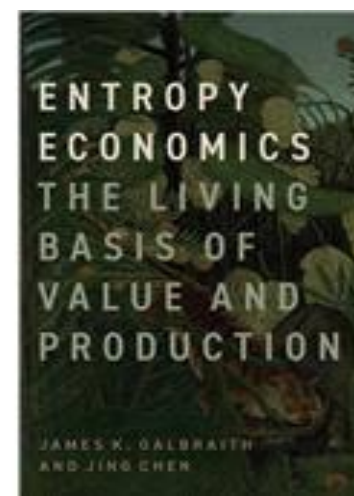


# Entropy Economics, the Great Crash, the Strait of Hormuz and the AI Revolution

Remarks to  
The Levy Institute Economics Conference  
May 8, 2016

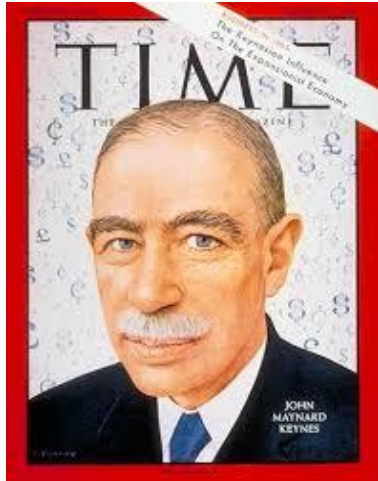


James K. Galbraith  
Senior Scholar



After almost 100 years, we still don't  
Know what Caused the  
Great Crash and the Great  
Depression

Isn't that strange?



# Keynes

## “The Great Slump of 1930”

1. Why are workers and plant unemployed?  
Because industrialists do not expect to be able to sell without loss what would be produced if they were employed.
2. Why cannot industrialists expect to sell without loss? Because prices have fallen more than costs have fallen—indeed, costs have fallen very little.

(Quoted from the original text)

# Galbraith

## *The Great Crash, 1929*

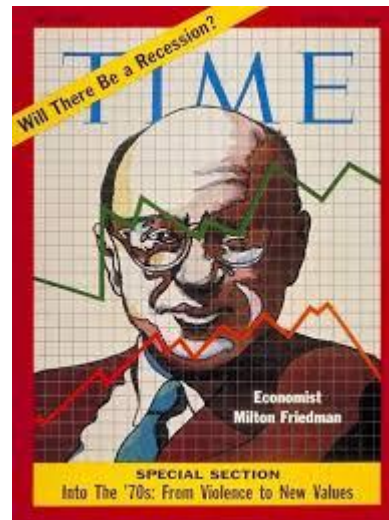
- “A bad income distribution”
- “A bad corporate structure”
  - Too much leverage
- “A bad banking structure”
  - No deposit insurance
- “A dubious foreign balance”
  - Vulnerability to debt defaults
- “A poor state of economic intelligence”
  - Commitment to balanced budgets



Quoted from the book

# Friedman and Schwartz

## *A Monetary History of the United States*



- "The Great Depression, like most other periods of severe unemployment, was produced by government mismanagement rather than by any inherent instability of the private economy".

(1964, quoted from the usual reliable Internet)

# Kindleberger and Temin

- Charles Kindleberger: Supplementing Friedman and Schwartz, it was the weakness of the international monetary system that turned a national slump into a global depression.
- Peter Temin: Contrary to Friedman and Schwartz, it was mainly an exogenous shock to the consumption function.



# Jude Wanniski

## *The Way the World Works*



It was the Smoot-Hawley Tariff



(1978, I have a signed copy but didn't check for a quote)

Larry Summers  
*Federal Reserve Bank of  
Minneapolis Quarterly Review*

“ It seems clear that a central aspect of depressions, and probably economic fluctuations more generally, is a breakdown of the exchange mechanism. Read any account of life during the Great Depression in the United States. Firms had output they wanted to sell. Workers wanted to exchange their labour for it. But the exchanges did not take place.”

