

# “De los Picapiedras a los Supersónicos”

## Del Crecimiento y la Convergencia a la Singularidad



**Javier Gerardo Milei**

**“The consequences for human welfare involved in questions like these are simply staggering: Once one starts to think about them, it is hard to think about anything else”**

**Robert E. Lucas, Jr.**

# Crecimiento Económico



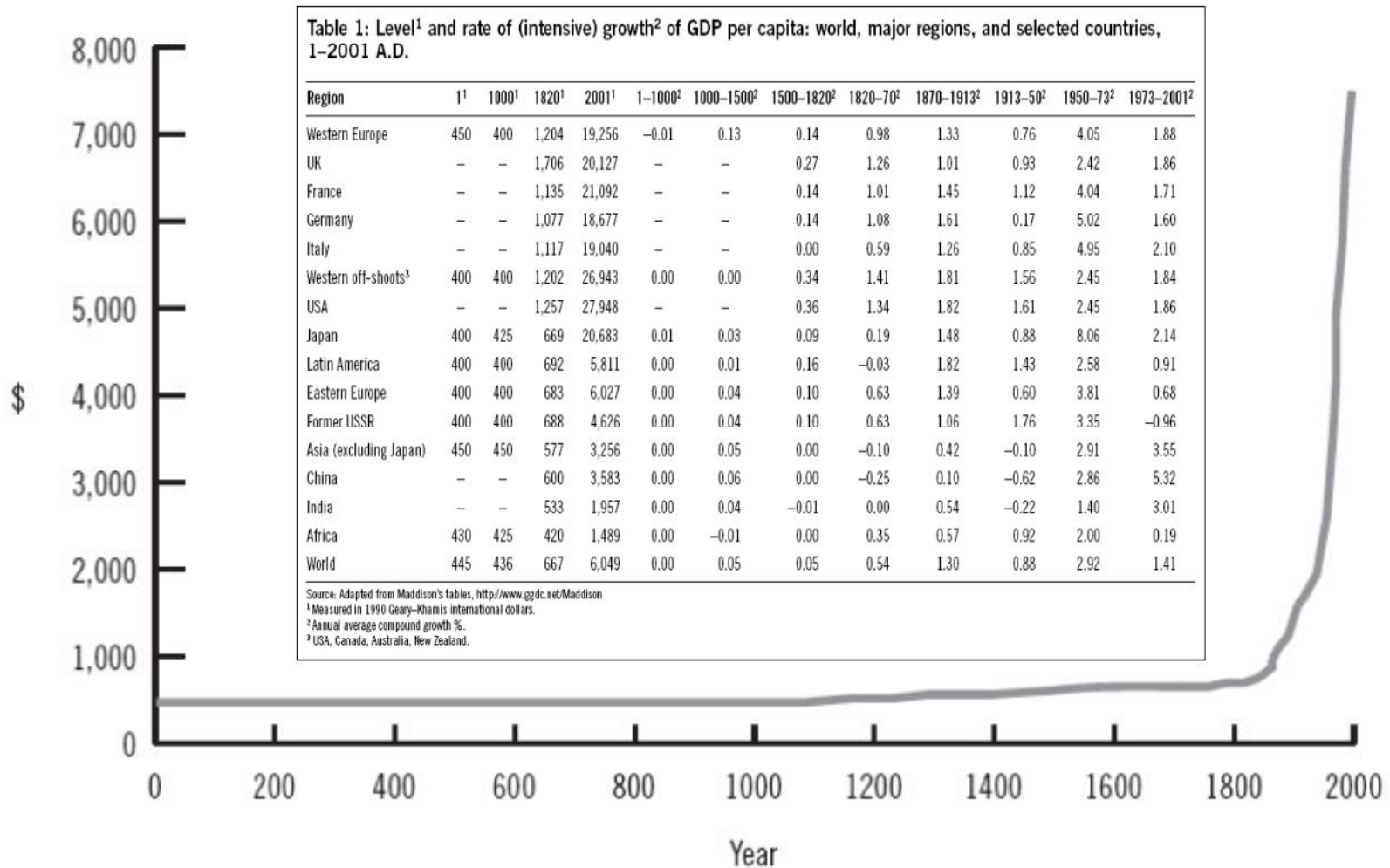


# **Breve Reseña Histórica de la Teoría del Crecimiento Económico**

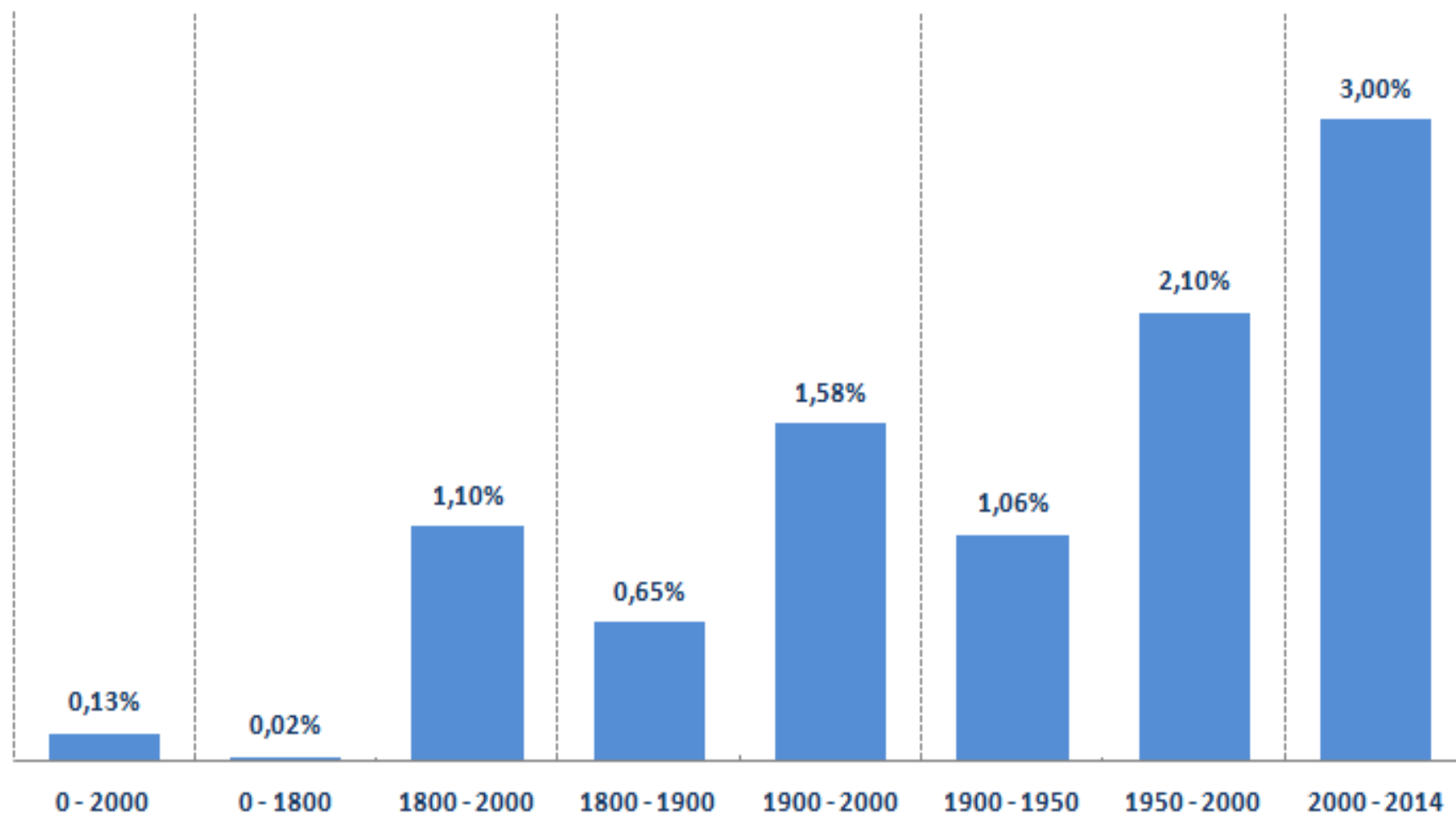
- **Adam Smith, la fábrica de alfileres, la idea de la mano invisible, la competencia y los discípulos pesimistas**
- **Alvin Young y Alfred Marshall**
- **Chamberlin vs. Robinson**
- **El desvío keynesiano y la vuelta al pesimismo**
- **Solow-Swan y el aporte de Hirofumi Usawa**
- **Paul Romer y el crecimiento endógeno**
- **Lucas y el tridente Mankiew-Romer (D)-Weil**
- **El Dilema de la Optimalidad de Pareto**
- **Rothbard y la visión austríaca del monopolio**

