*

# END NOTES

Joskow, Paul: “*Regulation of Natural Monopoly*,” Handbook of Law and Economics, Vol. 2, MIT Elsevier B.V., 2007.

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