(1986, Quoted in DeVroey and Pensieroso)

# Christina Romer

## NBER Working Paper 2639

“This paper argues that the collapse of stock prices in October 1929 generated temporary uncertainty about future income which caused consumers to forego purchases of durable and semidurable goods in late 1929 and much of 1930. Evidence that the stock market crash generated uncertainty is provided by the decline in confidence expressed by contemporary forecasters. Evidence that this uncertainty affected consumer behavior is provided by the fact that spending on consumer durables and semidurables declined immediately following the Great Crash and by the fact that there is a negative historical relationship between stock market variability and the production of consumer durables in the prewar era.”

(1988, quoted from original)

# Real Business Cycle Theory No or Yes?

Sargent: “I do not have a theory, nor do I know somebody’s else’s theory, that constitutes a satisfactory explanation of the Great Depression”

(1984, Interview by Klamer, quoted in De Vroey and Pensieroso)

Kehoe and Prescott: “The general equilibrium growth model is the workhorse of modern economics. ... Until recently, however, it has been taboo to use the growth model to study great depressions. This volume breaks this taboo.”

2002, Quoted in De Vroey and Pensieroso

But...

Robert Lucas  
*Journal of Monetary Economics*

“What technological or psychological events could have induced such behavior in a large, diversified economy? How could such events have gone unremarked at the time, and remain invisible in hindsight?”

(1994, Quoted in De Vroey and Pensieroso)

# Joseph Schumpeter

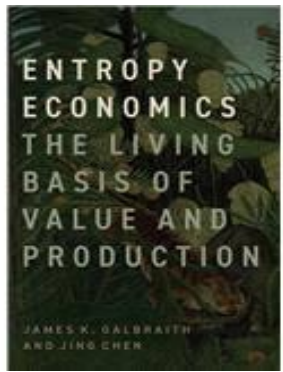


“Add successively as many mail coaches as you please, you will never get a railway thereby.”



(Quoted from  
Theory of Economic Development)

# Entropy Economics



A theory of Value in one equation:

