Understanding oil cycle dynamics to design the future economy

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Outline

Introduction

Future design?

The scientific method

Non standard economic theory

False conclustions

The elephants in the room

Conclusion

Neoclassical economics vs biophysical economics

1. Optimism.
2. Criticism of the current economy.
3. Ambition: policy recommendations vs redesign through evangelism (marketing).
4. $E = f(Y)$ or $Y = f(E)$? (Diamond, 1998).

Peak oil

The oil cycle: growth, stagflation, contraction (Turchin and Nefedov, 2009).
In 2017 estimates between 2017 and 2050. (Babusiaux and Bauquis, 2017)
(Garcia et al., 2020): pandemic $\Longrightarrow$ peak oil 2018-2019 $\Longrightarrow$ chronic economic contraction.

Permaculture design

(My influence Julia Schindler)

Definition

The use of system science to satisfy human needs with as little energy as possible.

1. Protect the earth. 2. Protect humans. 3. Share

Holmgren (2002).

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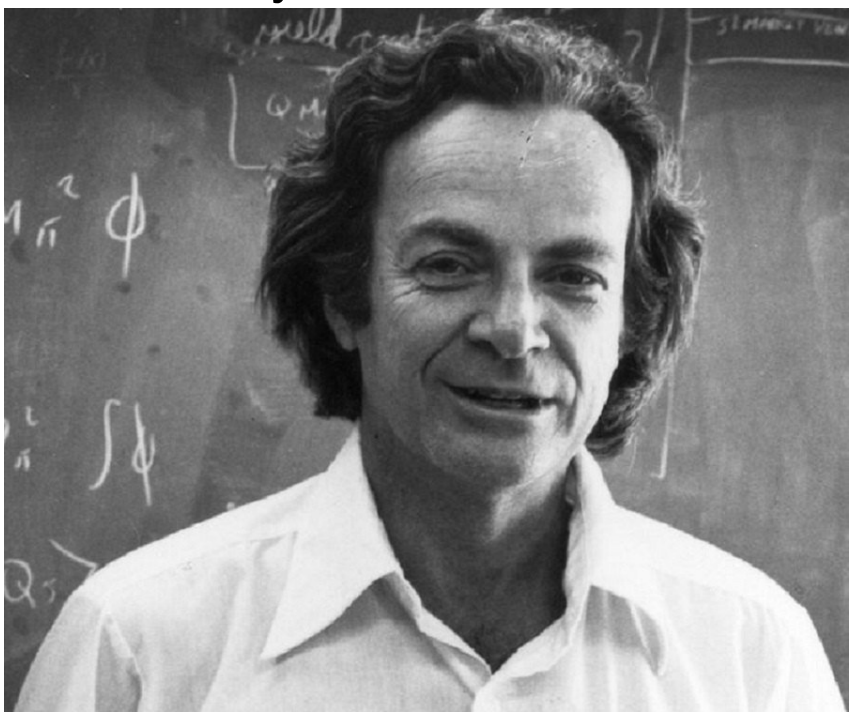
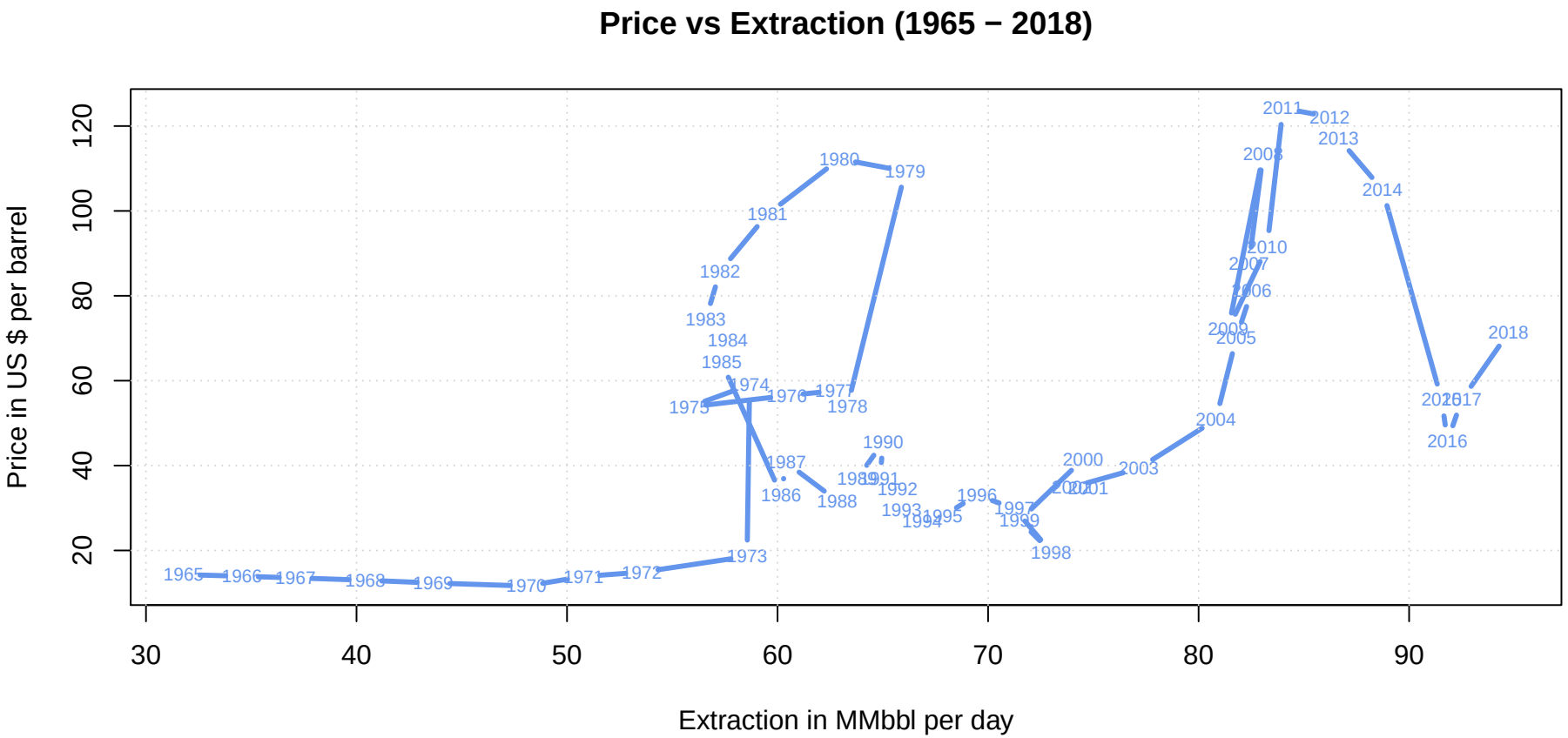
Solutions exist!

