

## Roberto Fritzsche and Eduardo Fernández

# Notes on Potential Relative Population Density in Lyndon LaRouche's Economics

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LaRouche Legacy Foundation  
Roberto Fritzsche



LaRouche Legacy Foundation  
Eduardo Fernández

**Roberto Fritzsche:** Good afternoon! First, I'd like to thank Helga Zepp-LaRouche and the LaRouche Legacy Foundation for asking us to participate in this most important conference. We will explain some features of Potential Relative Population Density. To do that, we'll mention Vladimir Vernadsky's comment in 1938, in his "The Transition from the Biosphere to the Noösphere," in which he says:

Taking into account the energy received from the Sun, agriculture makes it possible to support 150 people on one square kilometer, that is, on the entire land area of the globe you could support a population of 22.5 billion individuals, that is, 22-24 times the number that now inhabit it. Utilizing new energy sources, Earth could support a population of 3 trillion people, that is, more than ten million times greater than the present population. These figures ought to be greatly increased since man may now use a source of energy ... the energy connected to the atomic nucleus.

When mention is made of the main concepts of LaRouchean economics, it is clear that his view is totally contrary to the theoretical frameworks estab-

lished by Malthus or also, by the expressions and reasoning expressed by Newton, Bentham or Hume, which imply viewing man as an animal lacking any ability to improve, and therefore they present the human race as a factor that can be eliminated, as some public figures state today, such as the philanthropist and billionaire Bill Gates, with his formula for population control.

It is very important to understand, therefore, that LaRouchean economics develops in three different domains that act in a shared universe, where man, the soul (as a reflection of mind), and the pursuit of happiness are presented as interacting with each other. There is:

- A domain established by the *not* living, with its own space.
- The domain that belongs to the biosphere, which encompasses all living beings in nature.
- And the domain that belongs to man, who has the ability to think and reason, which introduces the novel concept of the noösphere, which, as part of the system, is considered as having higher level features than the other two concepts of domain.

This is how man is considered in the image and likeness of God, where the Universe has a basic principle of creation, finite but unbounded, with curvature. Einstein expressed this idea of curvature, which is finite, and that only human beings have the creative capacity to change the reality of that physical world, that is, of that physical economy that sur-

FIGURE 1

**Potential Relative Population Density**

	Technology	Period	Life Expectancy	Population Density	Total Population
A	Hunting and gathering	100,000 - 15,000 B.C.	18 -20	0.1 / km <sup>2</sup>	2 - 3 million
B	Agro (Iron Age)	3-1,000 B.C.	28	10 / km <sup>2</sup>	50 million
C	Middle Ages (artisans)	800 - 1,300 A.D.	30 +	20 + / km <sup>2</sup>	220-360 million
D	Fossil fuels	20 <sup>th</sup> C. A.D.	70	100 - 300 / km <sup>2</sup>	4 billion
E	Nuclear	21 <sup>st</sup> C. A.D.	80 - 90	300 - 500 / km <sup>2</sup>	20 - 30 billion

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rounds him and that he needs to transform in order to live better.

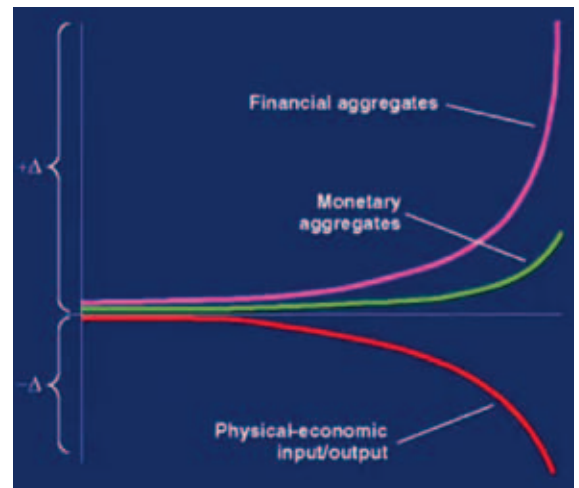
**Potential Relative Population Density and the New Paradigm**

Man, through his evolution, has shown he is able to adapt to the various changes that have arisen throughout history. This is how the different cycles originated, which were characterized primarily by occupying the territorial spaces as the population and access to technology increased, as we can see in **Figure 1**.

