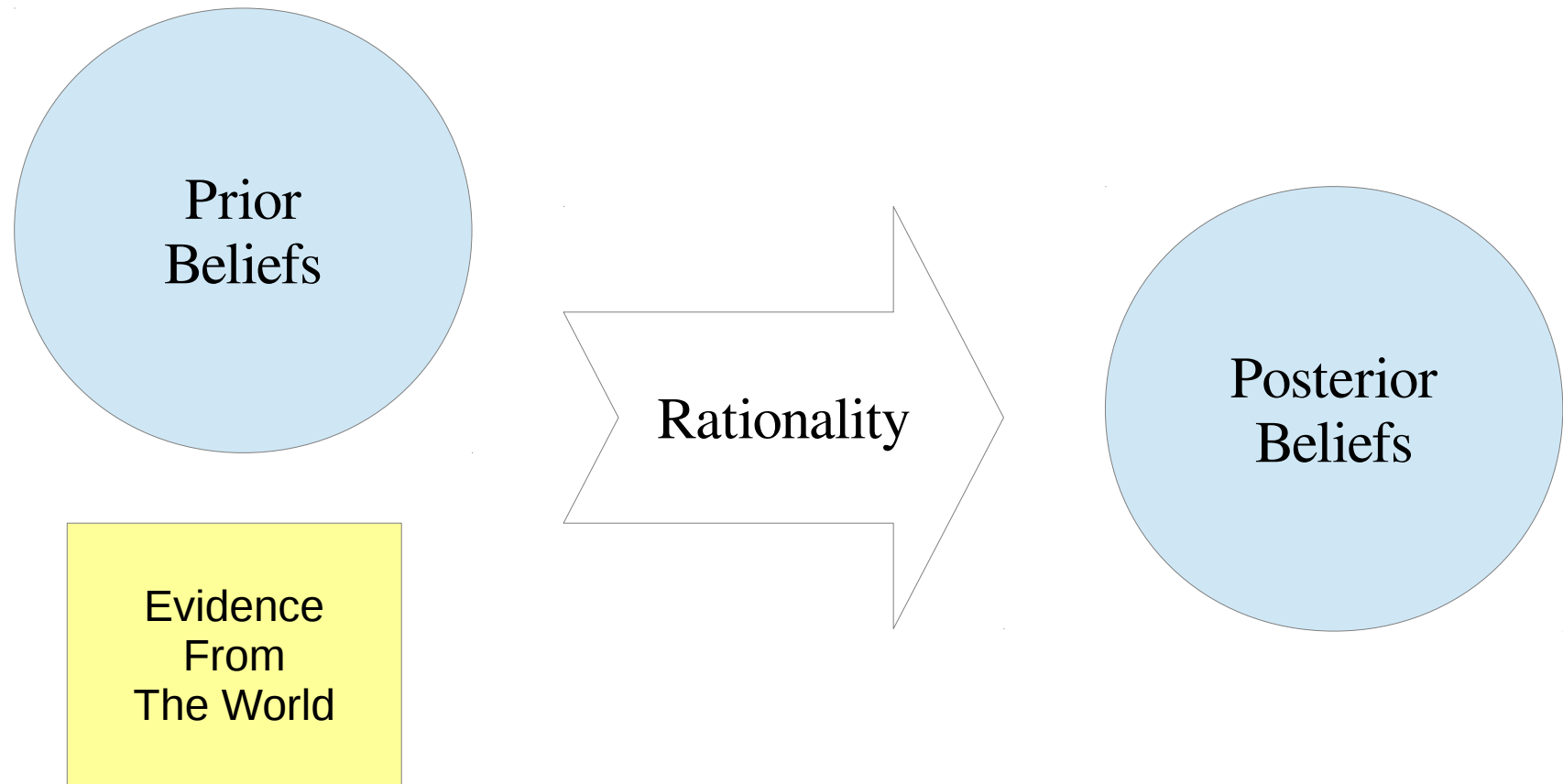# The credit economy and the economic rationality of science

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Carnegie Mellon University

Rational Choice and Philosophy Conference

May 17, 2014

Philosophy of science

Arational choices?

- How much time should I dedicate to science?

- What experiments should I perform?

- How much evidence should I collect?

- Should I publish now or later?

- Where should I publish?

Etc.

Irrational choices

Many of these decisions are governed by concern for:

- Career advancement

- Credit

- Prizes

- Friendship

Etc.

Credit

Does introducing credit as a source of motivation help to make science better or worse?