# El Crecimiento durante 2000 Años

Figure 2: World per capita GDP over time

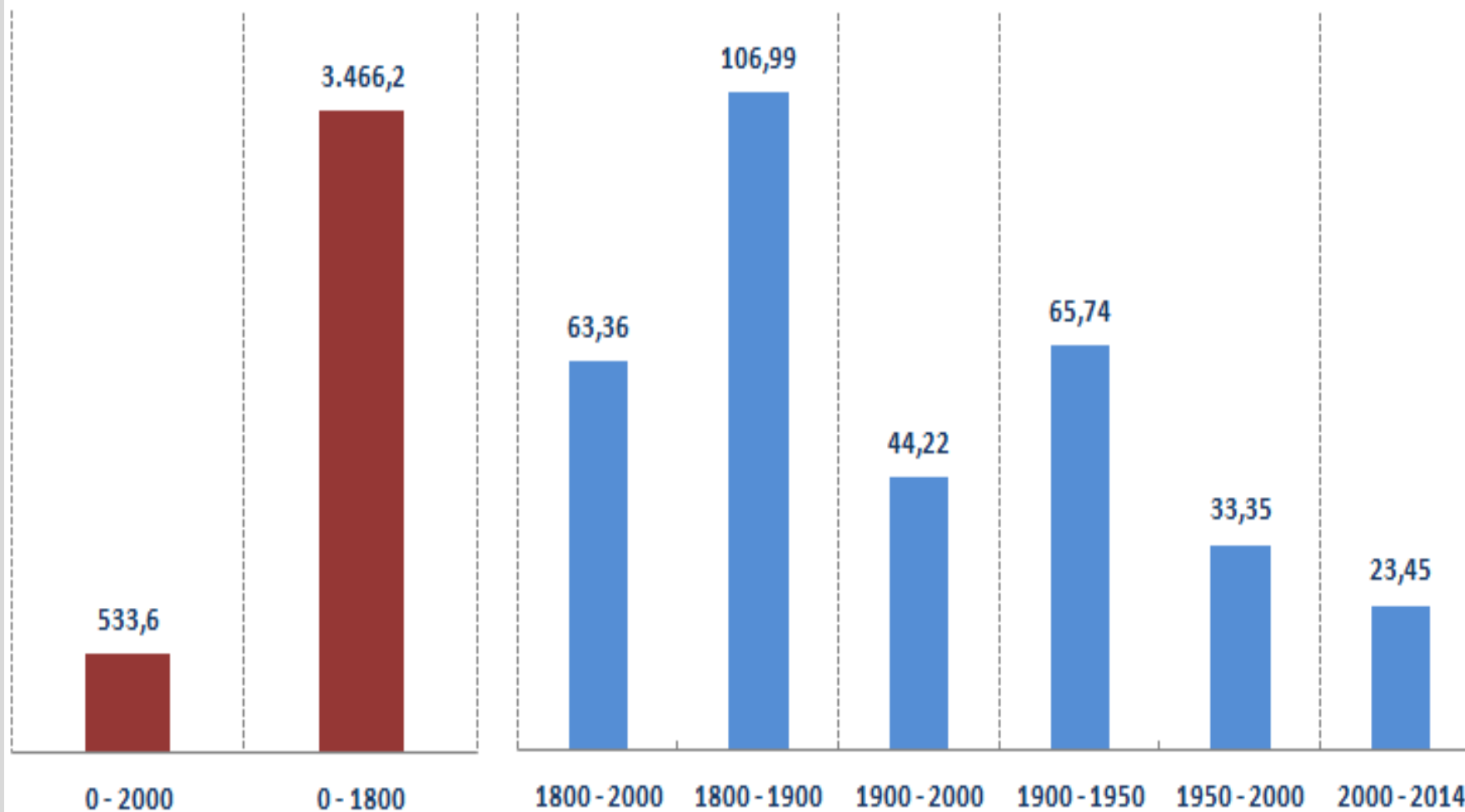


# Aceleración del Crecimiento

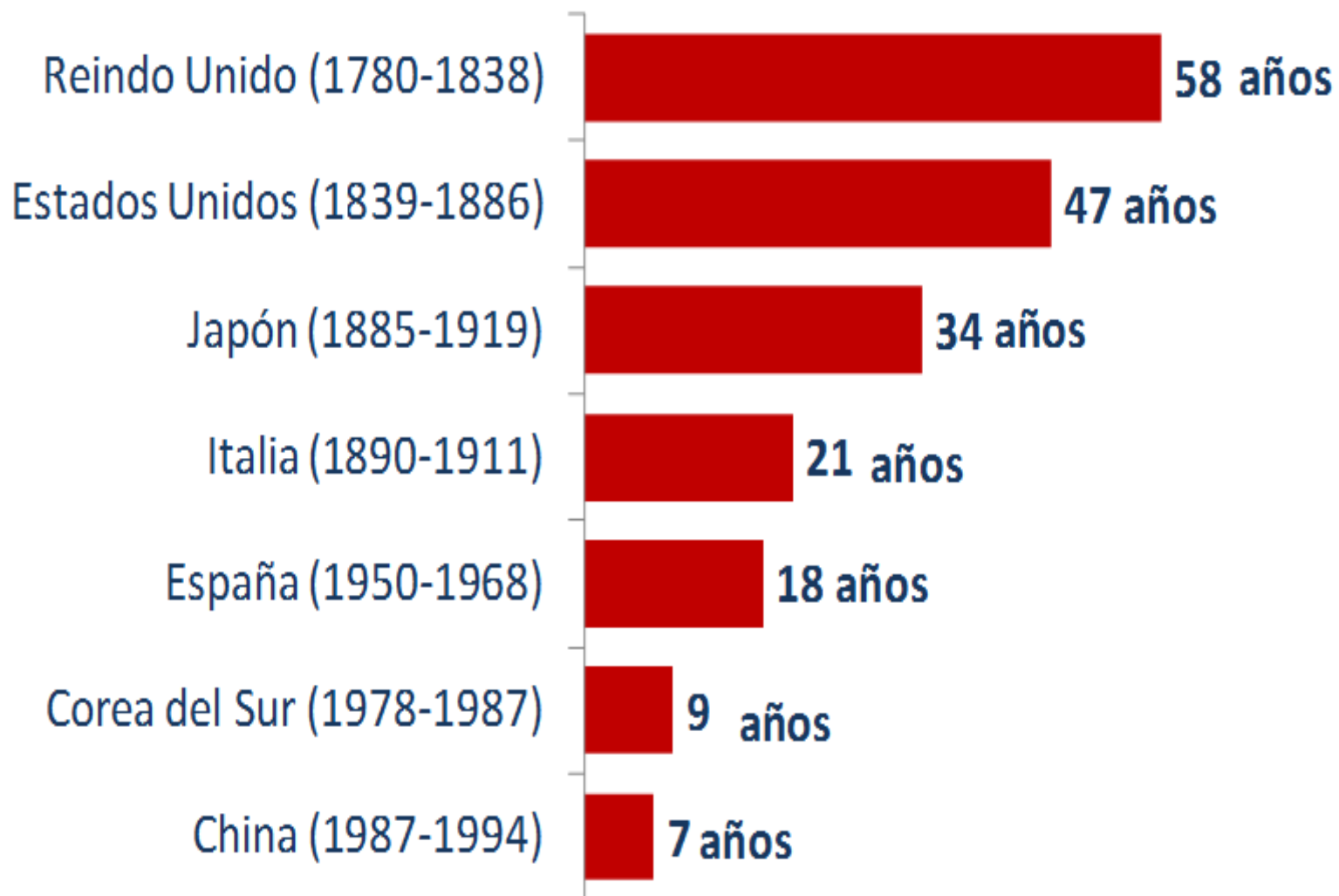


Tasa de crecimiento del PIB per cápita

# Años para duplicar el PIB per-cápita



## Años para duplicar el PIB per-cápita (II)





# Aceleración por encima del 7%

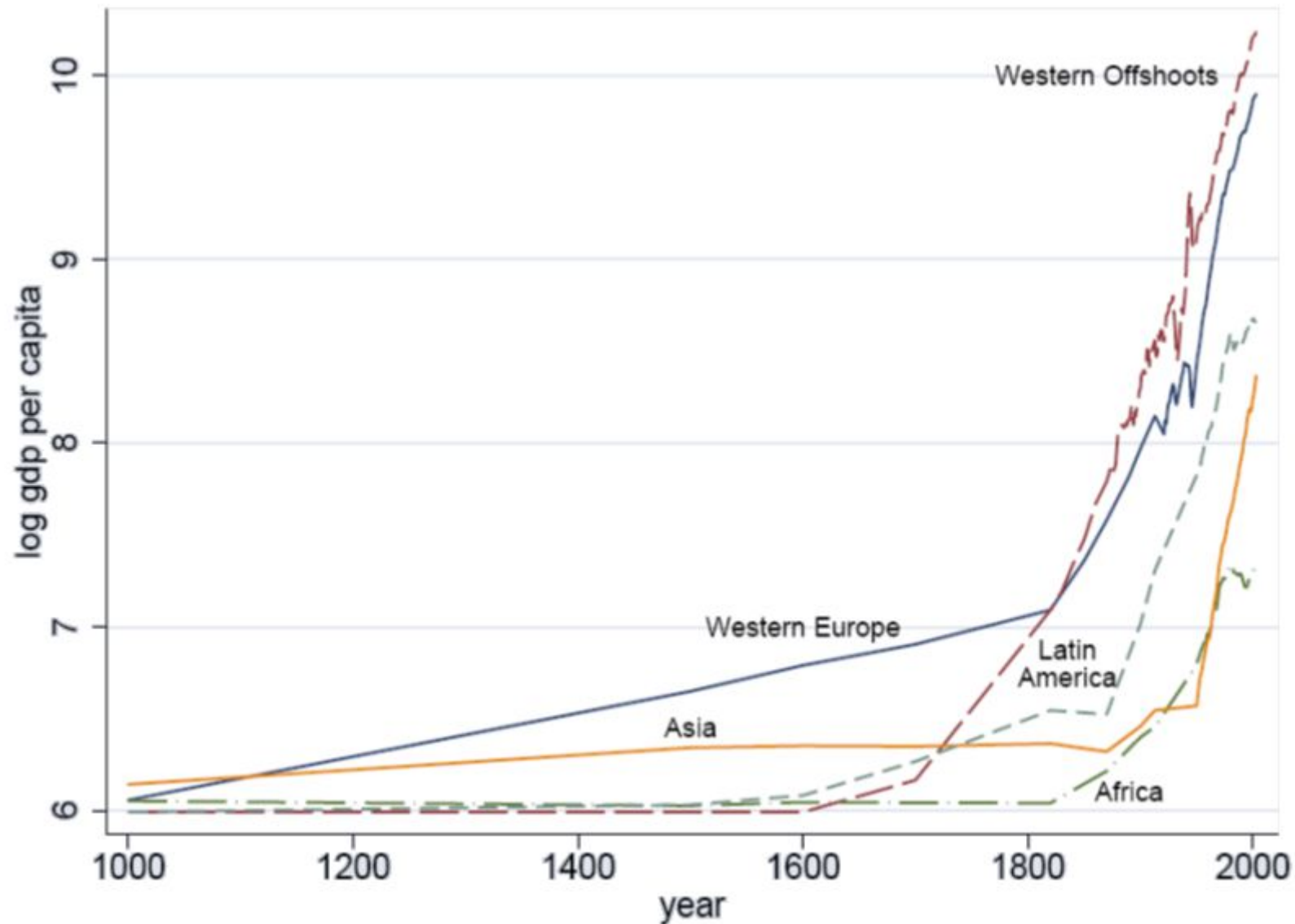
Economy	Period of high growth**	Per capital income at the beginning and in 2005***	
Botswana	1960-2005	210	3.800
Brazil	1950-1980	960	4.000
China	1961-2005	105	1.400
Hong Kong*	1960-1997	3.100	29.900
Indonesia	1966-1997	200	900
Japan*	1950-1983	3.500	39.600
Korea Rep. Of*	1960-2001	1.100	13.200
Malaysia	1967-1997	790	4.400
Malta*	1963-1994	1.100	9.600
Oman	1960-1999	950	9.000
Singapore*	1967-2002	2.200	25.400
Taiwan	1965-2002	1.500	16.400
Thailand	1960-1997	330	2.400

\*Economies that have reached industrialized countries per capita income levels

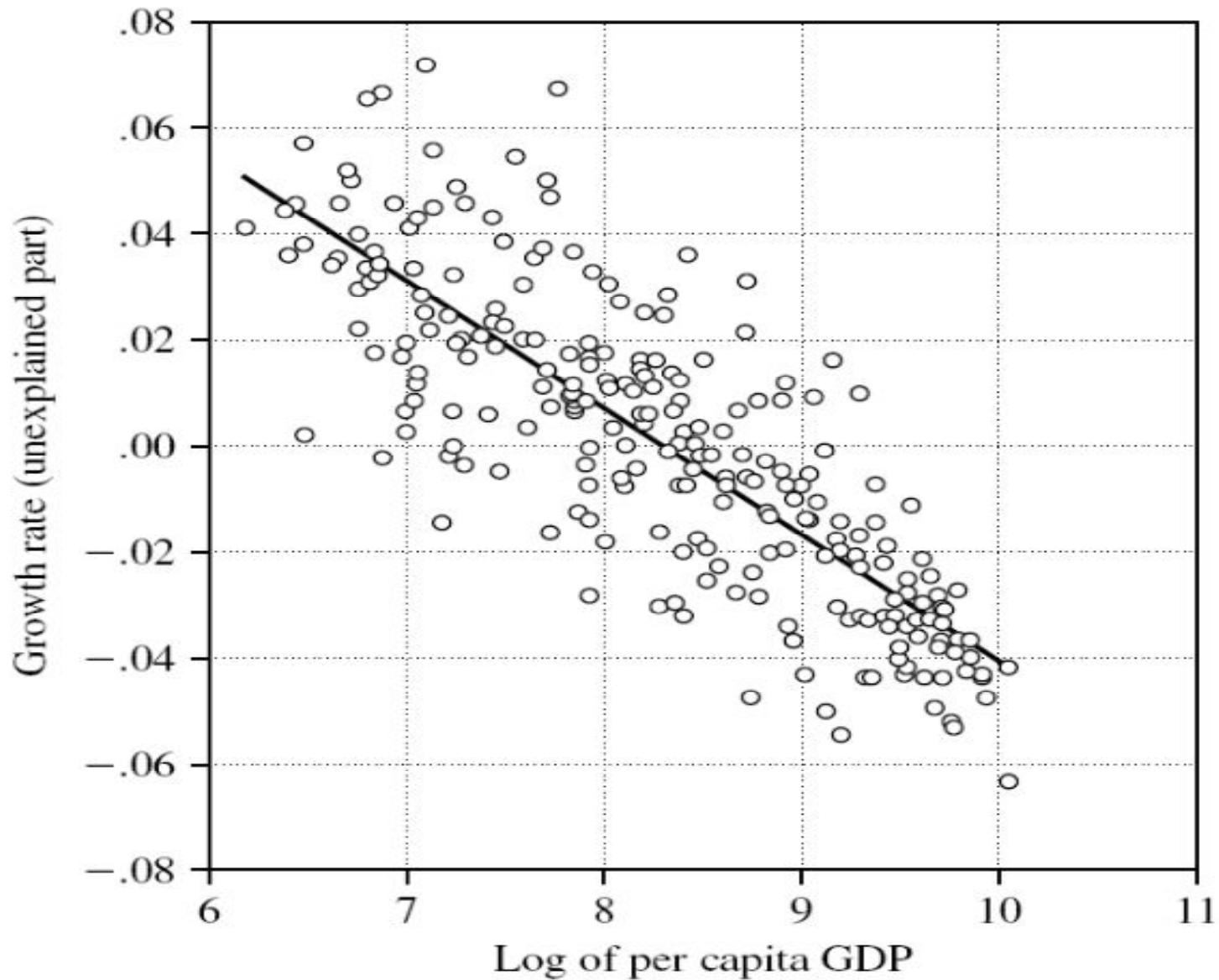
\*\*Period in which GDP growth was 7 percent per year or more

\*\*\*In constant U.S. dollars of 2000

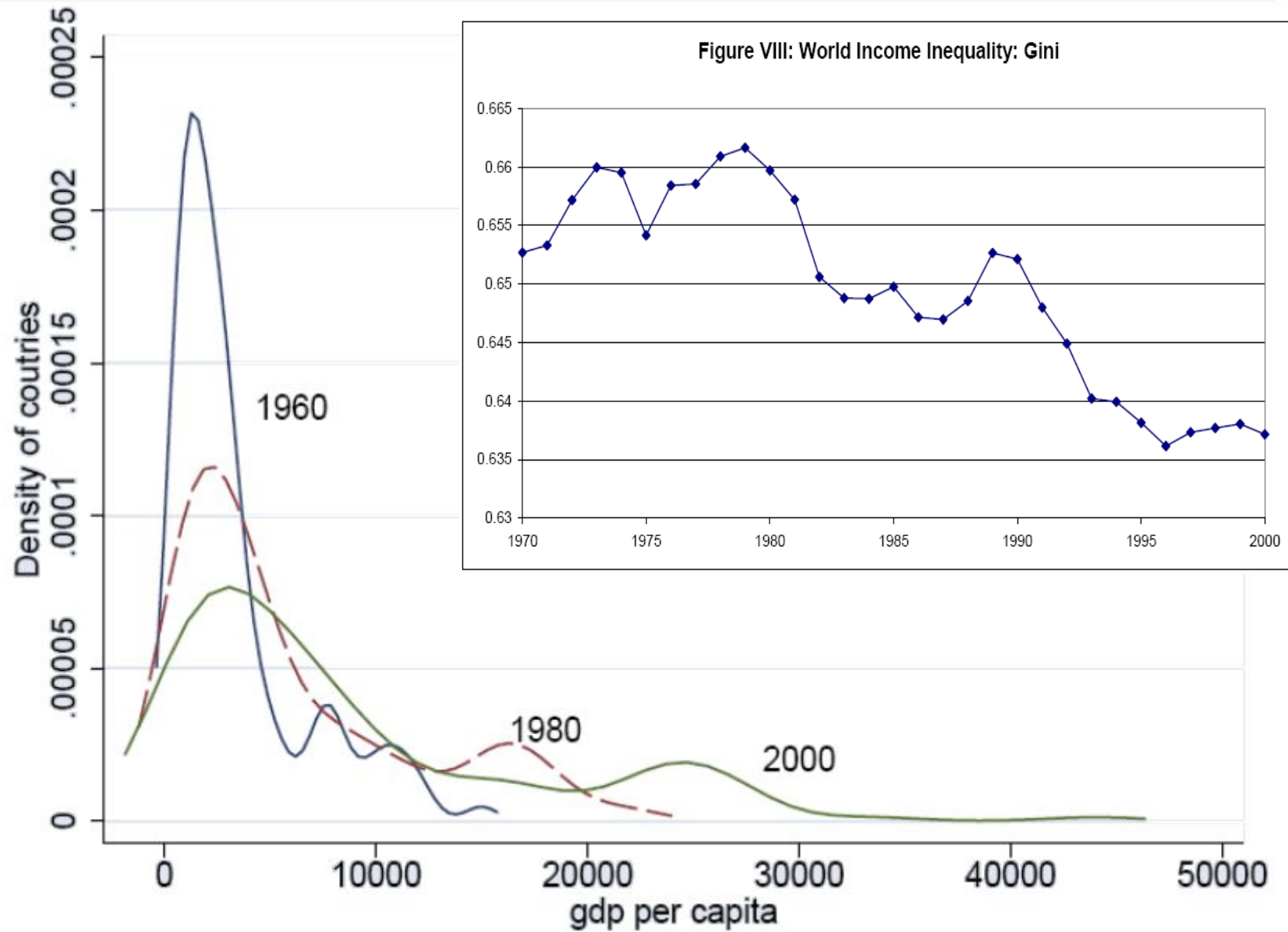
# Convergencia por Zonas durante 1000 años