The present century from the standpoint of the theoretical framework of LaRouche's economics, shows the need to adopt and re-adopt policies such as the re-enactment of the Glass-Steagall Act for the control of commercial banks, as opposed to investment banks, as well as to decisively address the minimum necessary requirements for humanity to have an energy-flux density that allows it to evolve in a socially and eco-

FIGURE 2

**A Typical Collapse Function**



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nomically stable, upward direction linked to areas of knowledge and happiness of humanity.

In this context, LaRouche's economics rejects Malthusian ideas along with the expressions of the Club of Rome and other institutions like that, as they are the ones that demand restrictions on the development of the population based on their insistence on the limitations to economic growth, arguing that the world has limited resources for its development.

For this reason, from LaRouche's point of view, the human species is not defined by its biology, but rather we have the possibility of applying the technology of knowledge. In this way, the relative population-density can expand beyond the limitations of the Earth, thereby tripling the current population. With

FIGURE 3

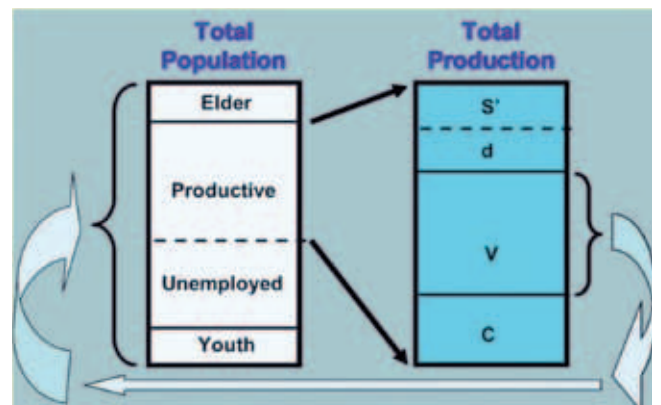
**Fuel Energy Density**

FUEL	DENSITY (kJ/g)
Wood	18
Coal	27
Oil	46
Nuclear fission	3.7 x 10 <sup>6</sup>
Nuclear fusion	3.2 x 10 <sup>8</sup>
Matter-antimatter	9.0 x 10 <sup>10</sup>

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FIGURE 4

**Total Population and Total Production**



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the application of technological advances, the density would rise or expand about ten times more, as for example with the development of thermonuclear fusion energy using deuterium and tritium, which require 30 grams of the material to operate a plant for 30 years.

In this sense, LaRouchean economics is aware of and emphasizes the physical economy that is shown in the third, descending curve of physical-economic production, as seen in **Figure 2**.

Therefore, there has to be rising energy-flux density, as would occur with the application of nuclear fusion, which could provide abundant power, as we see in **Figure 3**.

We consider two factors in this substantive analysis of the theoretical framework. The first is the increase in population and its geographic density. The second is to observe the increased standard of living and energy technology that humanity has achieved. For this reason, in physical economy and from the perspective of potential relative population-density, growth is perpetual, based on that creative capacity that man has to make such quantum leaps.

Therefore, the theoretical framework is established by taking into account that  $S'$ , or net surplus, [the top portion of Total Production in Figure 4] whose increase ensures the continued growth of the economic structure. This is basically as follows as shown in **Figure 4**.

In looking at this issue of  $S'$ , the analysis we focused on and developed [was] based on a few indicators expressed by the use of knowledge as measured by the issuance of patents, along with energy consumption and population growth.