Feynman's explanation

Richard Feynman



An overrated law



Basics

1. $Y \stackrel{\text{def}}{=}$ GWP
2. E energy production, $U \stackrel{\text{def}}{=} eE$, e efficiency.

Assumptions:

Ass1 $Y(U) \nearrow \implies Y(E) \nearrow$.

Ass2 The means of economic production are enabled by energy production.

$q \stackrel{\text{def}}{=}$ quantity of energy (including food) produced in some unit.

$p \stackrel{\text{def}}{=}$ average price per unit of energy. Definitions:

$$Y_E \stackrel{\text{def}}{=} pq \subset Y \tag{1}$$

$$Y_{E^{\complement}} \stackrel{\text{def}}{=} Y - Y_E \tag{2}$$

$$C \stackrel{\text{def}}{=} \frac{Y_E}{Y} = \frac{Y_E}{Y_E + Y_{E^{\complement}}} = pq/Y \tag{3}$$

$C =$ *cost share* or *energy intensity*.

The explicit price equation

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Scarcity rent: $p = f(q, \nabla q, \tau)$.

Unprofitable oil is not produced

WRONG

1. High CAPEX to LOE ratio.
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Equinor invested $4.7 billion in 2011 to drill in the Bakken, spent several more billion in CAPEX from 2011-2020 and exits the Bakken in 2021 with $900 million.