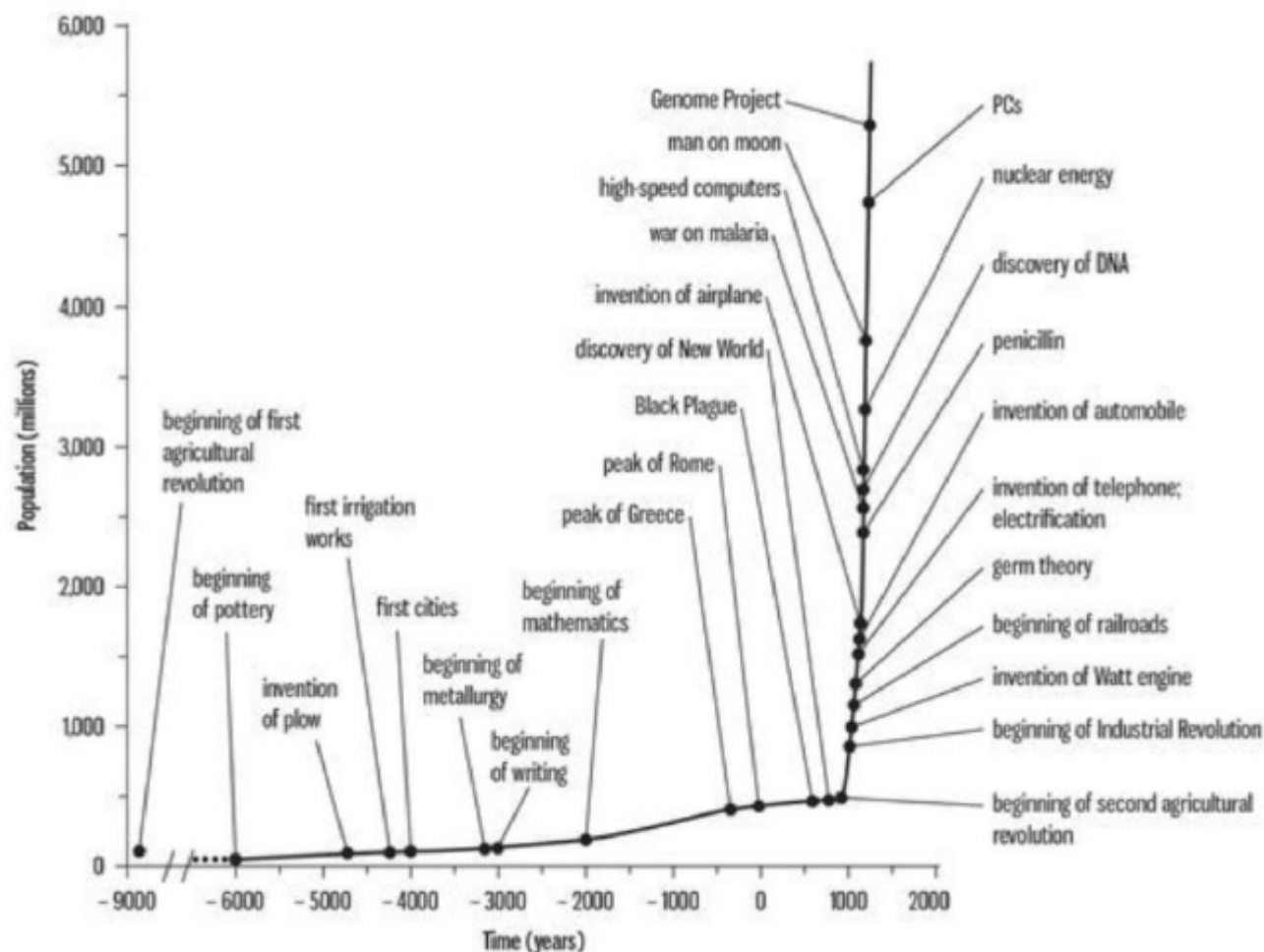
# Convergencia y Crecimiento



# Convergencia y Distribución del Ingreso



# Progreso Tecnológico y Población



Source: Robert Fogel, "Catching Up with the Economy," *American Economic Review* 89(1) (March 1999): 1-21.

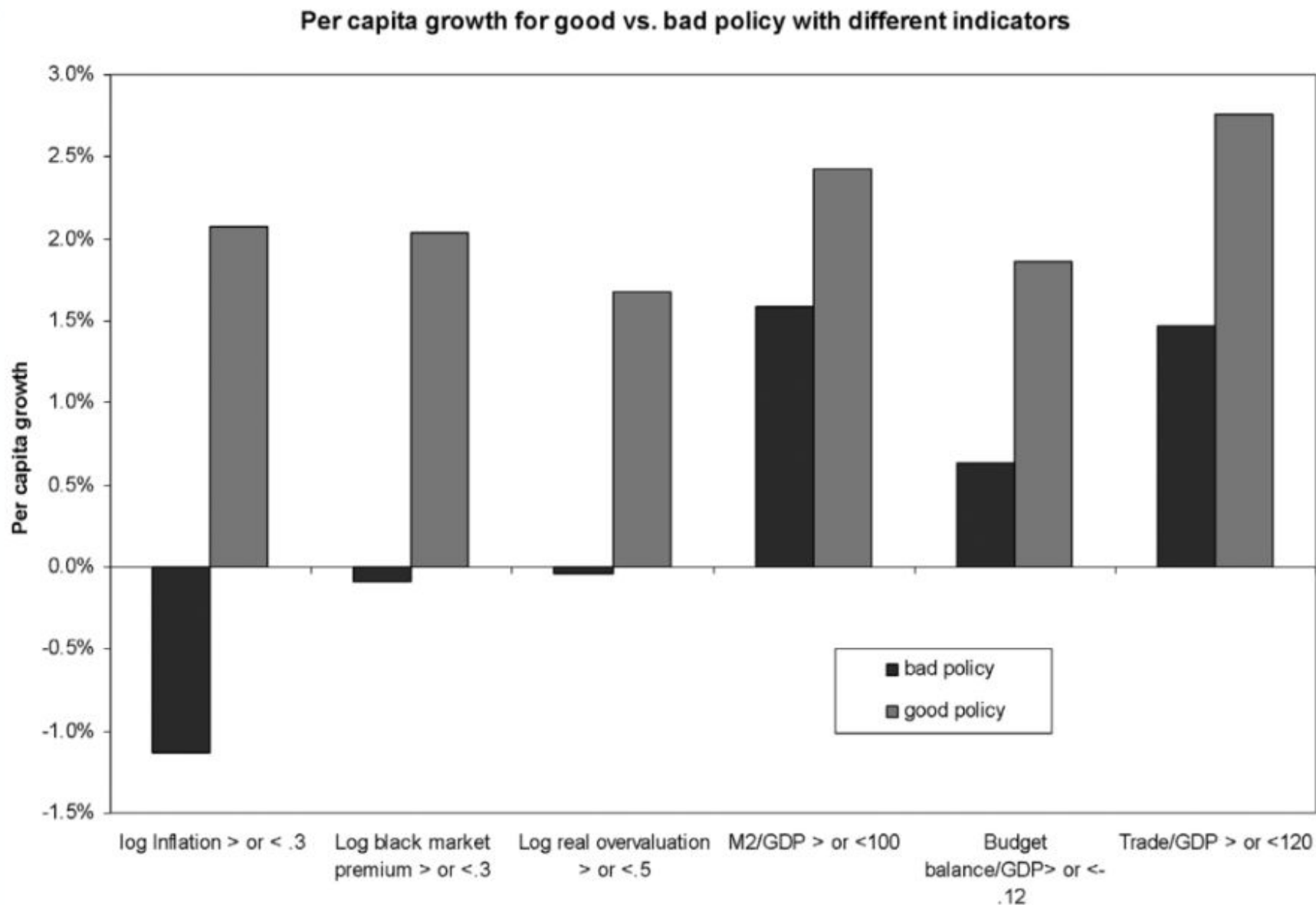
Note: There is usually a lag between the invention of a process or a machine and its general application to production. "Beginning" means the earliest stage of this diffusion process.