This allows us to approach, develop, and research the concepts and theoretical framework established by Lyndon LaRouche himself. For our conclusion,

FIGURE 5

**Total Electricity Consumption (1980-2018)**

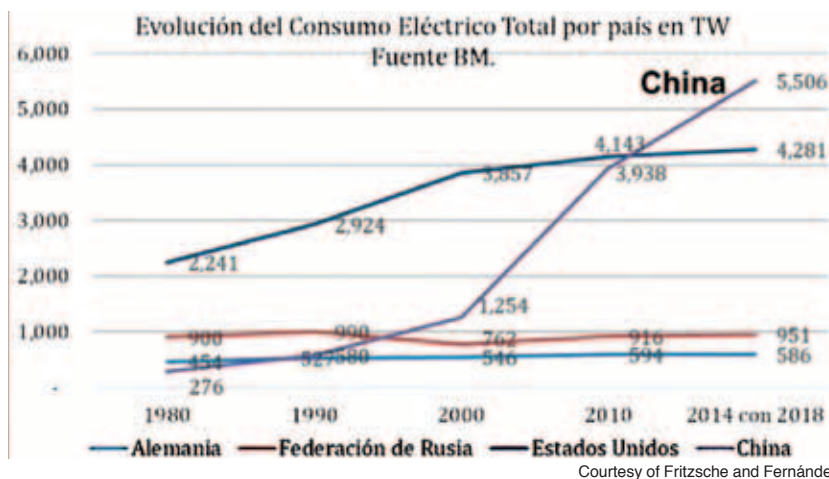


FIGURE 6

**Population Density by Region (1980-2018)**

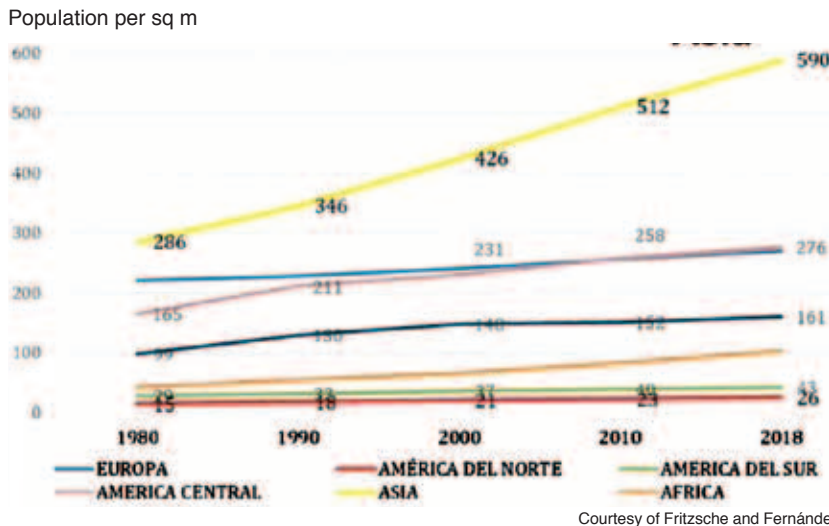
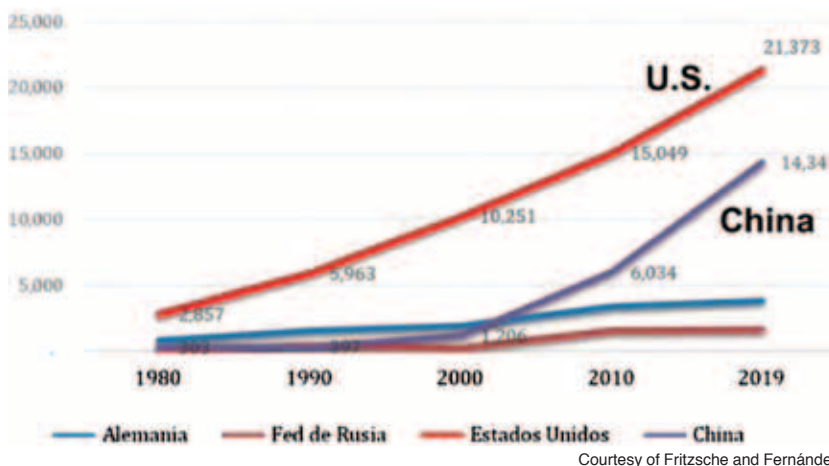