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Solves a public goods problem

Dasgupta, P., & David, P. A. (1994). Toward a New Economics of Science. Research Policy, 23(5), 487–521.

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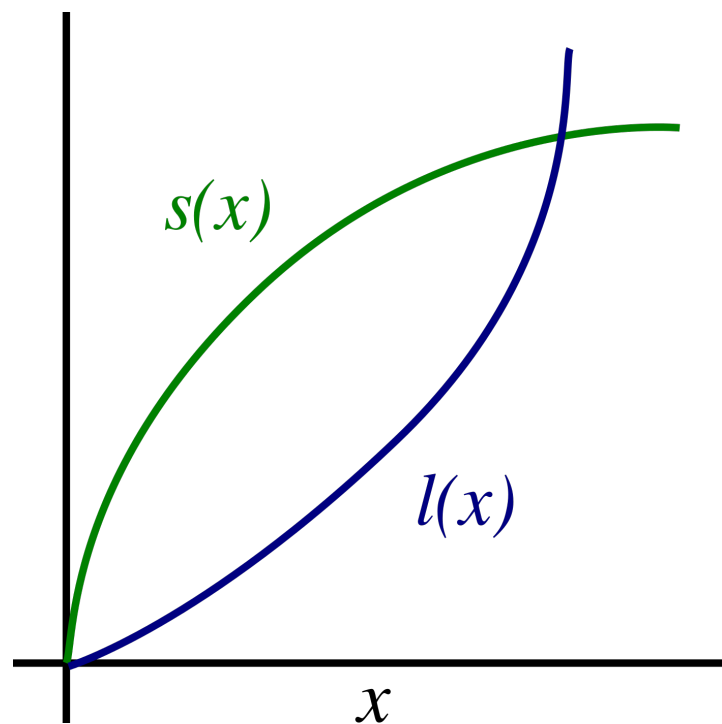Dasgupta, P., & David, P. A. (1994). Toward a New Economics of Science. Research Policy, 23(5), 487–521.

Solves a labor allocation problem

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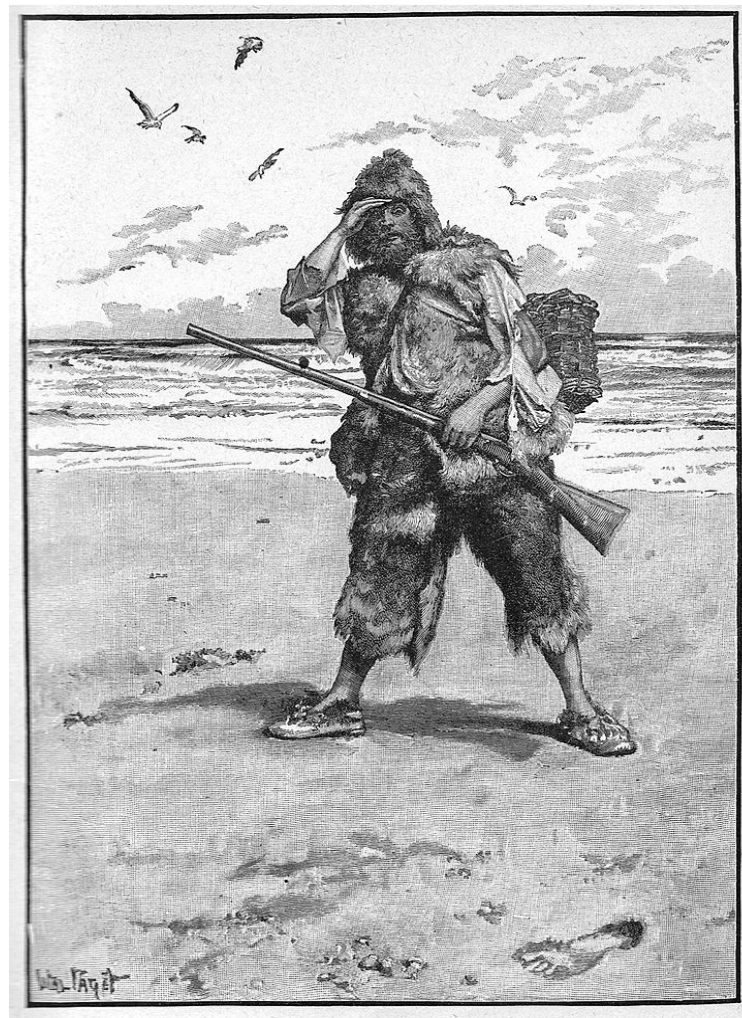Kitcher, P. (1990). The Division of Cognitive Labor. The Journal of Philosophy, 87(1), 5–22.