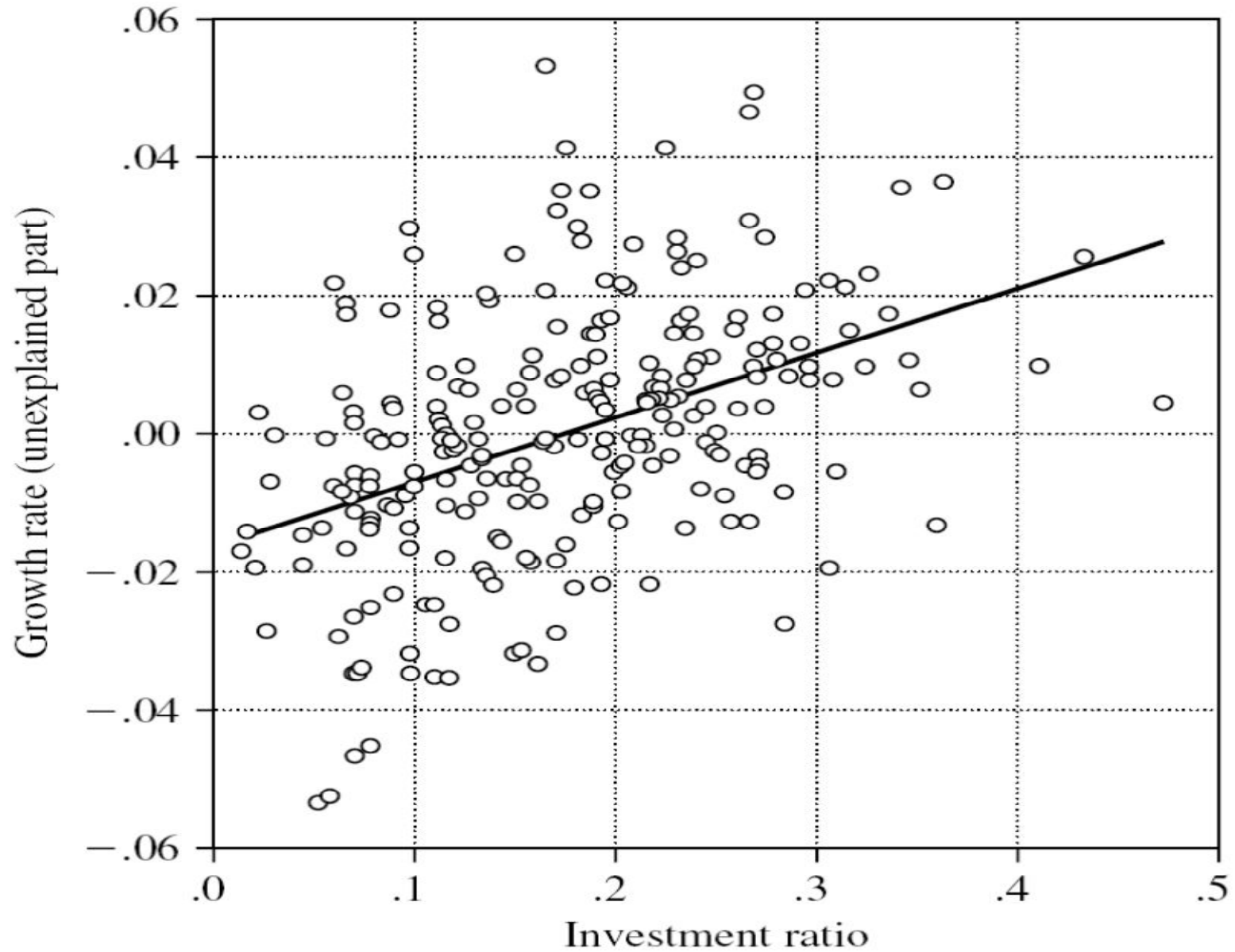
# FUNDAMENTOS DEL CRECIMIENTO ECONÓMICO SOSTENIBLE



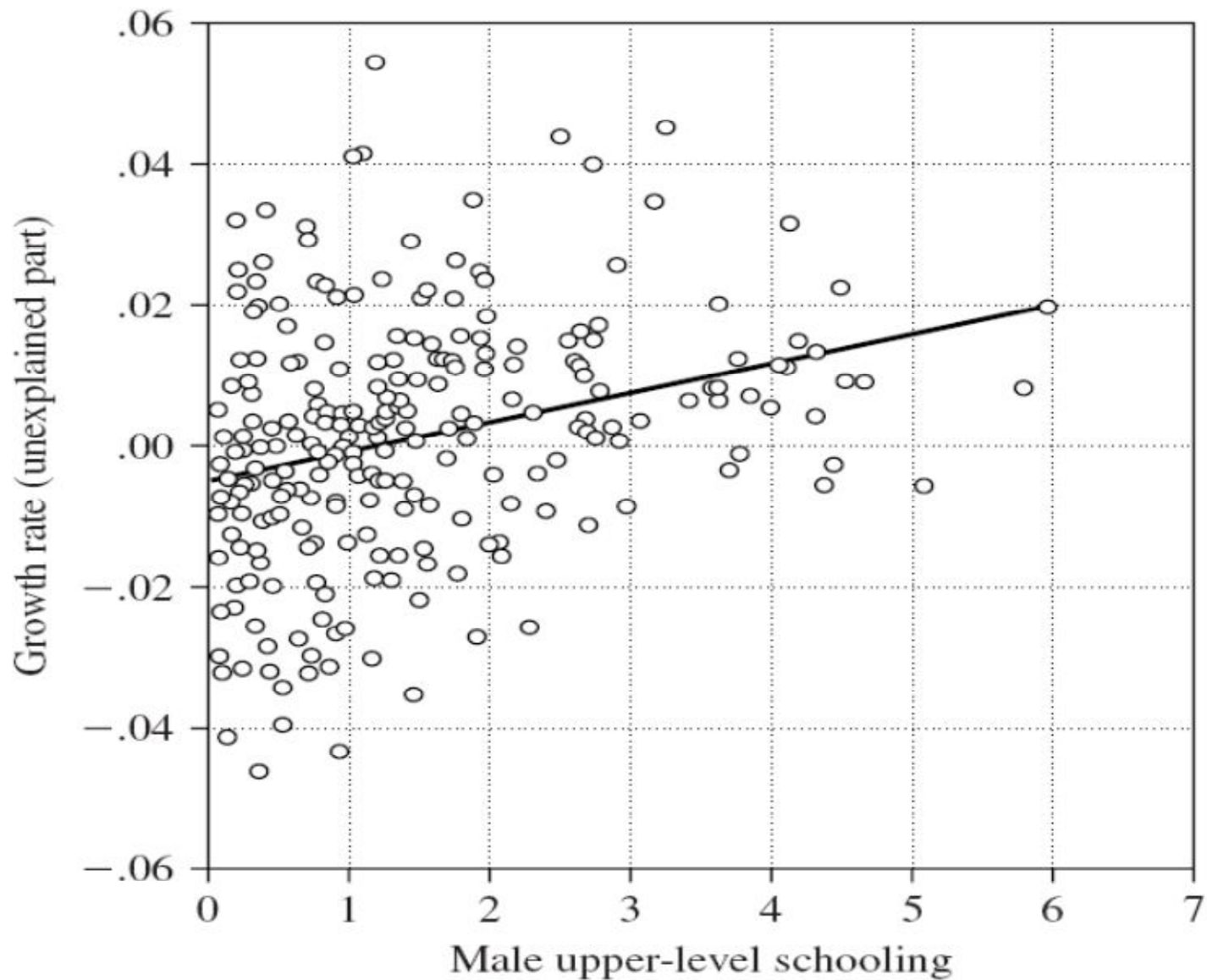
# Política Económica y Crecimiento



# Inversión y Crecimiento



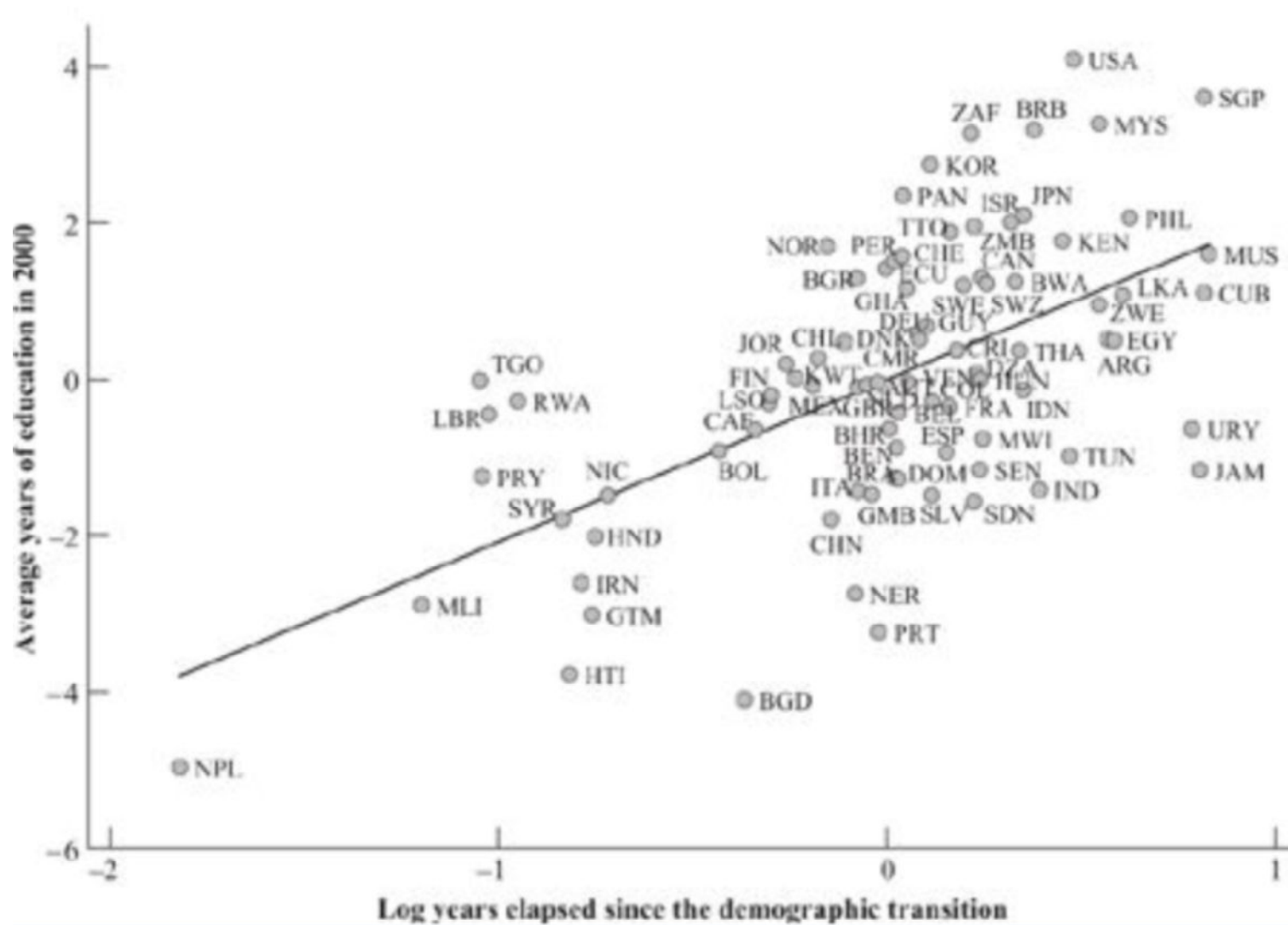
# Educación y Crecimiento



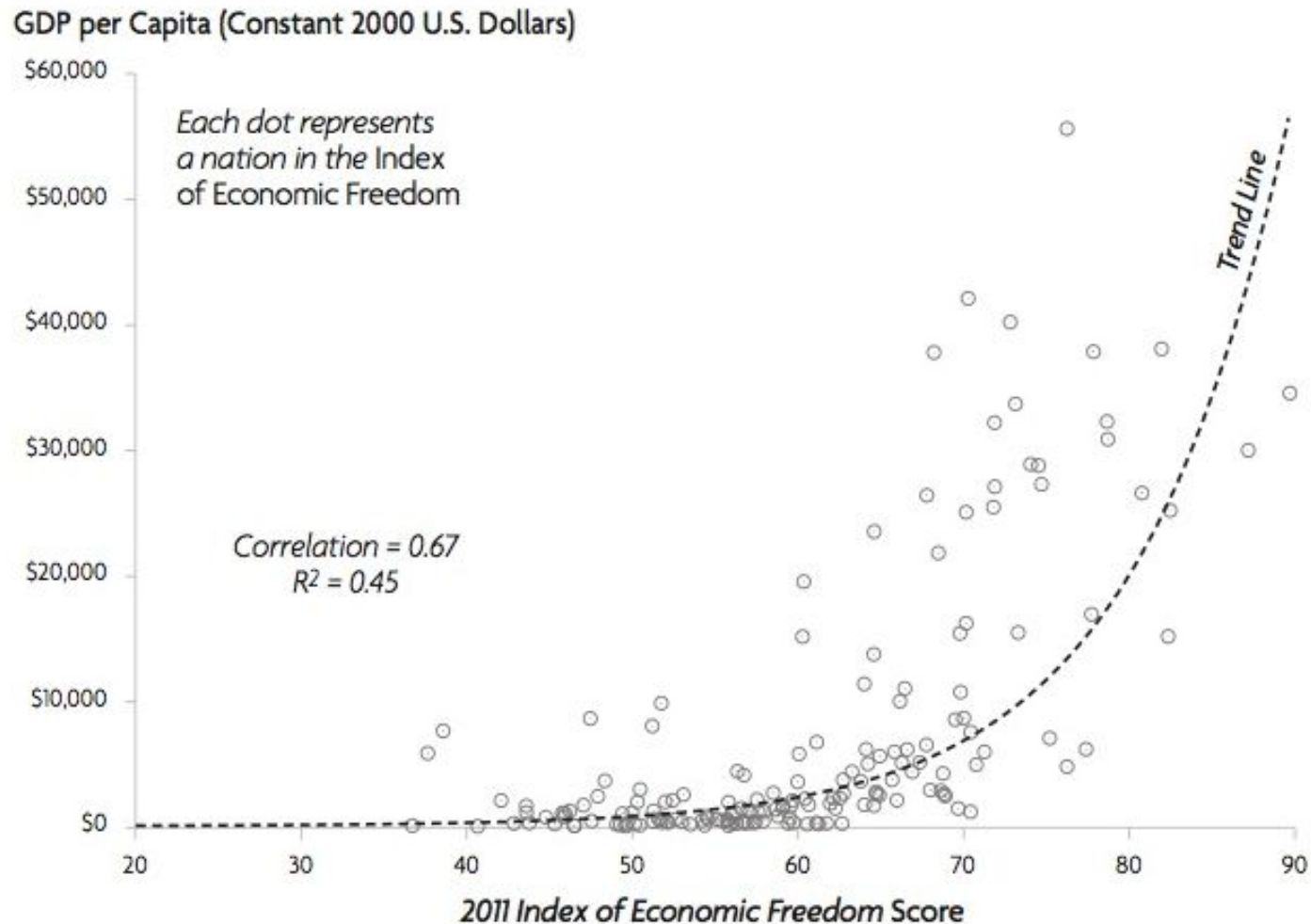




# Crecimiento y Transición Demográfica (II)



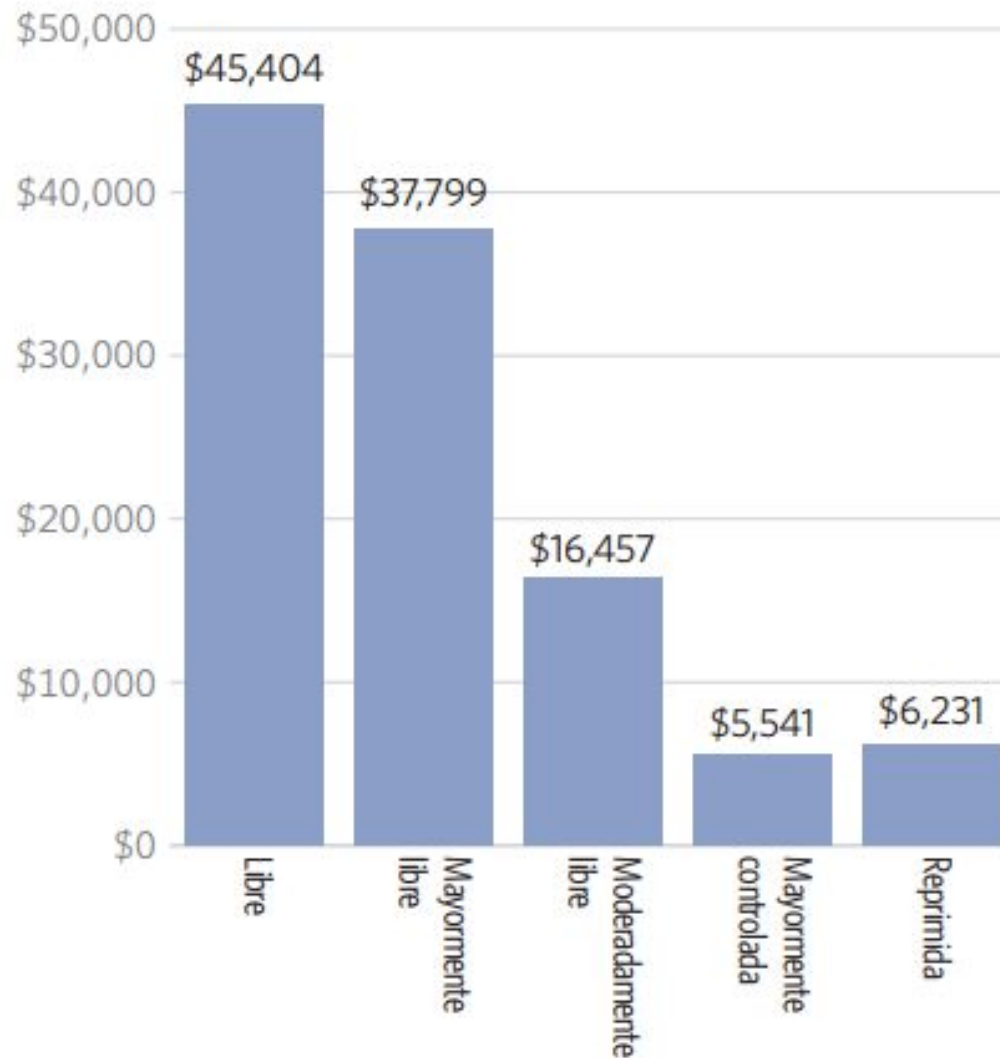
# Libertad económica y crecimiento



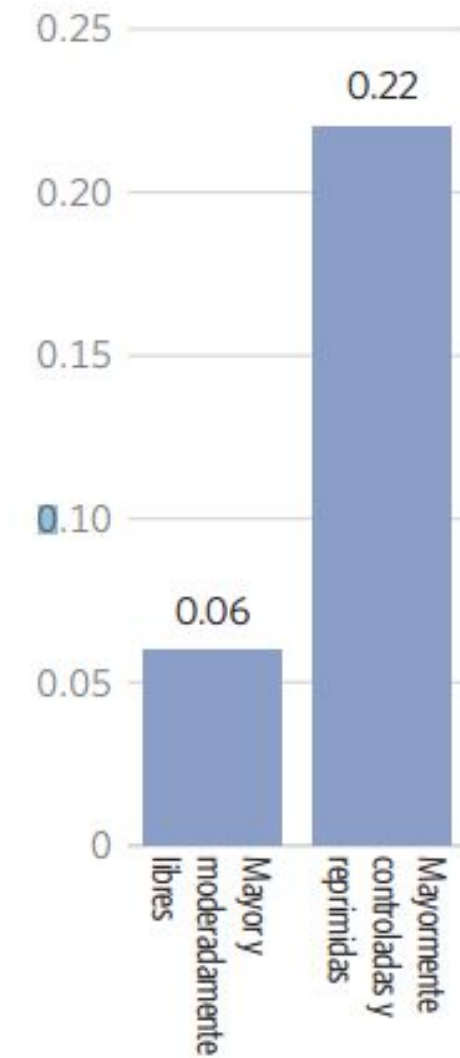
Sources: Terry Miller and Kim R. Holmes, *2011 Index of Economic Freedom* (Washington, D.C.: The Heritage Foundation and Dow Jones & Company, Inc., 2011), at [www.heritage.org/index](http://www.heritage.org/index); World Bank Group, *World Development Indicators Online*, at <http://publications.worldbank.org/WDI/> (November 5, 2010); International Monetary Fund, *World Economic Outlook Databases*, at <http://www.imf.org/external/ns/cs.aspx?id=28> (November 5, 2010).