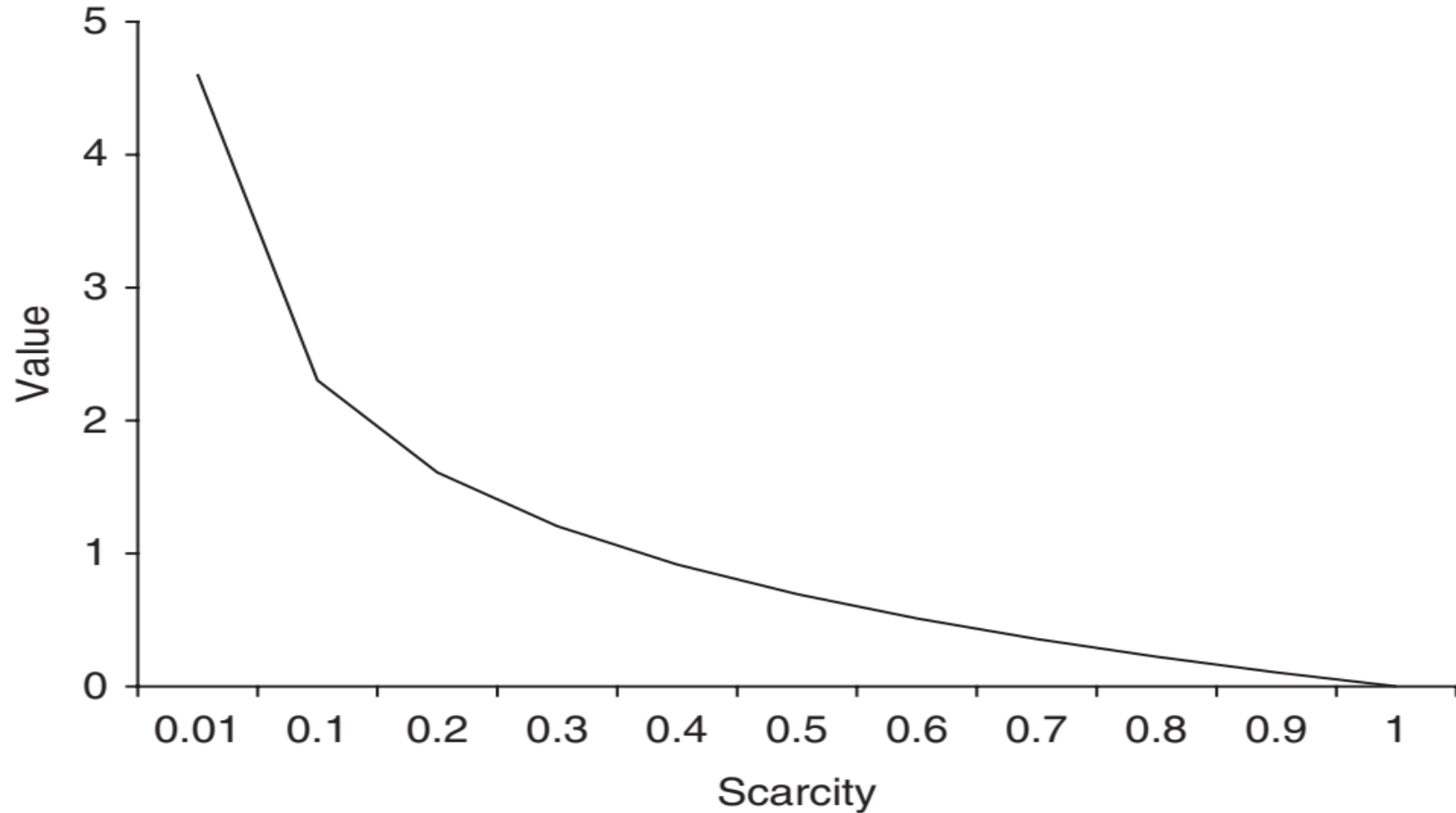
$$V = -\log_b(P)$$

Where  $P$  is a probability, measuring scarcity,  
And  $b$ , the base of the logarithm, is the number of  
suppliers, capturing the degree of monopoly.

Galbraith and Chen, 2025

# Scarcity and Value

An economic good or service loses value as it becomes more widely-diffused. This is why all new production seeks to provide a distinctive, “new” product or service. (There is almost no such thing as a generic commodity.)



**FIGURE 4.1** Value and scarcity.

This relation also explains why new “tech” companies have high stock valuations while mature industrial firms, though much larger, generally do not.

# Market Power and Economic Value

Monopoly or oligopoly is a highly-desired way to extract economic value. However the power conveyed declines quickly as the number of suppliers increases.