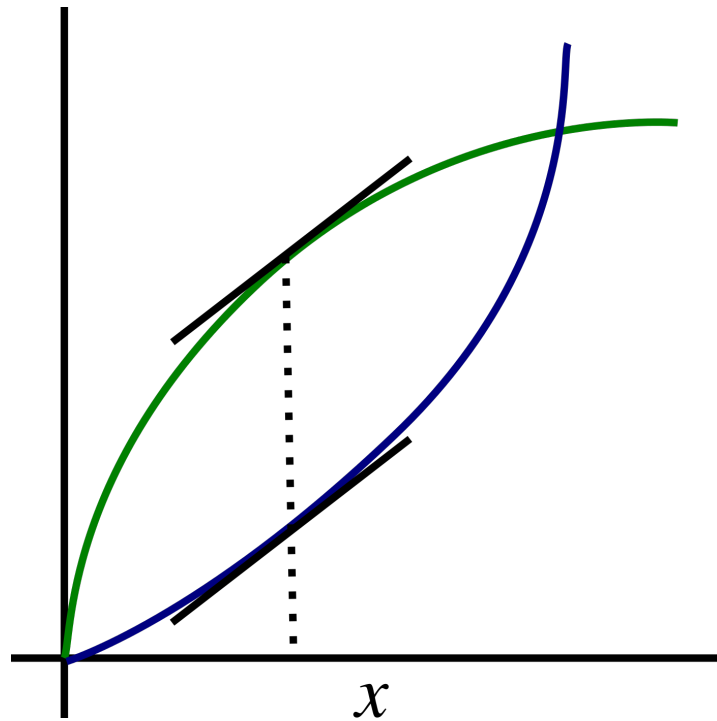Strevens, M. (2003). The Role of the Priority Rule in Science. Journal of Philosophy, 100(2), 55–79..
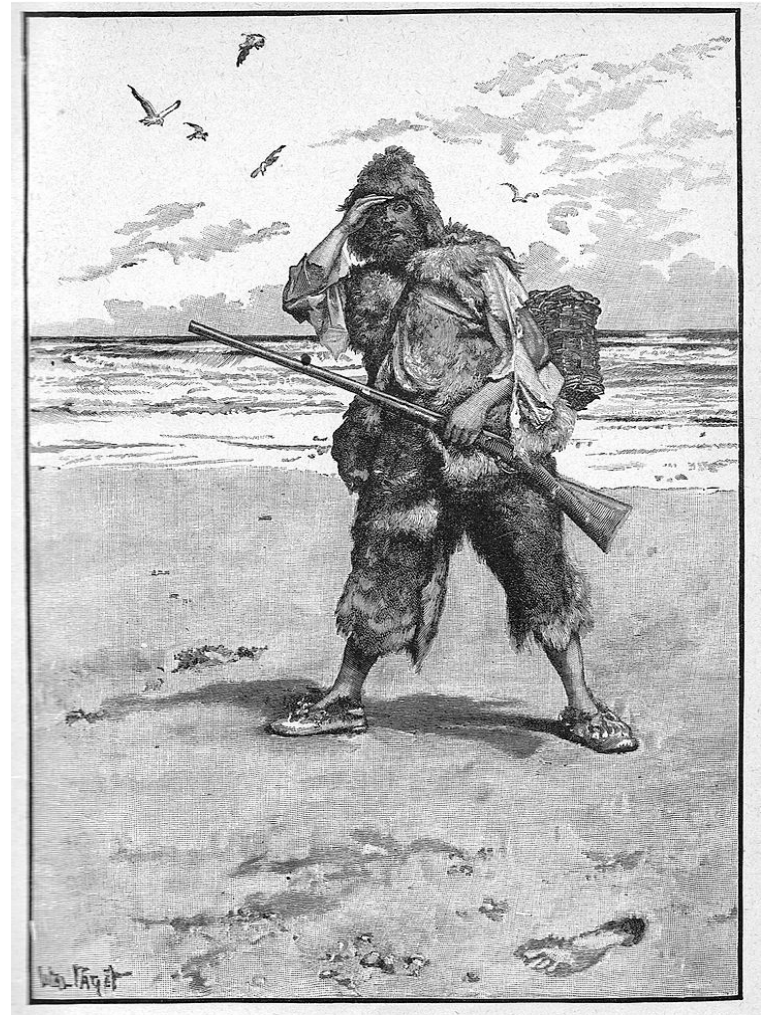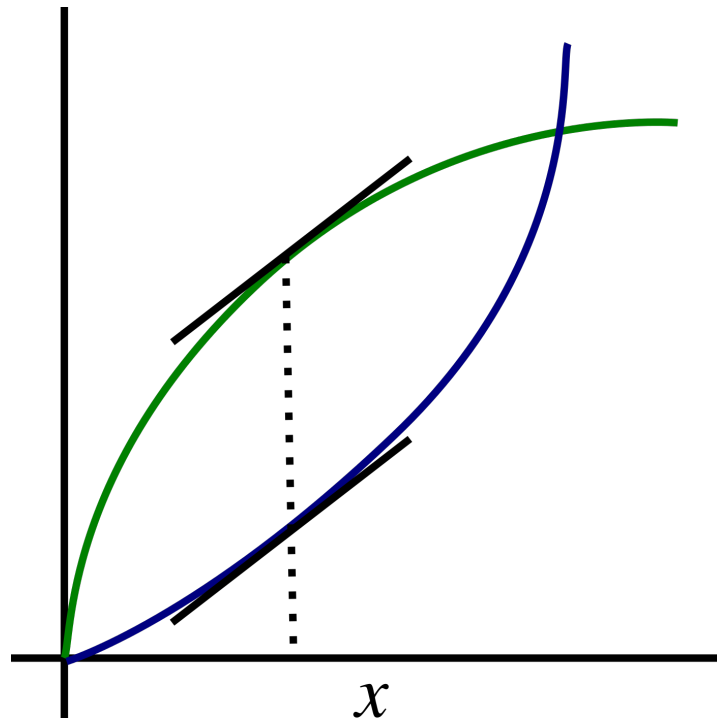
Prof. Crusoe