# Libertad económica, nivel de vida y pobreza

PIB per cápita (Paridad de poder adquisitivo)



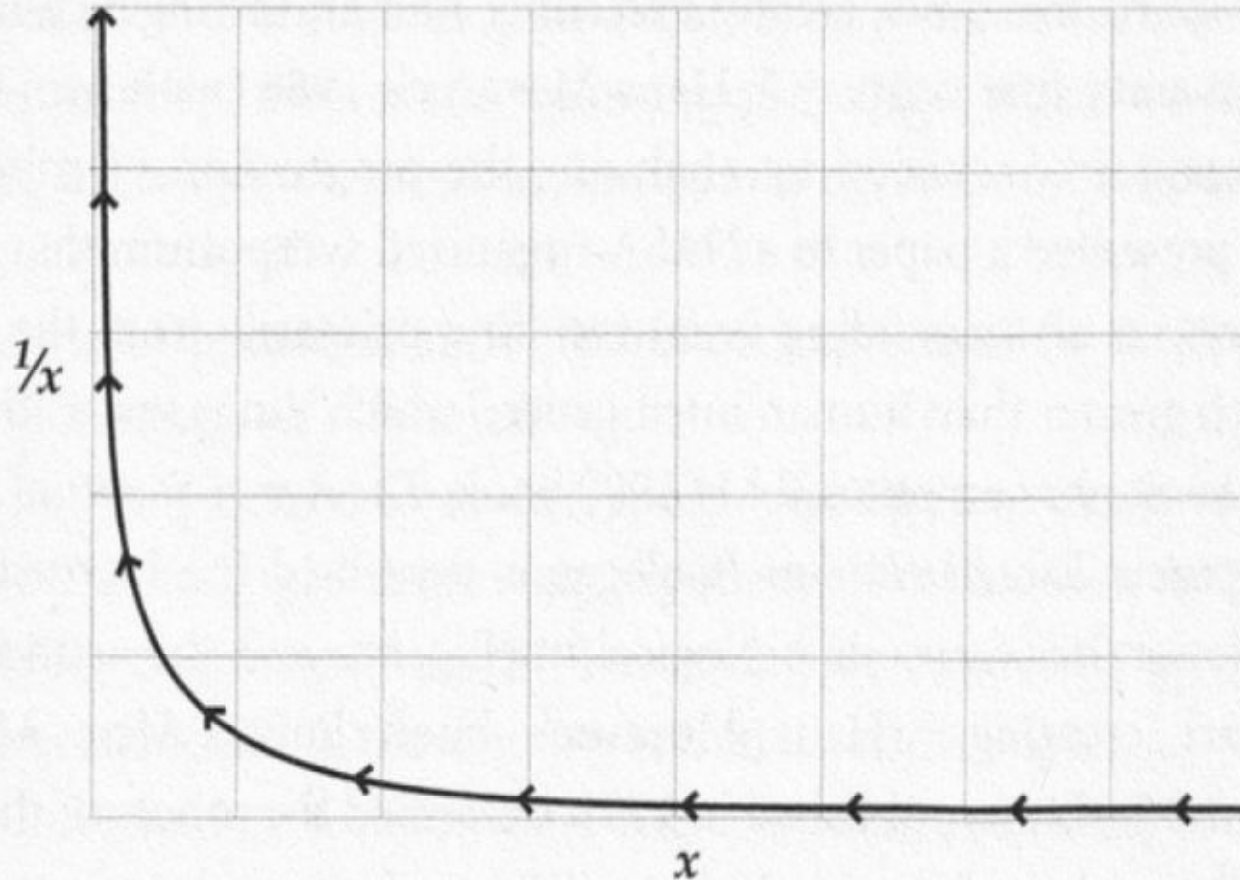
Intensidad de la pobreza





# Singularidad Matemática

**A Mathematical Singularity** *Linear Plot*

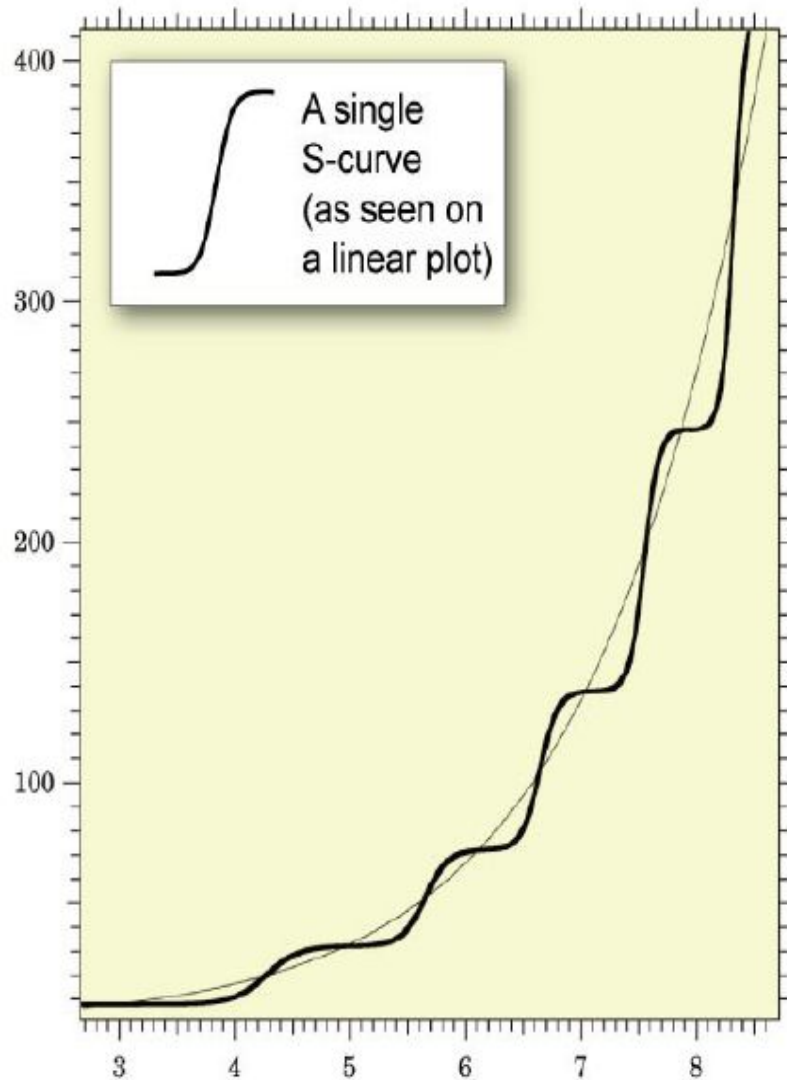


*A mathematical singularity: As  $x$  approaches zero (from right to left),  $1/x$  (or  $y$ ) approaches infinity.*

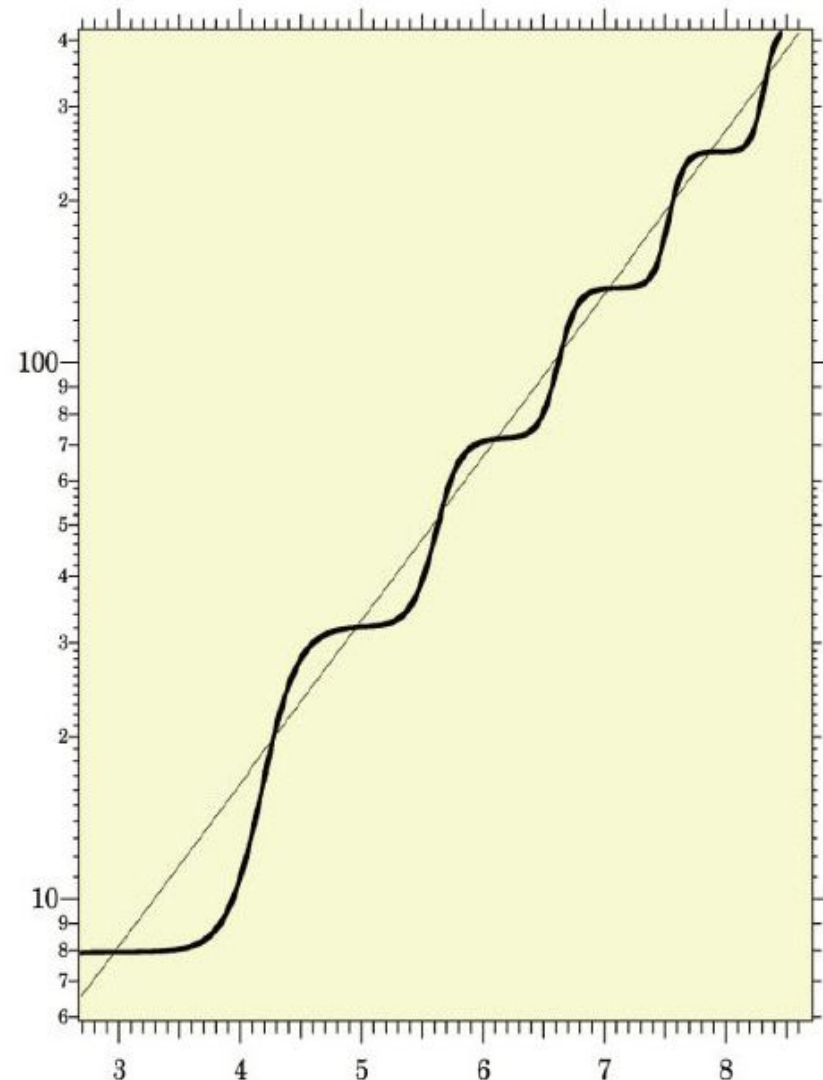


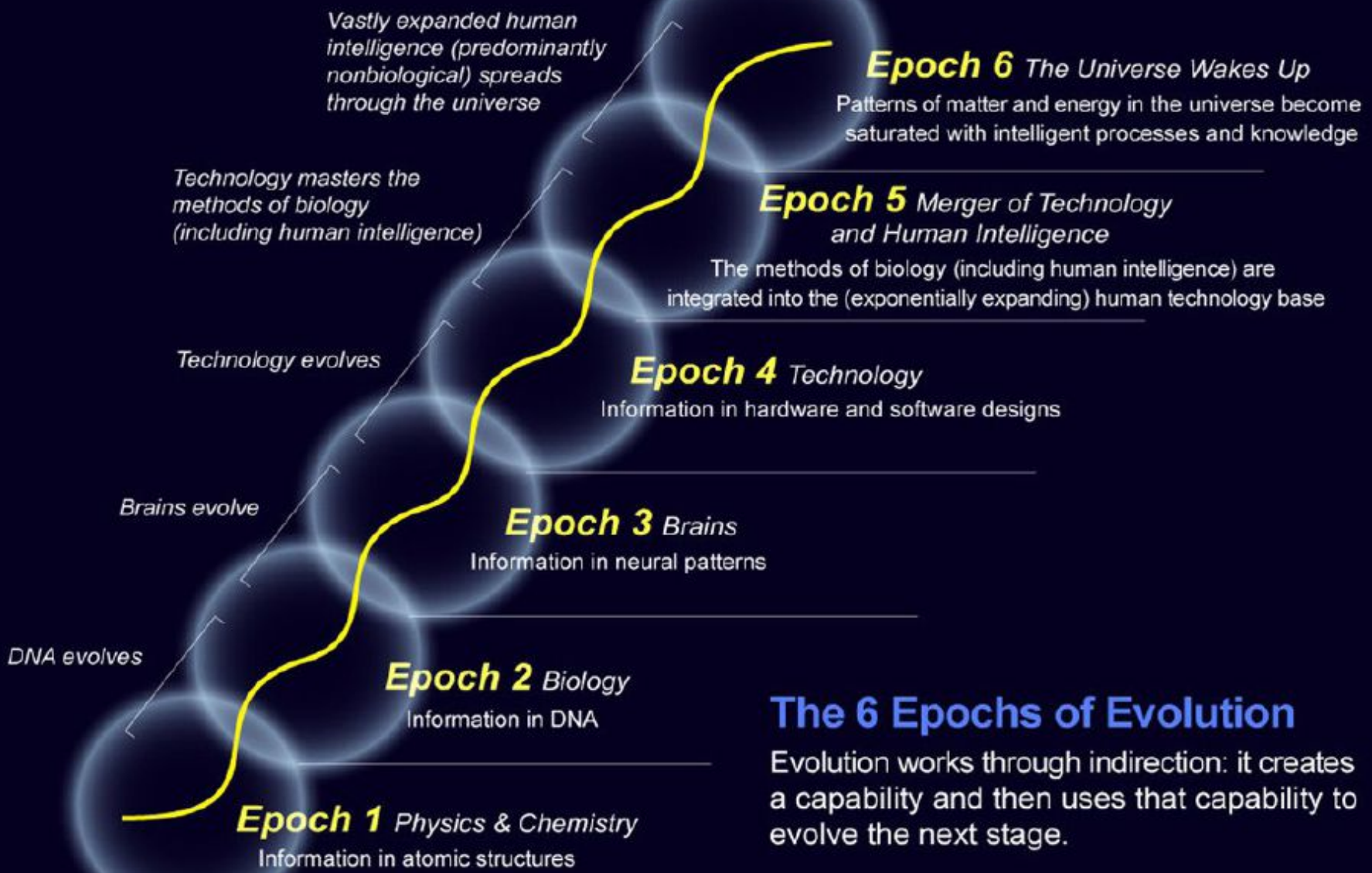
# Secuencia del proceso de crecimiento

An ongoing exponential sequence made up of a cascade of S-curves (linear plot)



The same exponential sequence of S-curves on a logarithmic plot

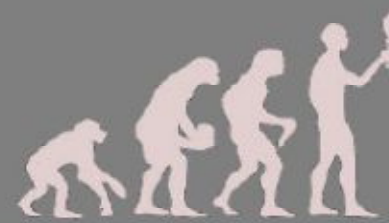




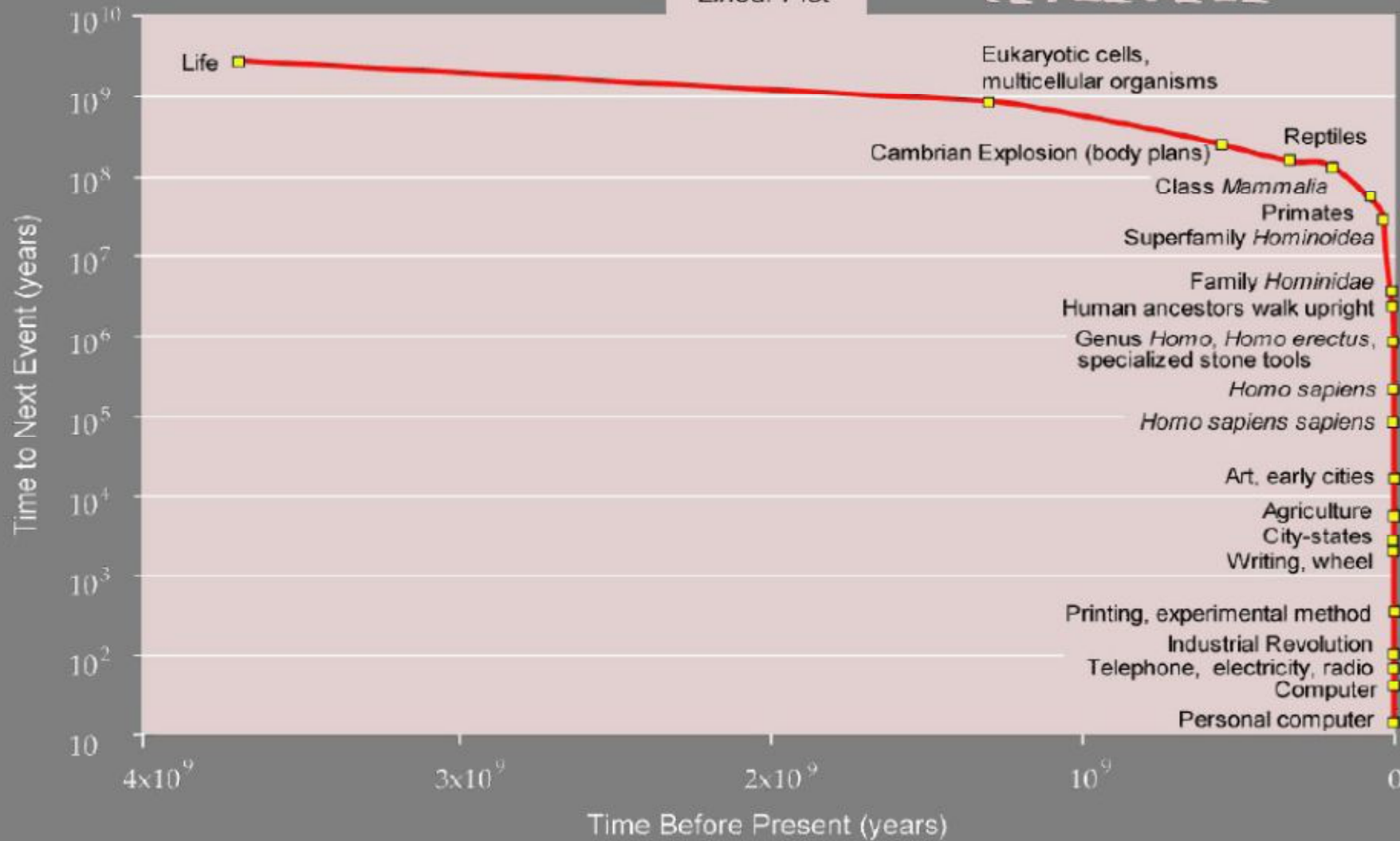
## The 6 Epochs of Evolution

Evolution works through indirection: it creates a capability and then uses that capability to evolve the next stage.