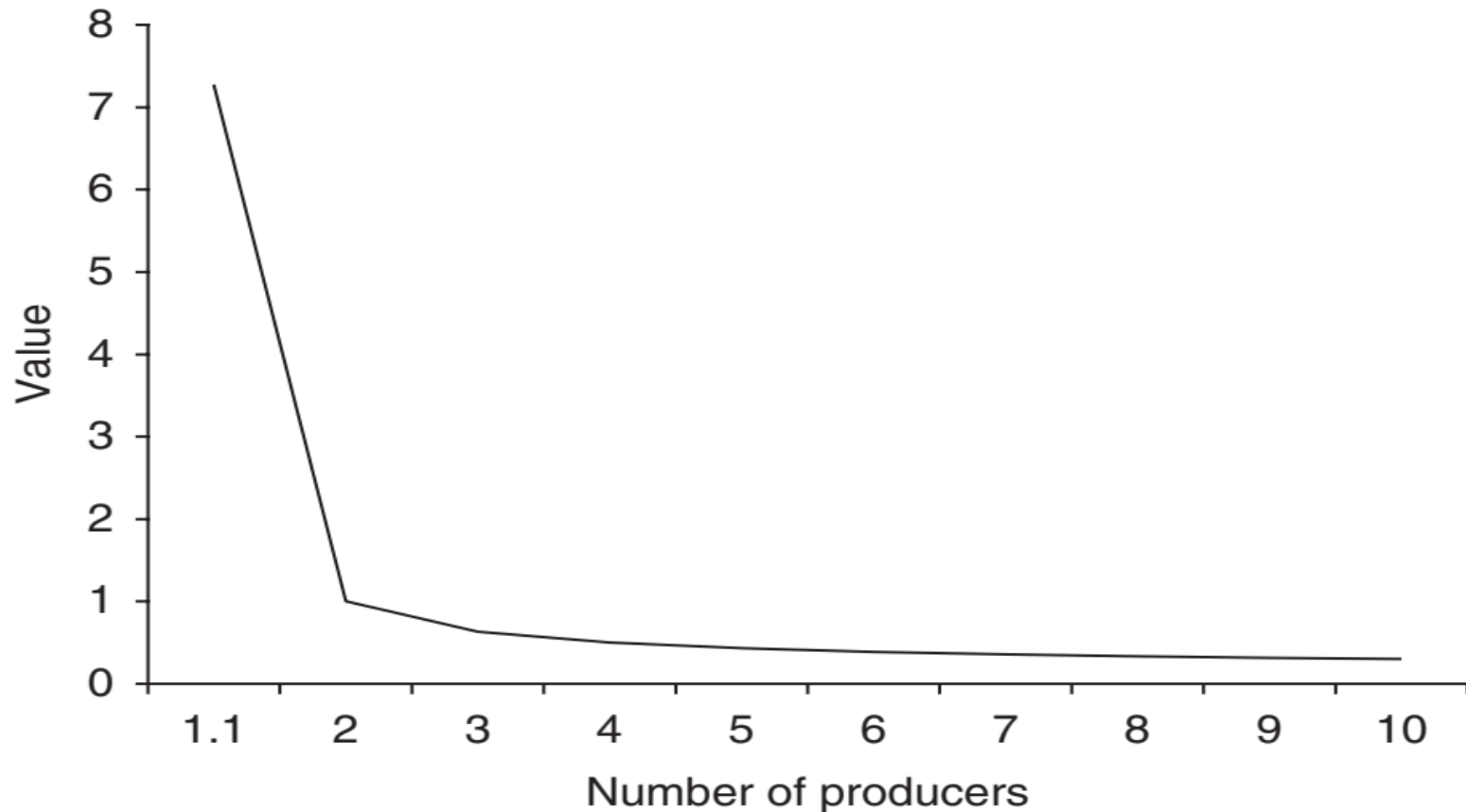
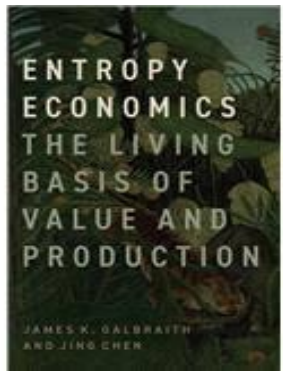


FIGURE 4.2 Value and the number of producers.

# Effects of a New Resource



The discovery of a new low-entropy resource is good news. But it will translate into *falling expected profitability* for activities that (a) do not use this resource, and (b) will be competing, eventually, with activities that do. This may translate into falling valuations, falling investment, and into bankruptcies. Meanwhile uncertainties associated with the demands for new infrastructure and the time required to build it may slow the adoption and expansion of the new alternative.

# The US Economy Before the New Deal

- Agriculture employed one-quarter of the working population and was powered by horses. One-third of all land was in forage.
- Railroads, powered by coal and steam, were the largest industry.
- Oil was in use but it was scarce, and the expansion of oil-based technologies was limited by proven reserves.