$s(x)$

$l(x)$

x

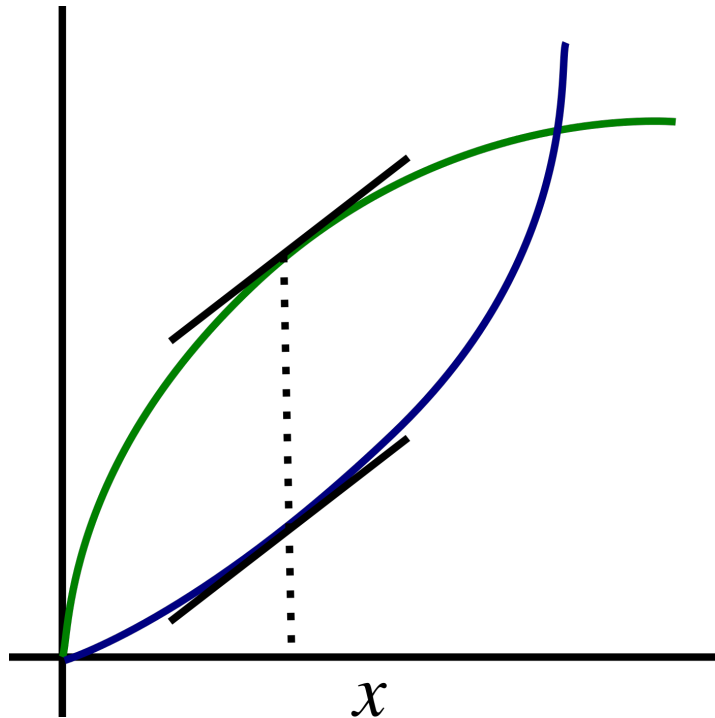$$u(x) = s(x) - l(x)$$

Prof. Crusoe

$$u(x) = s(x) - l(x)$$

Society of scientists

- Each scientist individually chooses how much effort to dedicate

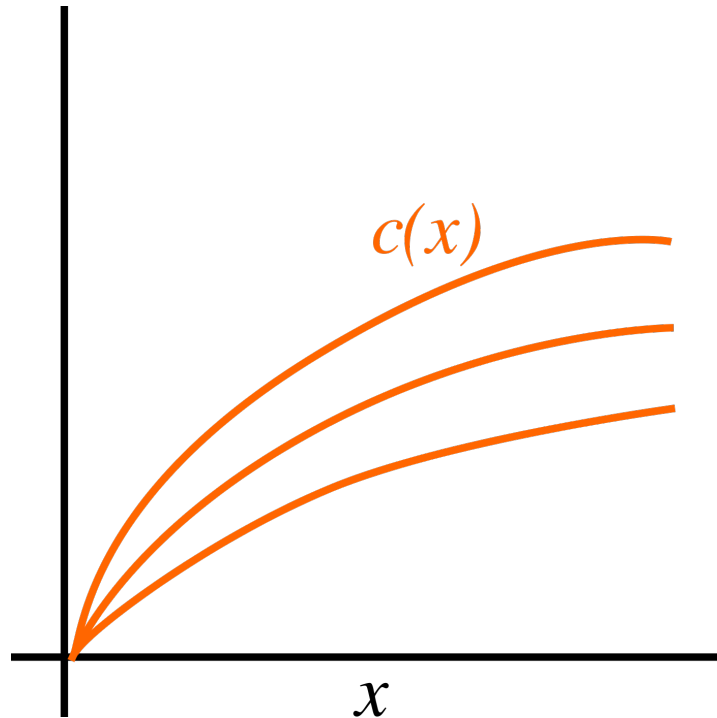- Every scientist benefits from everyone's effort

- Each pays a private cost

$$u_i(x) = s_i(x) - l_i(x_i)$$

Society of scientists

- Creates a public goods problem

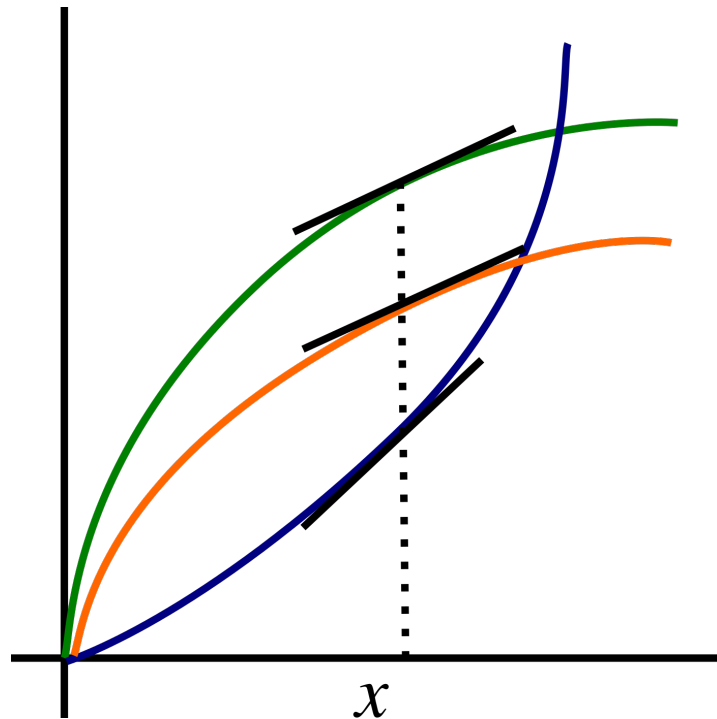- Private choices are worse than centralized control

$$u_i(x) = s_i(x) - l_i(x_i)$$

Adding credit

$c(x)$

x

- Expected credit is increasing in my effort

- Expected credit is decreasing in others' effort

$$u_i(x) = s_i(x) - l_i(x_i) + c_i(x)$$

Adding credit

- This increases the equilibrium allocation

- It may not "solve" the public goods problem

- It may even "overshoot"