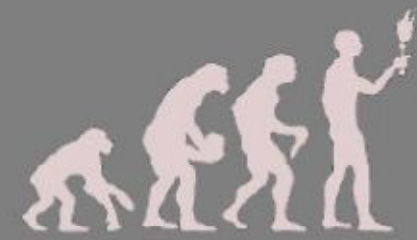
# Countdown to Singularity



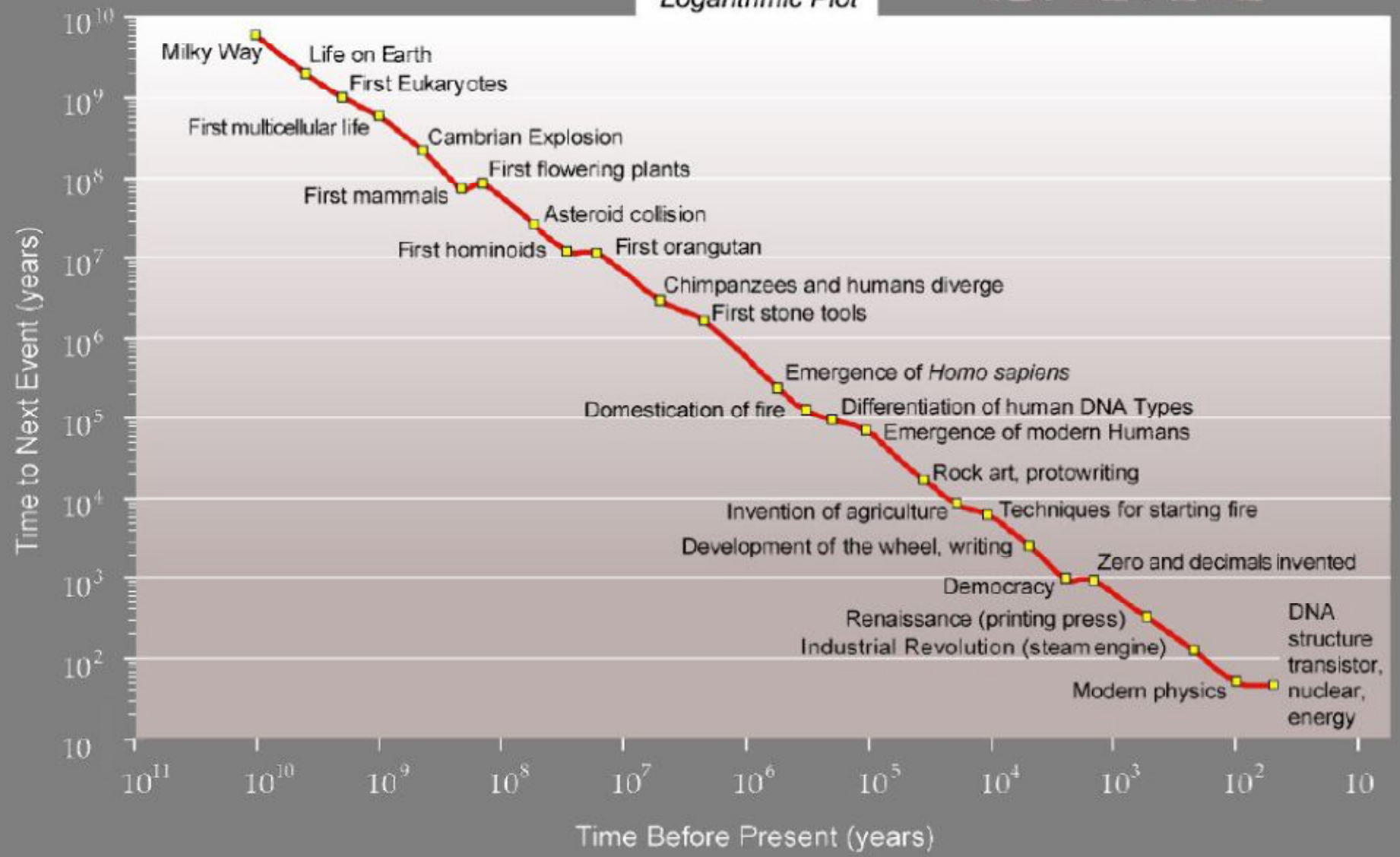
Linear Plot



# Canonical Milestones



Logarithmic Plot

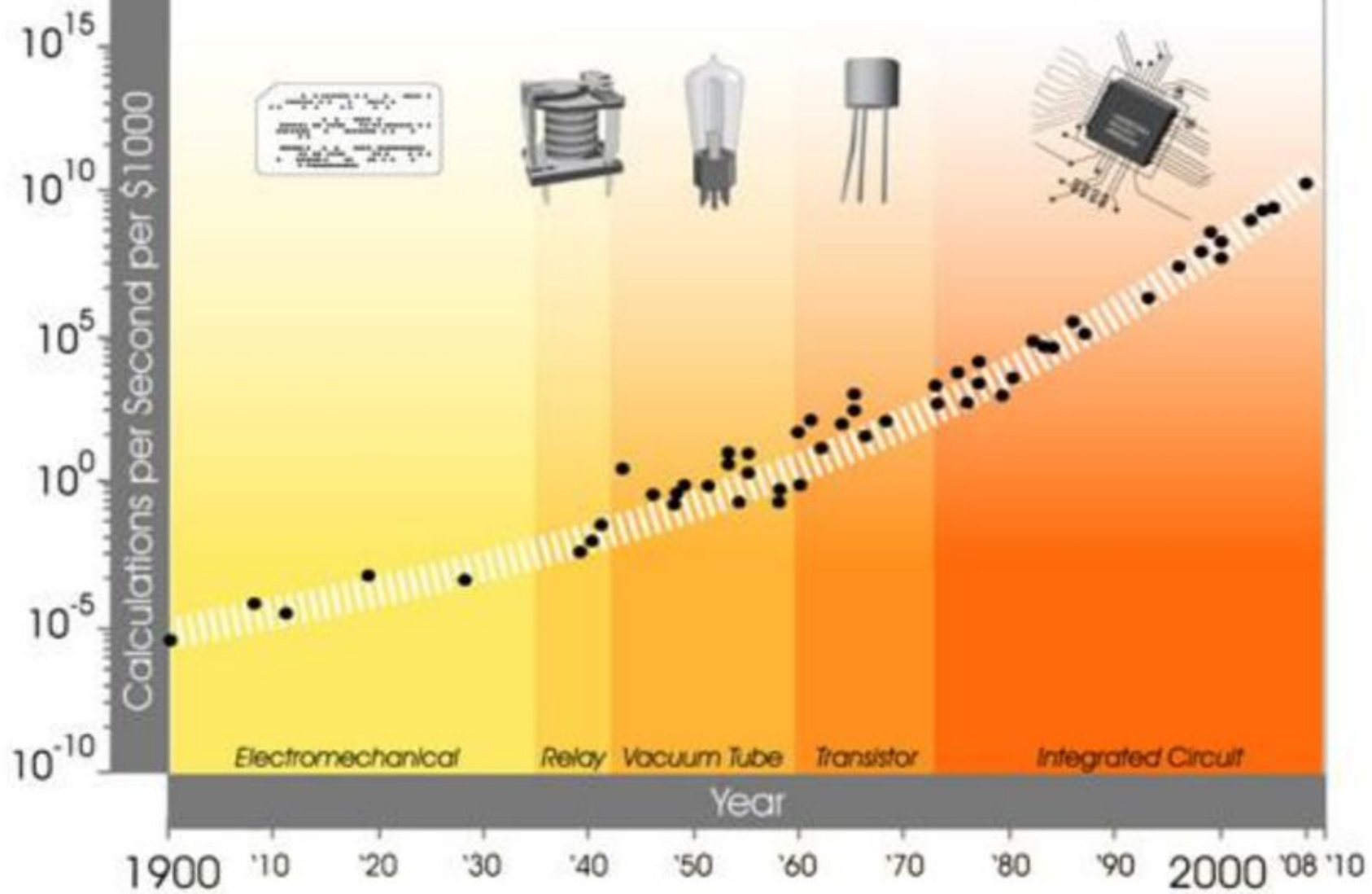




# Exponential Growth of Computing for 110 Years

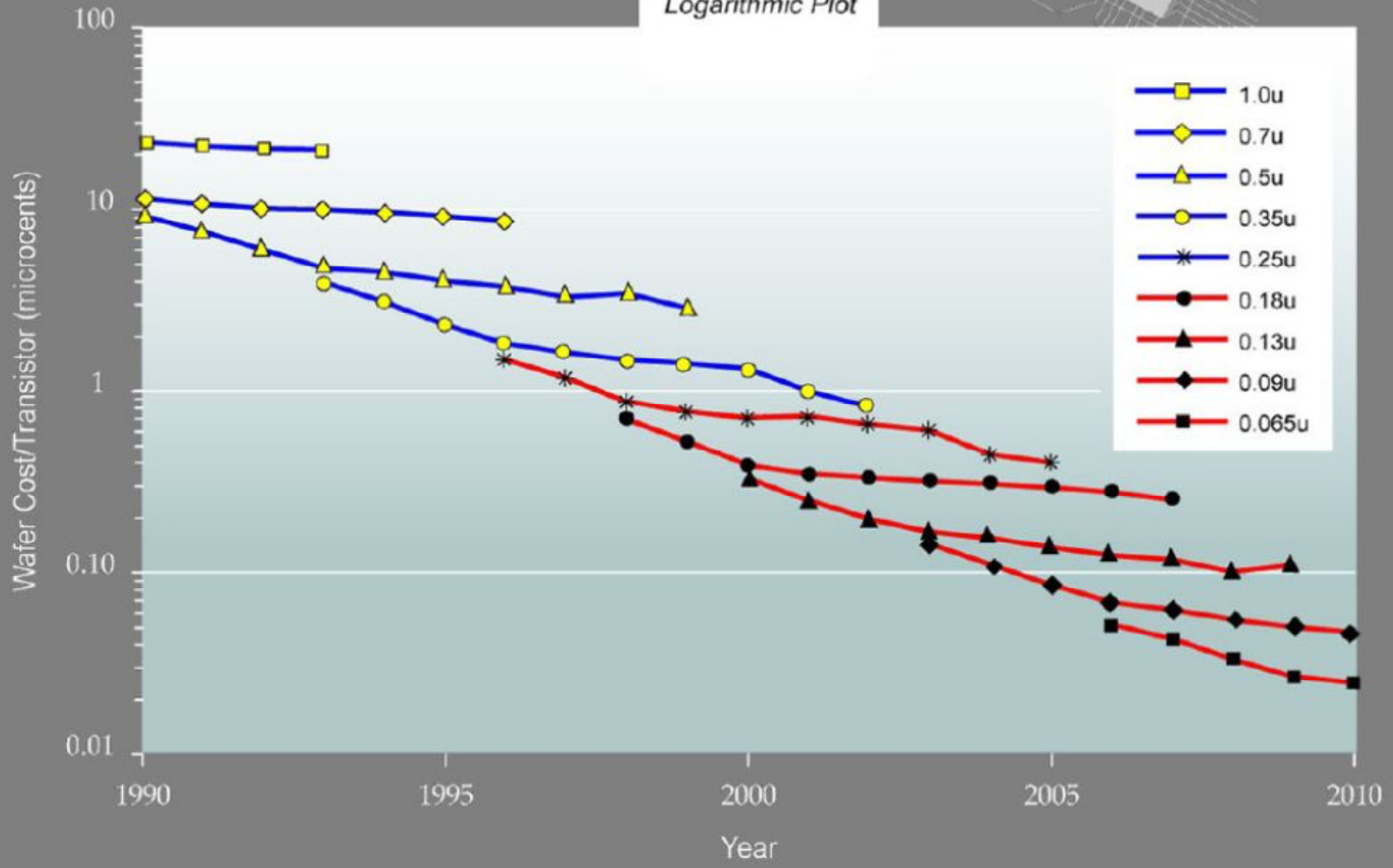
Moore's Law was the Fifth, not the First, Paradigm to Bring Exponential Growth in Computing