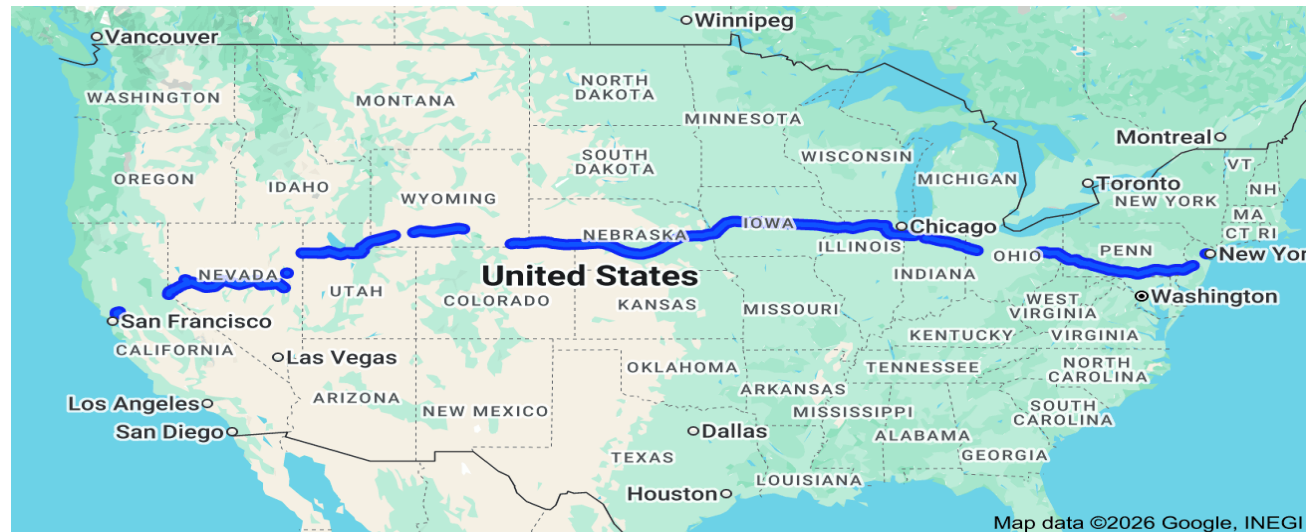
# Crude Oil Proved Reserves, Value and Prices, 1928-1931

- 1928: 11 billion barrels
- 1938: 17.3 billion barrels
- If we take P in 1928 at .4 (relative scarcity) and increase it by the growth in reserves to .629, we get a predicted price decline of  $.463/.916 = .505$
- Allowing for the possibility that large increases in reserves were anticipated, actual price decline from 1928 to 1931 is  $.65/1.17 = .555$ .
- Admittedly, a bit forced, by 1938 much else had changed, and the price had recovered, but still...

# 1930



From Lincoln Nebraska to the California line, the roads were not paved.



# What Was the New Deal?

- A Federal program to build the infrastructure of the oil economy
- 600,000 miles of paved roads
  - Triborough Bridge, Lincoln Tunnel, Bay Bridge.
  - 1,000 airfields
  - Diesel-electric locomotives
  - Ships, including an aircraft carrier.
  - Hydropower and electrification.