$$u_i(\boldsymbol{x}) = s_i(\boldsymbol{x}) - l_i(x_i) + c_i(\boldsymbol{x})$$

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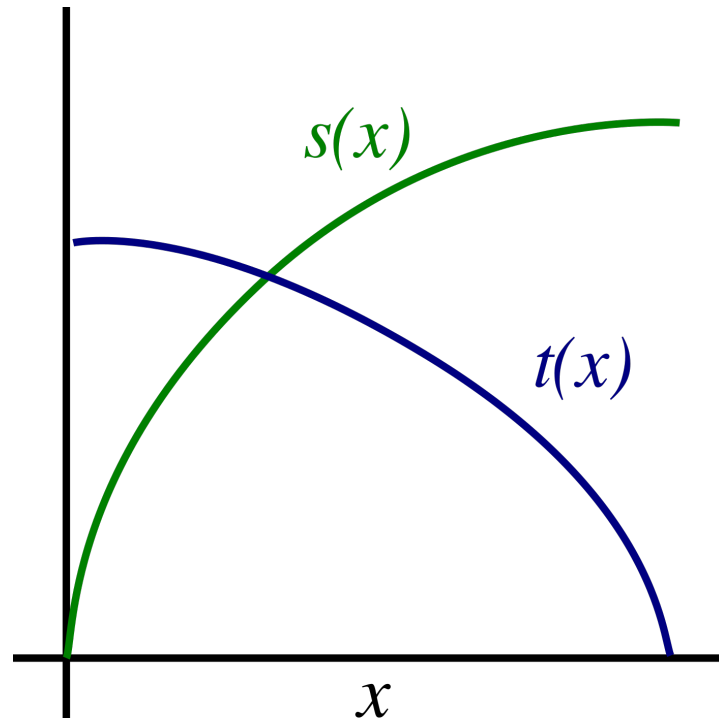
