

Economics 100B: Macroeconomics

Drivers of Growth: Part II – Policy and Institutions

November 9, 2020

Reading:

- M. Mazzucato, *The Entrepreneurial State*.
- Mishkin - Chapter 7
- W. H. Janeway, *Doing Capitalism in the Innovation Economy: Reconfiguring the Three-Player Game between Markets, Speculators and the State*, Cambridge University Press (2018). (**not required**)

Agenda:

- ① *Technology* as a production input (again!).
- ② *Policies* to promote productivity.
- ③ *Institutions* and property rights.

Technology and Total Factor Productivity:

- *Total factor productivity*, A , is the most important source of growth in the:
 - growth accounting formula.
 - Solow growth model.
 - Romer growth model.

Technology as a Production Input

Technology and Total Factor Productivity:

In modern, high-income economies total factor productivity is largely analogous with *technology*.

- Technology increases the efficiency with which labor and capital are used together.
- In this sense technology can be treated as a factor input into the production process.

Technology as a Production Input

Technology Characteristics:

Technology differs from capital and labor in two important characteristics: *rivalry* and *excludability*.

- ① *Rivalry* means that only one person can use the factor at any given time.
- ② *Excludability* means that the owner of the factor can prevent others from using the factor.

Capital and labor are *physical objects* characterized by *rivalry* and *excludability*: *technology is not!*

Technology Characteristics:

In contrast to capital and labor, technology is characterized by *non-rivalry* and *non-excludability*.

- ① *Non-rivalry* means that more than one person can use the factor at any given time.
- ② *Non-excludability* means that one person cannot prevent others from using the factor.

Because technology is largely non-excludable, the private sector is likely to spend too little, rather than too much, on developing new technologies.

The Role of Government:

Government policies that have been adopted to promote productivity include:

- 1 Building infrastructure.
- 2 Increasing human capital.
- 3 Encouraging research and development.

(1) Building infrastructure:

- *Infrastructure* is the highways, bridges, utilities, dams, airports, etc. that support the transportation and distribution of goods and services.
- Research suggests a correlation between the amount and quality of infrastructure and productivity growth.

(1) Building infrastructure:

Government can promote improved infrastructure by:

- ① *direct government expenditures* such as highways, bridges, ports, tunnels, dams, airports, etc.
- ② *providing tax incentives* for private infrastructure spending.
- ③ *streamlining or removing barriers to* private-sector investment in infrastructure.

(2) Increasing human capital:

- *Human capital* is the knowledge and skills that workers acquire through education and training.
- Research suggests a correlation between the amount and quality of human capital and productivity growth.

(2) Increasing human capital:

Government can encourage human capital by:

- *its educational policies* and worker-training programs.
- *its public health programs.*
- *removing barriers to business formation* to promote human capital in the form of *entrepreneurial skill*.

(3) Encouraging research and development:

- *Research and development* is the effort to directly increase the growth rate of technology.
- Research suggests a correlation between research and development activities and productivity growth.

(3) Encouraging research and development:

Government can promote research and development (R&D) by

- Ⓐ *direct government expenditures* on R&D.
- Ⓑ *providing tax incentives* for private R&D spending.
- Ⓒ *providing patents, copyrights*, and other intellectual property rights protection.

Policies to Promote Productivity

(3) Encouraging research and development:

(a) Direct government expenditures on R&D:

Examples include:

- Direct engagement in R&D in government labs.
- Funding R&D at universities and private labs.

Government R&D activities almost always focus on *basic*, rather than commercial, research.

Policies to Promote Productivity

(3) Encouraging research and development: R&D in government labs.

What Makes the iPhone so Smart?

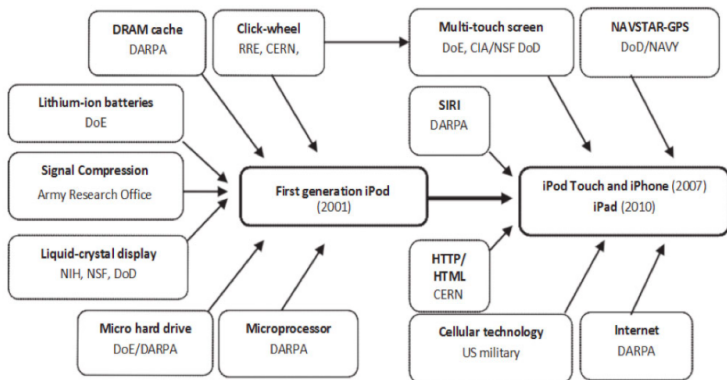


Figure 13 from *The Entrepreneurial State: debunking public vs. private sector myths* (2015, p. 116)

Policies to Promote Productivity

(3) Encouraging research and development:

(b) Providing tax incentives for private R&D:

Examples include:

- Tax credits or expensing for R&D expenditures.
- Accelerated tax depreciation of R&D investments.

Private R&D activities almost always focus on *commercial*, rather than basic, research.

Policies to Promote Productivity

(3) *Encouraging research and development:*

(c) Patents, copyrights, & other intellectual property rights protection:

- These protections allow the “inventor” to have exclusive rights to use, make, or sell licensing rights to others for a set period of time.
- This “temporary” grant of quasi-monopoly power is an attempt to minimize the effects of *non-excludability* of private R&D activities.

Policies to Promote Productivity

(3) Encouraging research and development:

(c) Patents, copyrights, & other intellectual property rights protection:

- There is a challenge to balance protection against diffusion.
- There are difficulties in enforcing intellectual property rights.

It's not just about technology:

- In low-income economies, total factor productivity is *not* always analogous with *technology*.
- Productivity needs to be thought of as much more than technology as it is usually defined.

It's not just about technology:

Recall the growth accounting formula:

$$g_Y = g_A + \alpha g_K + (1 - \alpha) g_L .$$

Solving for productivity growth, one obtains

$$g_A = g_Y - \alpha g_K - (1 - \alpha) g_L ,$$

or

$$g_A = g_Y - [\alpha g_K + (1 - \alpha) g_L]$$

Thus, productivity growth, or productivity, is *everything* that contributes to economic growth that is over and above the contributions from capital and labor.

Institutions:

Institutions are the set of

- rules,
- customs,
- practices,
- and organizations

that govern the behavior of individuals and firms.

Property rights:

- are the protections of property, including intellectual property, from expropriation by the government, other individuals, or firms.
- *are the most basic and fundamental set of institutions that affect economic growth.*

Property rights in general:

The degree of property rights can provide *incentives or disincentives* for undertaking investment and accumulation of capital.

- ① *Strong property rights* decrease the probability of expropriation and this lead to higher levels of investment and a higher accumulation of capital.
- ② *Weak property rights* increase the probability of expropriation and this lead to lower levels of investment and a lower accumulation of capital.

Property rights and the legal system:

Property rights are established through an *effective legal system* that operates quickly and at low cost and has:

- ① *The ability to enforce contracts.*
- ② *Adequate resources for the courts* with a sufficient number of qualified (and independent) judges.
- ③ *Adequately trained* (and independent) *lawyers.*

Property rights and the legal system:

The type of legal system a country has influences its ability to enforce contracts.

- 1 English common law.
- 2 Napoleonic law.
- 3 Hybrid of English common law and Napoleonic law.

Property rights and the legal system:

Obstacles to effective property rights include:

- ① Corruption.
- ② The high cost of establishing a legal business (cf. the World Bank's **Doing Business** report).
- ③ The grabbing hand of *kleptocracies*.
- ④ War.