Investors don't make mistakes

WRONG

1. Energy worst performing sector in the 10 years ending in 12/2019 (Staff, 2019).
2.

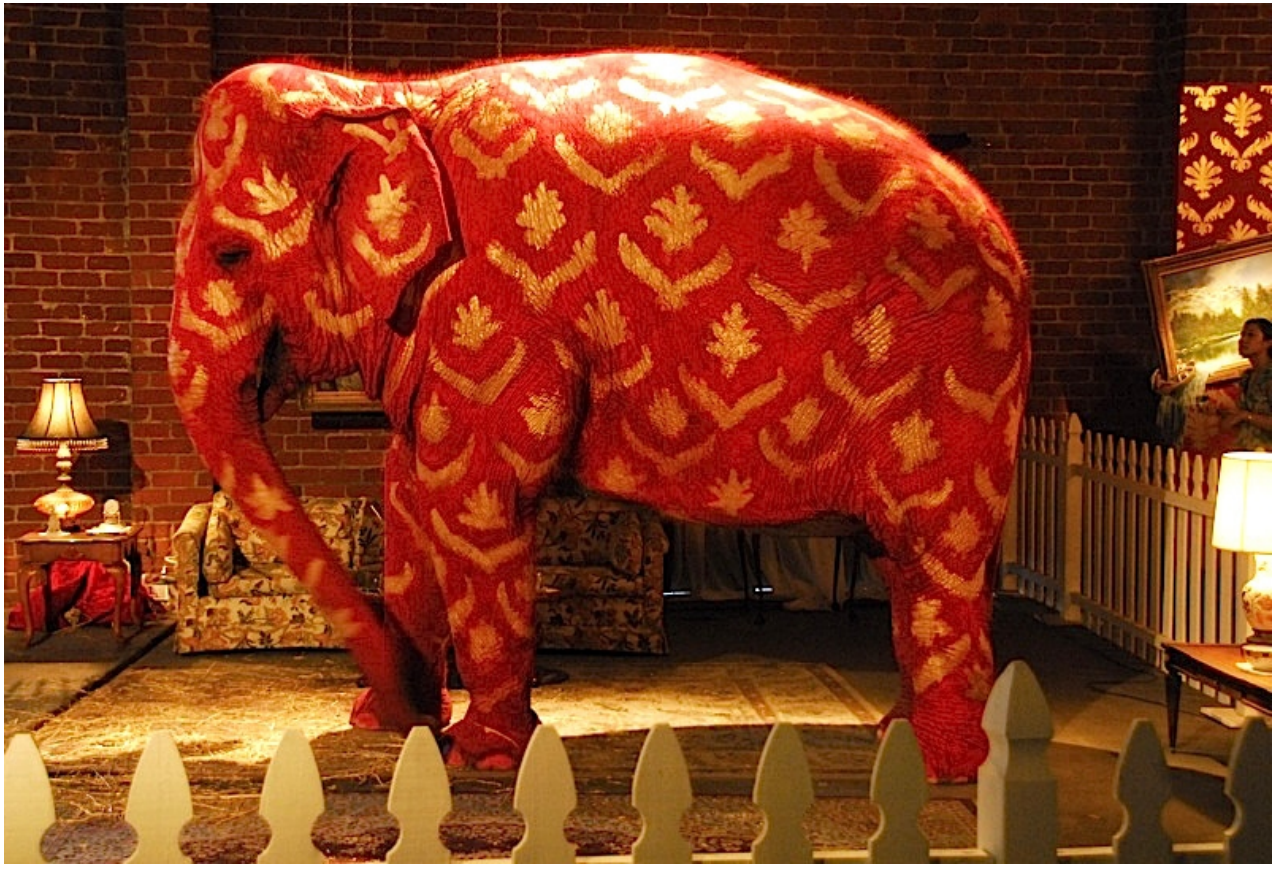
$$\begin{array}{lccc} \text{Oil \& Gas:} & \text{Total CAPEX} & \mapsto & \text{S\&P value 12/2019} \\ & 15\% & \mapsto & 4.4\% \end{array}$$

(Lepetit, 2020).

Oil markets self regulate

WRONG
Historically unregulated oil markets $\Longrightarrow$ boom bust cycles (Auzanneau, 2016).

Marketing



(Shellman, 2021)

Money creation

Monetary values are not universal! (Graeber, 2013; Lietaer, 2001; Laborde, 2012; Grandjean and Dufrêne, 2020). Cost benefit in universal units: (Hall and Kittgard, 2018).

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Oil companies lobbied to force lending (Wilkins, 2020)

Climate change mitigation

350.org has it right: focus on CAPEX. A carbon tax is a crude inefficient tool.
Recommendation:

1. A marketing campaign focused on investors. FUD, peak oil $\equiv$ costs rising faster than market prices.
2. Land use.

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