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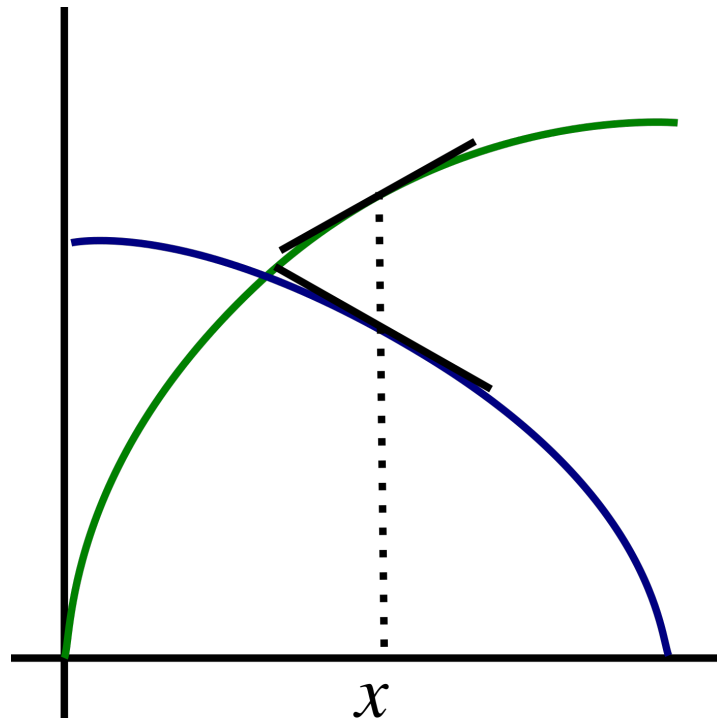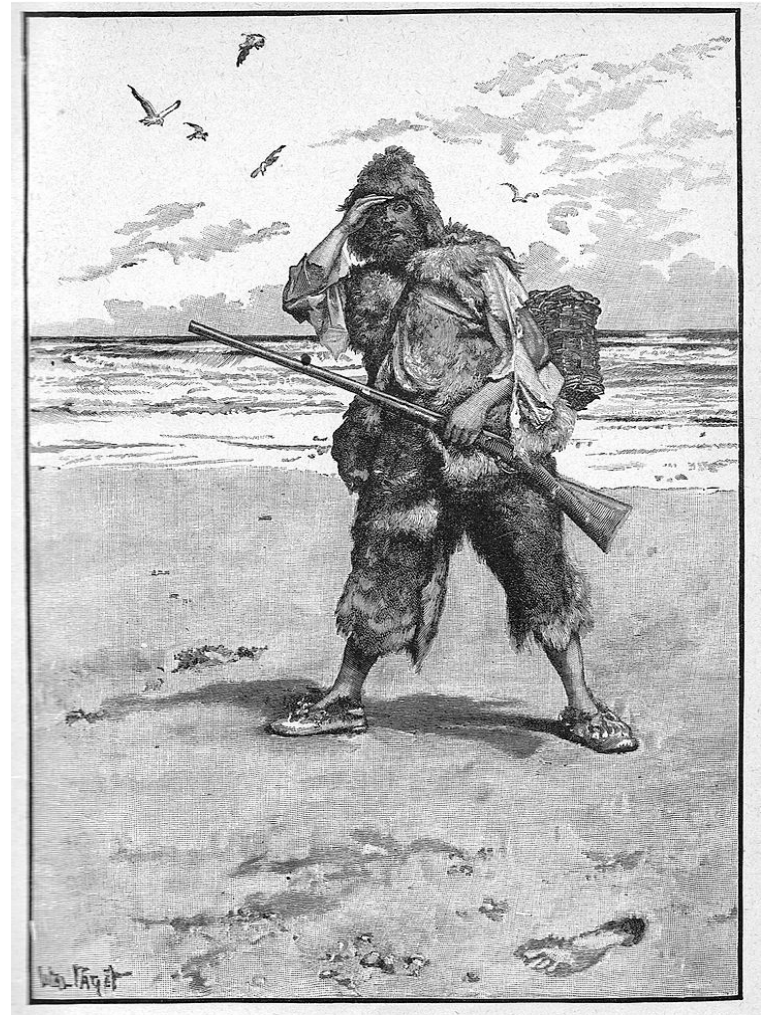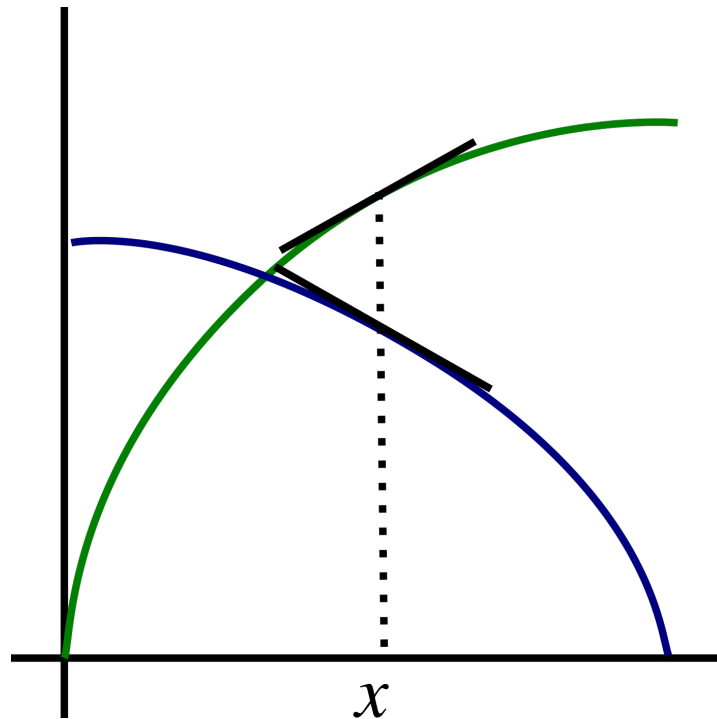
Prof. Crusoe