FIGURE 7

**Gross Domestic Product by Country (1980-2019)**

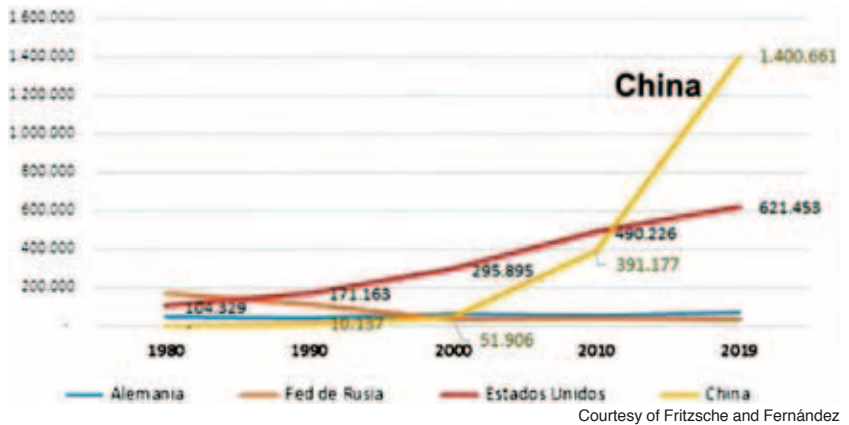


I would like to turn the floor over to my dear friend and colleague, Eduardo Fernández.

**Eduardo Fernández:** Thank you Roberto.

In **Figure 5**, Total Electricity Consumption by Country (1980-2018), we see clearly that energy use is related to the increase in population density, with 2010 as the turning point, if we compare the U.S. with China. In **Figure 6**, Population Density by Region (1980-2018), we observe the growth of population density in Asia, in contrast to the other regions of the planet. In **Figure 7**, Gross Domestic Product by Country (1980-2019), we see that GDP rises exponentially, while electricity consumption and population-density do not grow as rapidly, which makes it clear that the physical economy is below the speculative economy. As a corollary, we can see that investment in science and technology is essential to drive the development of the physical economy.

FIGURE 8  
Number of Patents Registered by Country (1980-2019)

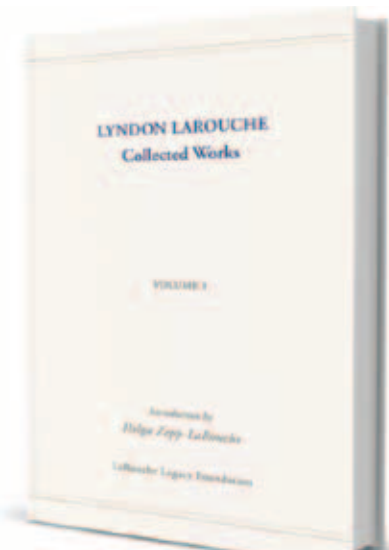


As shown in the previous graphs, China has a clear advantage over the United States, which is seen as of 2010. And the case of patents is no exception, as seen in **Figure 8**, Number of Patents Registered by Country (1980-2019).

Thank you very much and we are at your disposal for any questions or comments.

## LYNDON LAROUCHE Collected Works, Volume I

This first volume of the Lyndon LaRouche Collected Works contains four of LaRouche’s most important and influential works on the subject of physical economy:



- *So, You Wish to Learn All About Economics?*
- *There Are No Limits to Growth*
- *The Science of Christian Economy*
- *The Dialogue of Eurasian Civilizations: Earth’s Next Fifty Years*

**So, You Wish to Learn All About Economics?** was first published in 1984 and has become the single most translated of LaRouche’s books.

**There Are No Limits to Growth** first appeared in 1983 as a direct response to the Club of Rome’s *The Limits to Growth*, thoroughly refuting the latter’s unscientific Malthusian argument, which underlies the “green” environmentalist movement today.

**The Science of Christian Economy** (1991) is a groundbreaking study written by Mr. LaRouche during the five-year period he was unjustly incarcerated as a political prisoner in significant measure for the arguments he sets forth in this book.

**The Dialogue of Eurasian Civilizations: Earth’s Next Fifty Years** (2004) follows in the footsteps of Cardinal Nicholas of Cusa to establish the scientific, cultural, and theological basis for a true dialogue of civilizations, in order to successfully address the existential crises facing humanity today.

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