Jesse Jones



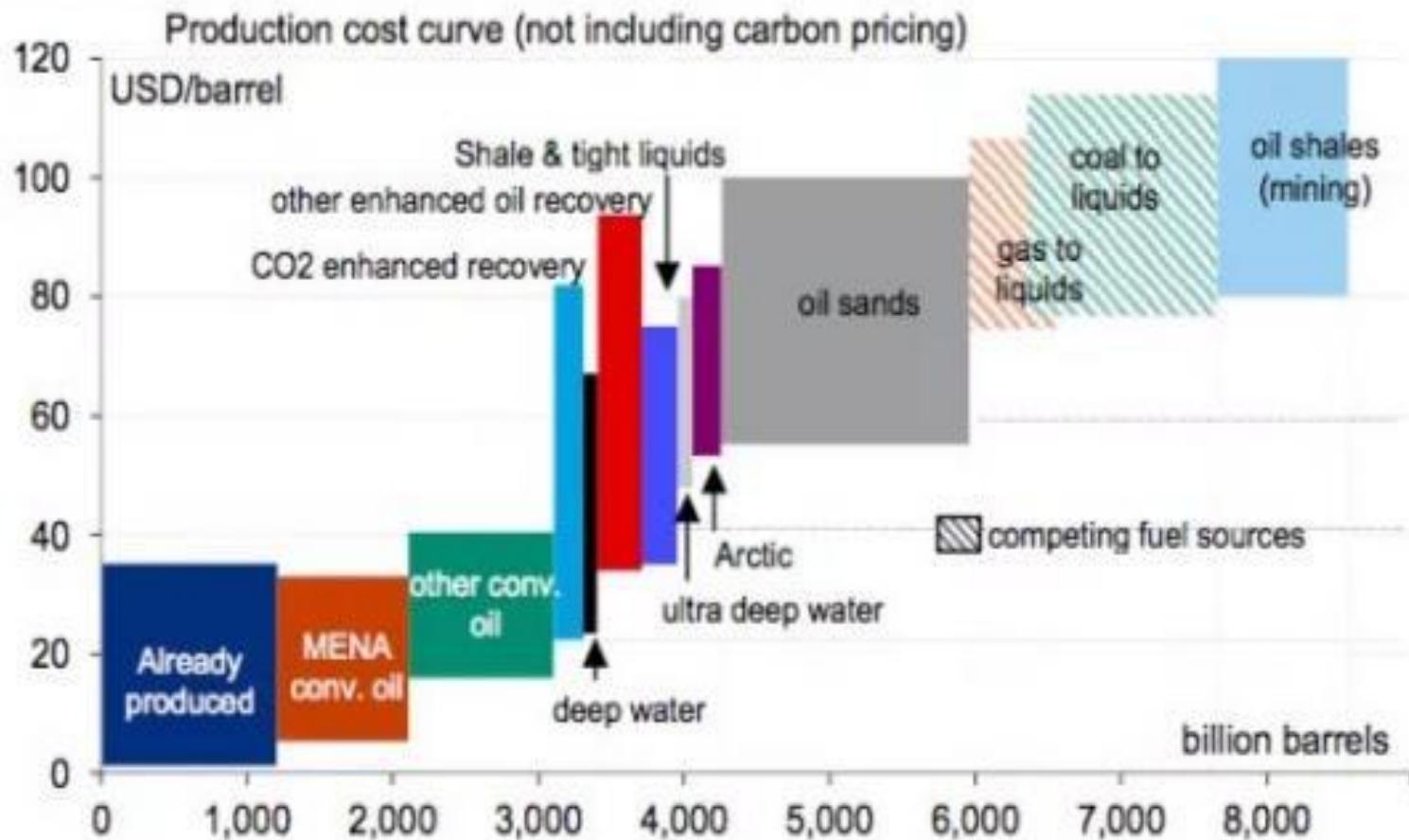
Skipping Ahead...

# Oil Prices in the Iran War, 2026

- If we take oil before February 28, 2026 as relatively abundant ( $P=0.8$ ), with five producing regions (North America, Iran/Iraq, Rest of Gulf, Russia, Rest of World), and reduce supply by 10 percent ( $P=.72$ ) and regions by 1, we get a predicted price increase of about 60 percent.
- Actual price increase in the first month of the war: 59 percent.
- Predicted price if the Gulf goes off-line: \$155/bbl – by well before this point demand destruction takes over.

# Basics of Cost and Supply

There is a Lot Left (status 2016/2024)



Sourced from a friend...

# The Struggle is About Supply and Price

- Oil is relatively abundant for the present, and there is no substitute yet in prospect at dramatically greater abundance and lower cost, unlike the situation in 1930.
- The Iran War may be seen as a struggle over who gets to supply the world with oil. Iran can prosper at high supply and a lower price.
- With breakeven in the Permian Basin at \$65/bbl, the US needs a price between \$70 and \$90/bbl. But that's also good for Iran.
- Is that what the “blockade” is (was) about?

# What About AI?

- Like oil for coal, artificial intelligence is a potentially abundant, inexpensive, low-entropy substitute for...*real intelligence*.
- Real intelligence requires the slow maturation of human brains, a costly process requiring fixed investment in schools, colleges, universities, libraries, time, and...teachers and professors.
- All of this is being radically devalued *as we speak*, following the principles of *Entropy Economics*. Sorry to break that news.

Thank you for your attention to this matter.