Logarithmic Plot



# Transistor Manufacturing Costs Falling

Logarithmic Plot

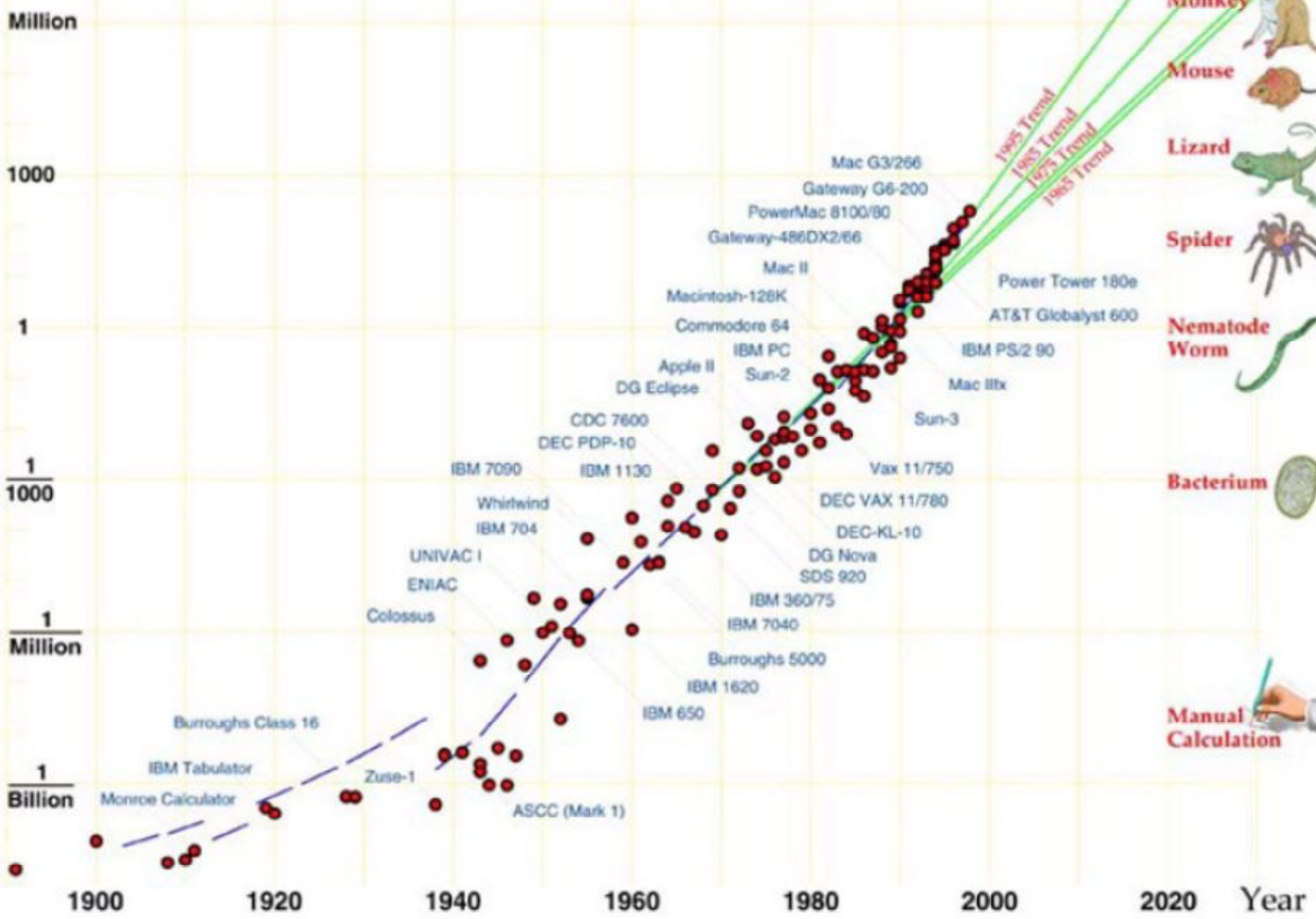




# Evolution of Computer Power/Cost

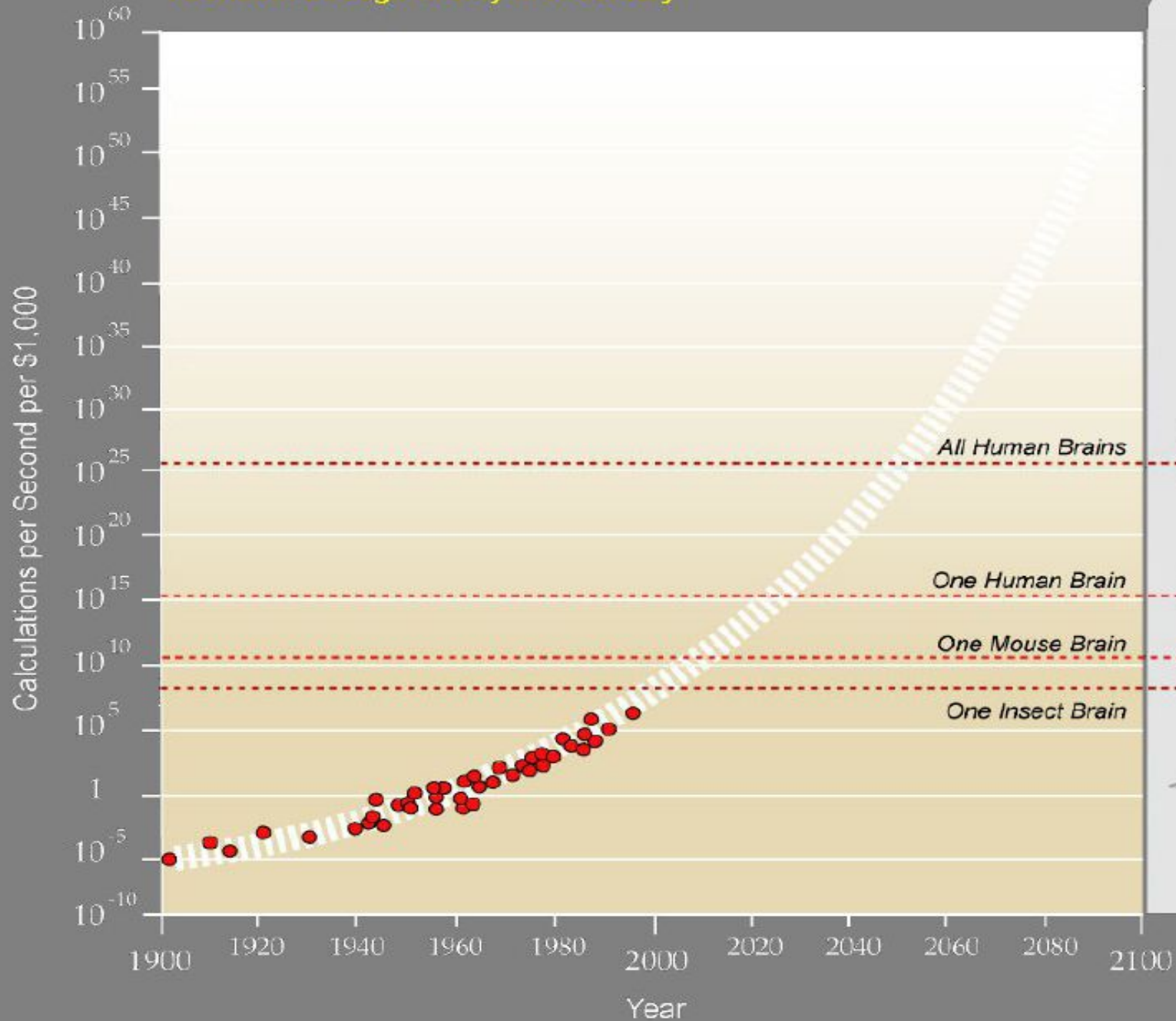
MIPS per \$1000 (1998 Dollars)