$$u(x) = s(x) + t(x)$$
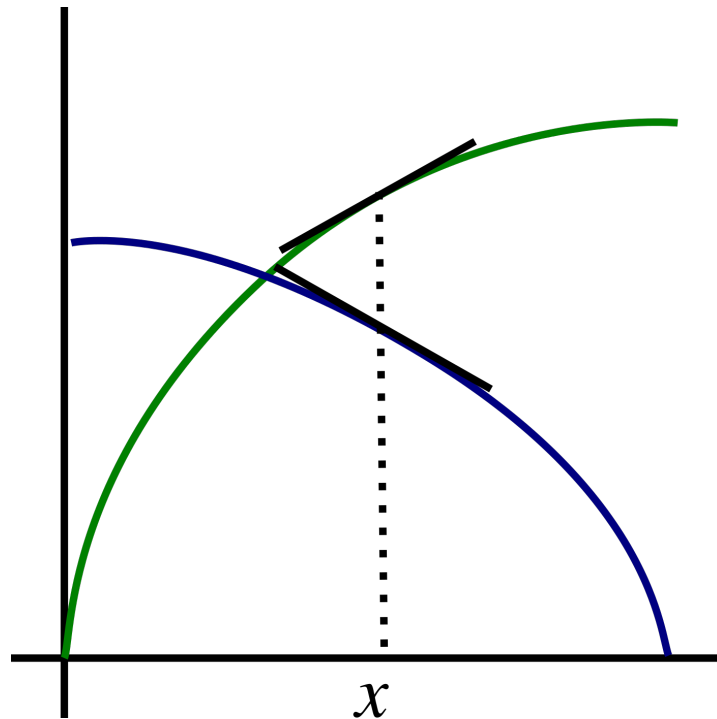
Prof. Crusoe

$$u(x) = s(x) + t(x)$$

Society of scientists

- Each scientist chooses individually how much to allocate to each project

- Everyone benefits from each others' allocations

$$u_i(x) = s_i(x) + t_i(x)$$
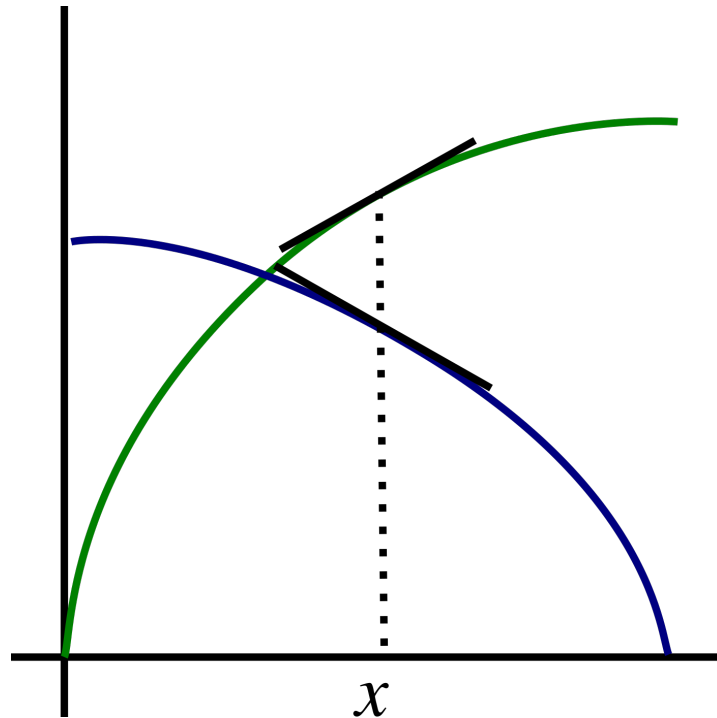
Society of scientists

$$u_i(x) = s_i(x) + t_i(x)$$

- Sometimes there is a gap between the socially optimal allocation and the equilibrium allocation

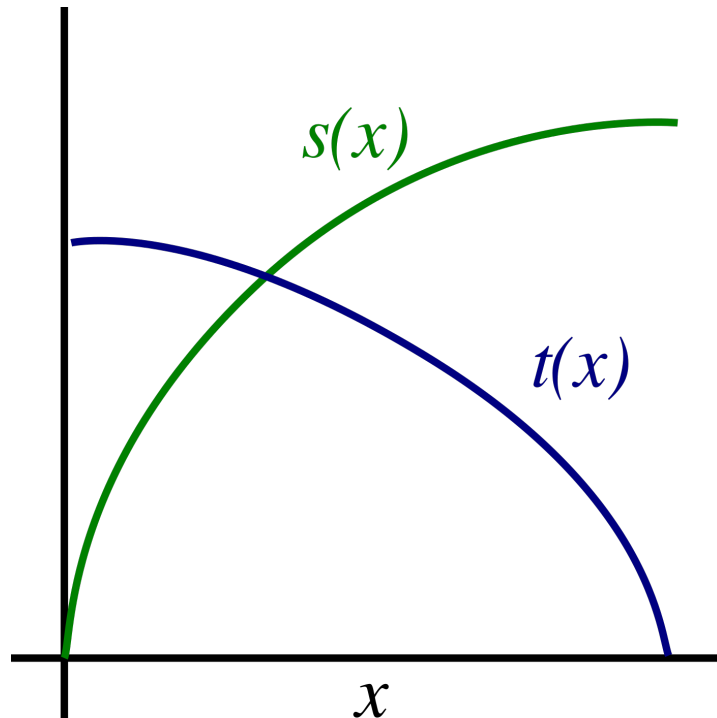- If we assume a certain level of homogeneity, there will not be a gap

Adding credit

- Credit will sometimes help and sometimes hurt

- The "priority rule" will hurt in highly homogenous situations (contra Kitcher and Strevens).

$$u_i(x) = s_i(x) + t_i(x) + c_i^s(x) + c_i^t(x)$$

Kitcher and Strevens

$$u_i(x) = s_i(x) + t_i(x) + c_i^s(x) + c_i^t(x)$$

- Both assume that without credit scientists will choose the project will the higher slope (project *s*)

- This assumption is derived from a lingering connection to the philosophical view of scientific rationality.

The credit economy

- What if scientists can "fake" effort?

- The credit economy helps to solve the public goods problem.

- The credit economy might help to solve labor allocation problems (but often will make the situation worse).

- How does one weigh these two considerations?