Brain Power Equivalent per \$1000 of Computer



# Exponential Growth of Computing

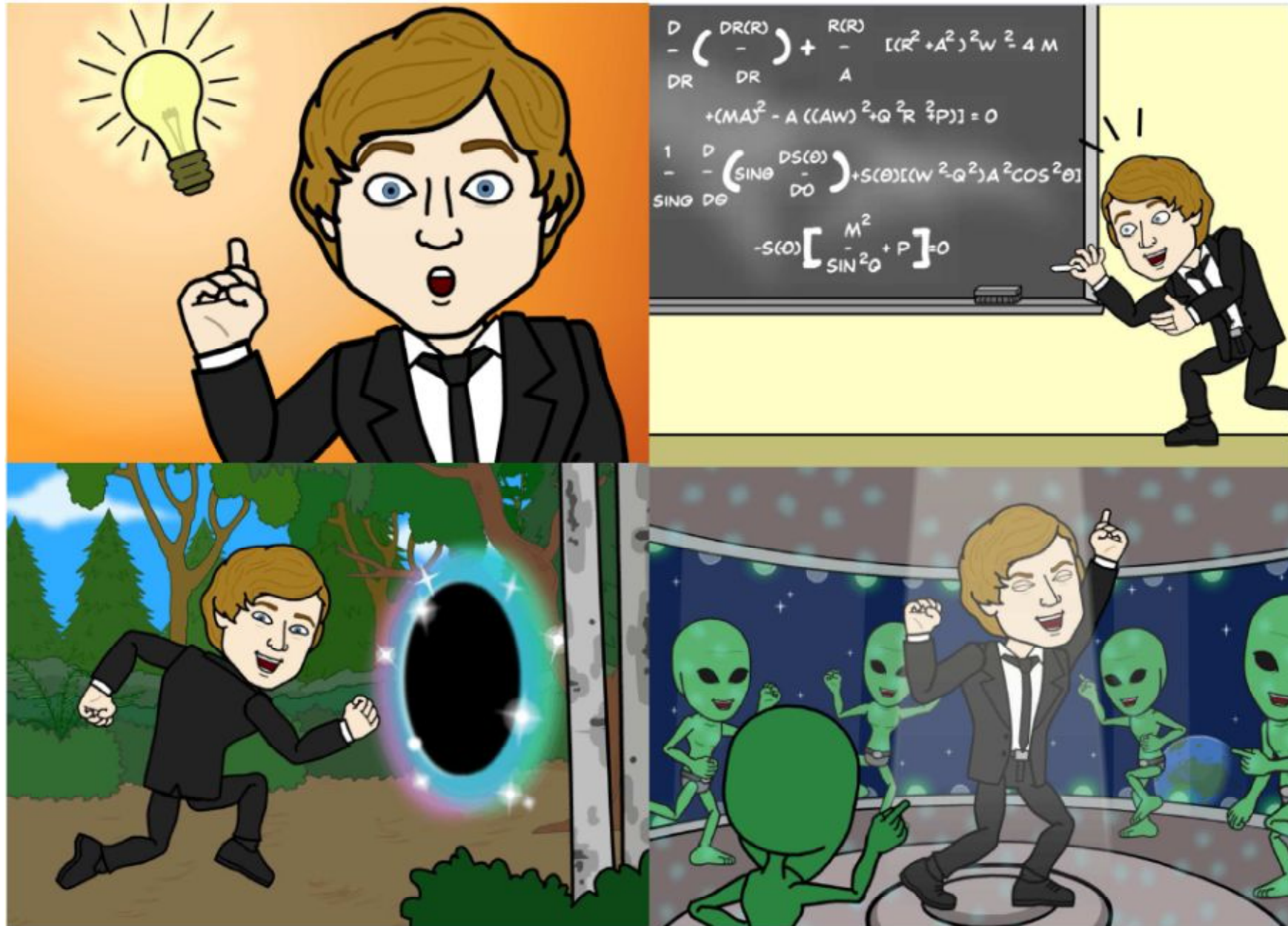
Twentieth through twenty first century



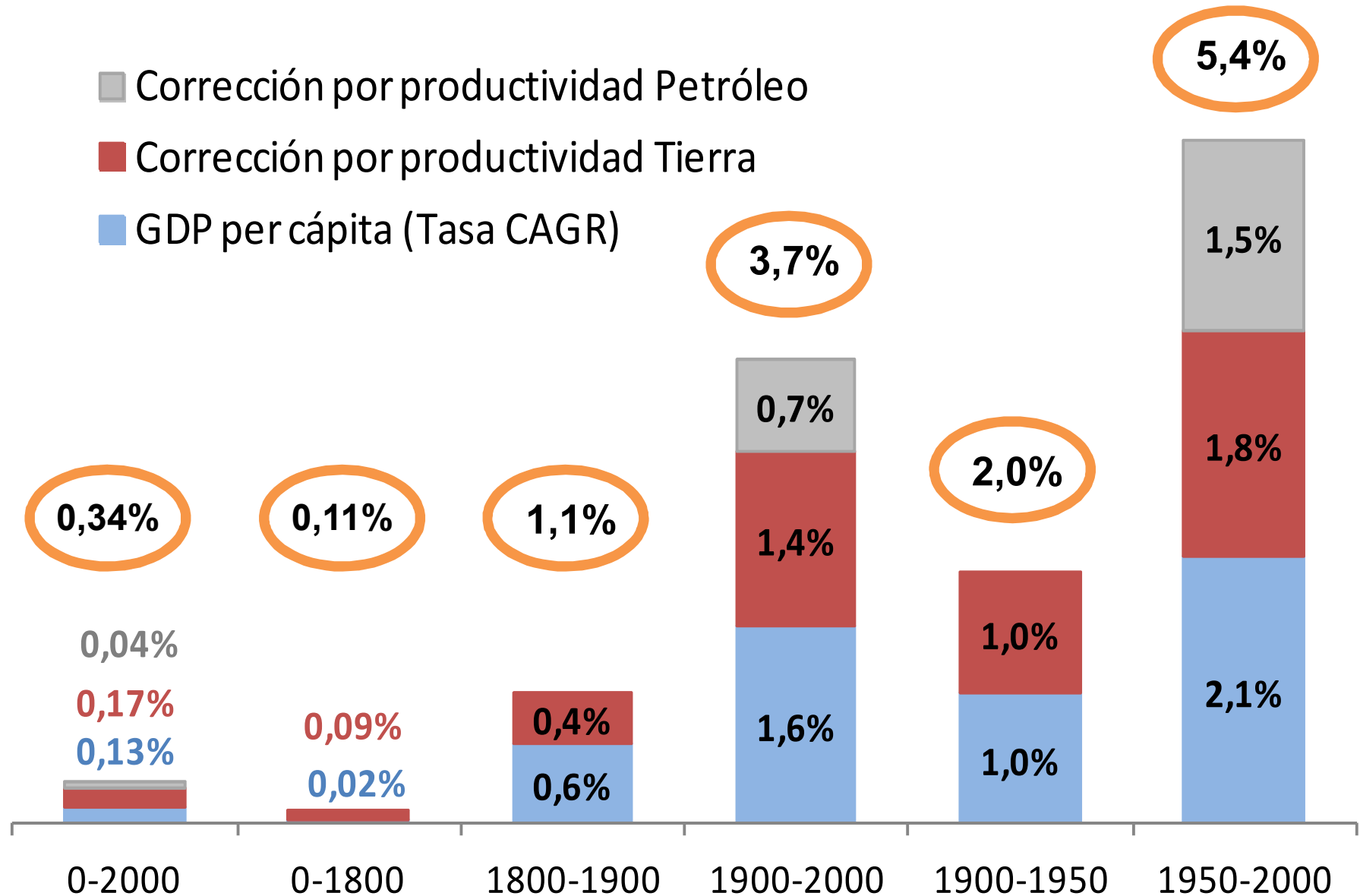
Logarithmic Plot



# Singularidad en Economía

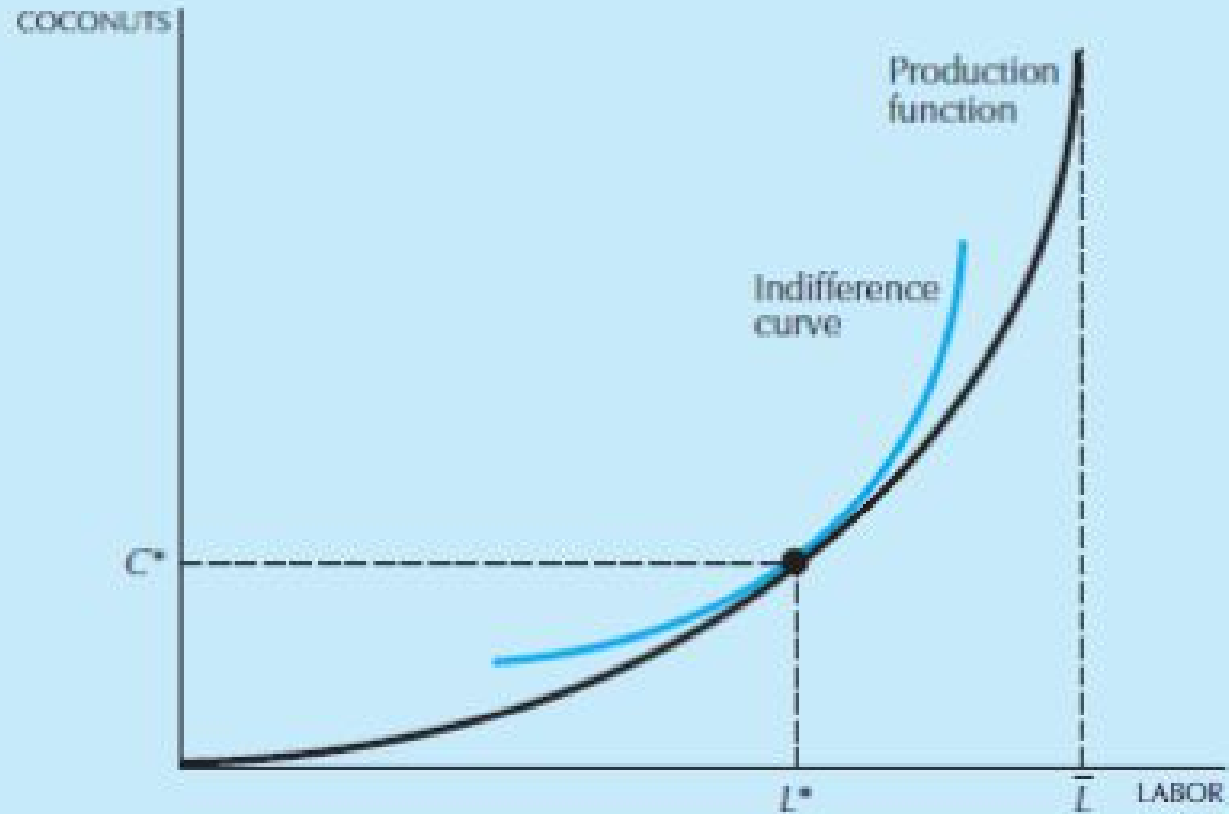


# LA DESATINADA visión de Robert Solow



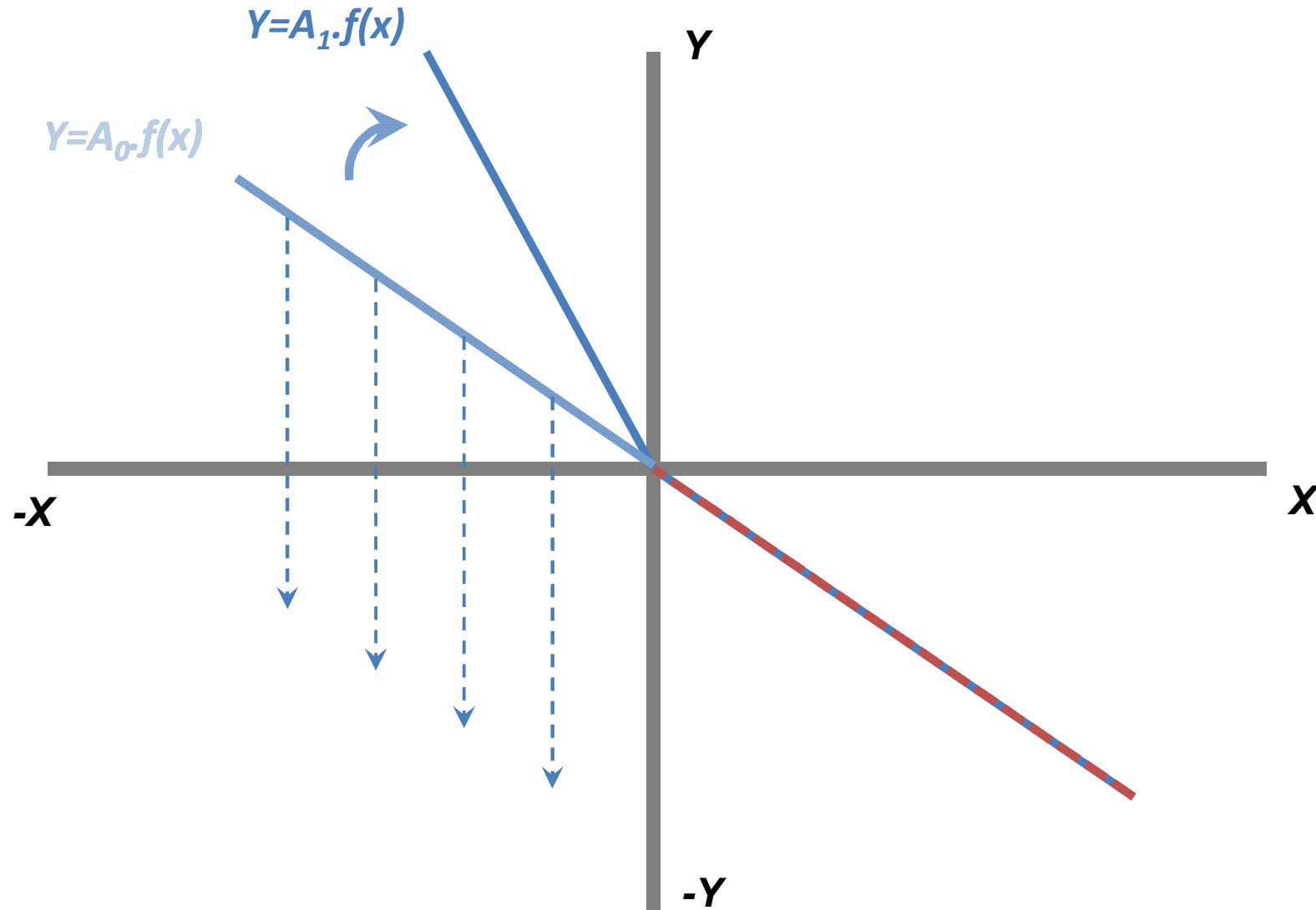


# Los Rendimientos Crecientes



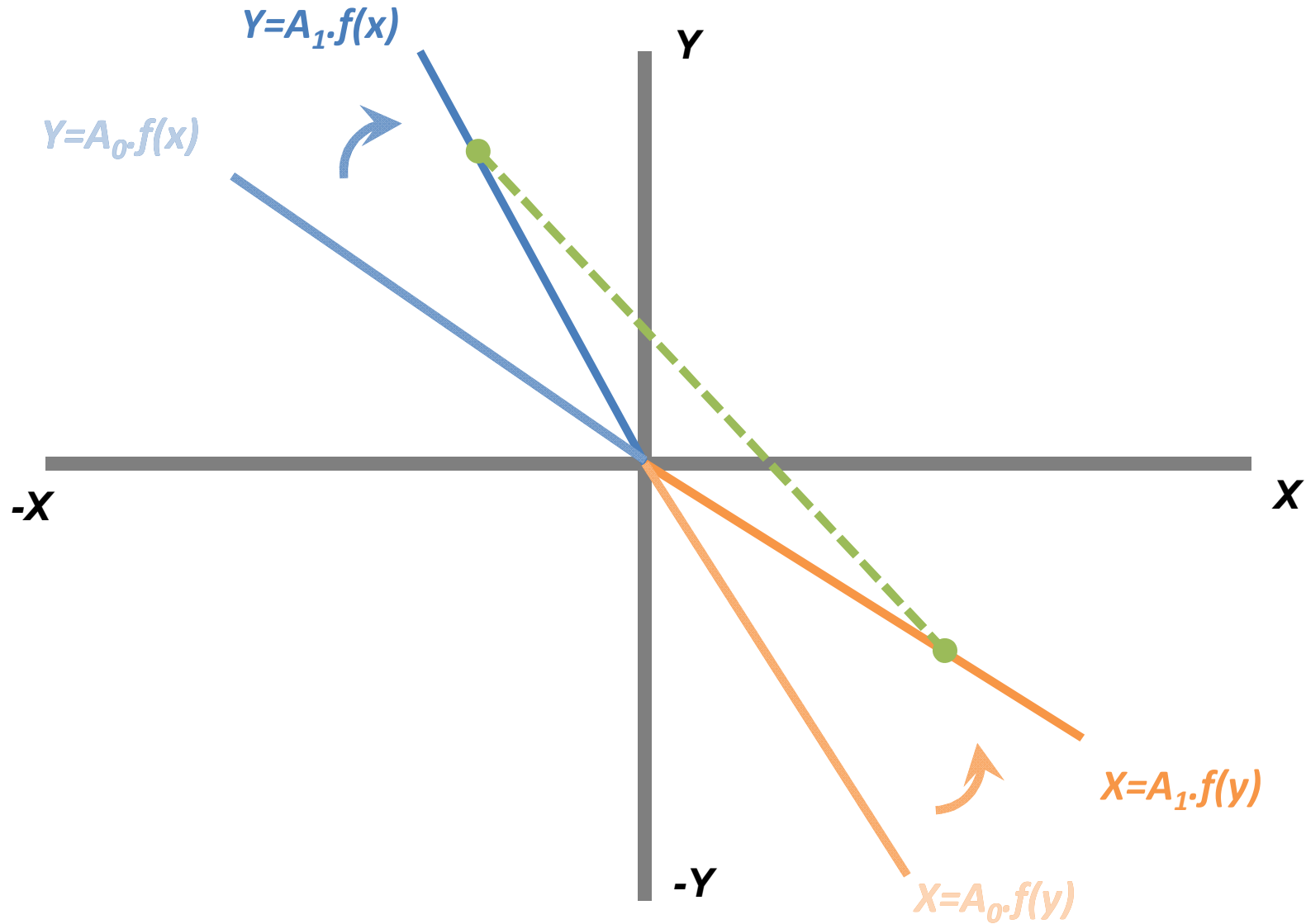
**Increasing returns to scale.** The production set exhibits increasing returns to scale and the Pareto efficient allocation cannot be achieved by a competitive market.

# Progreso Tecnológico y Crecimiento

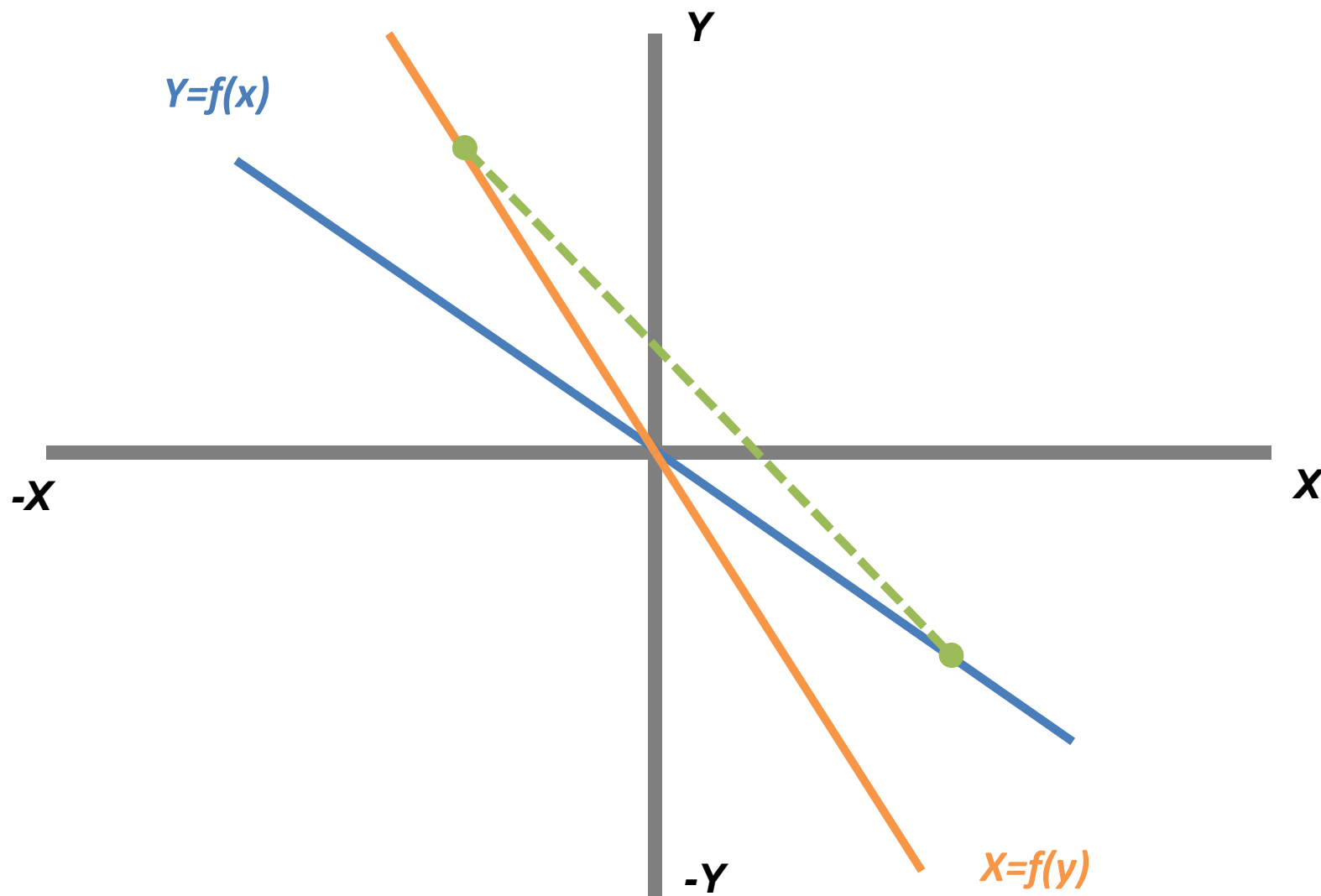




# La Trampa Monoproducto



# La Trampa de la Irreversibilidad



$$Y_j = f(Y_i)$$

$$Y \cap -Y = \{0\}$$

NO  
APLICA

**MUCHAS GRACIAS**

Singularidad  
en Economía

$$-Y_j$$

$$Y_i = f(Y_j)$$