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MEASURING THE ENERGY OF ECONOMICS (Ë): THE CASE OF CHINA

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This paper proposes the application of the special theory of relativity by Professor Albert Einstein in economics. It is based on the measurement of the energy of the economics (Ë). The construction of the energy of the economics (Ë) request the uses of two economic variables into the special theory of relativity follow by: The unemployment growth rate and the technological development speed. Finally, the energy of the economics (Ë) has been applied for the case of China

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Introduction

Before explaining how to measure the energy of economics (Ë), I would like to give a general summary about the special theory of relativity and how it works. The great contribution of Albert Einstein (1952) is the establishment and development of the special theory of relativity. It is based on the amalgamation of two fundamentals laws in physics into a single law. This single law is called the special theory of relativity, whereby the law of conservation of energy (C^2) and the law of conservation of mass (M) Ire combined into a single equation identified by $E=MC^2$. According to Einstein,

> *If followed from special theory of relativity that mass (M) and energy (E) are both but different manifestations of the same thing. A somewhat unfamiliar conception for the average mind: furthermore, the equation Energy (E) is equal to MC^2, in which energy is put equal to mass (M), multiplied by the square of the velocity of light shows that very small amounts of mass may be converted into a very large amount of energy and vice-versa. The mass (M) and energy (E) are in fact equivalent according to the formula mentioned before this by Cockcroft and Walton in 1932, experimentally.*[1]

This paper attempts to use the theory of relativity to measure the energy of economics and demonstrate that it is possible to apply the formula $E=MC^2$ into the economics analysis. I will use two variables - the unemployment growth rate (U) and the speed of technological development (T^2) to measure the final energy of economics (Ë). The exploration is to proof that the measurement of energy of economics (Ë) can be an alternative approach to analyzing economics behavior.

Introduction to the Energy of Economics (Ë)

For a start, I suggest the application of the equation $E=MC^2$ to measure the energy of economics (Ë). Hence, I replace all the original variables from $E=MC^2$ by two economic variables to measure the energy of economics (Ë). The Energy (E) is replaced by the Energy of Economics by (Ë); the mass (M) is replaced by the unemployment

[1] Albert Einstein, *Relativity: The Special and the General Theory*, New York: Three Rivers Press, 1952.

growth rate "U" (See Expression 1) and the C^2 will be replaced by the technological development speed represented by "T^2" (See Expression 2). First I will calculate the final unemployment growth rate for two years. I apply partial differentiation based on time - two periods of time divided by the past year (t) and the next year (t+1).

$$\delta U_{t+1}/\delta U_t \equiv U$$

For the construction of the technological development speed (T^2), I start by building the final technological output "δV" that is based on the total sum of three large integrals under the uses of the total sum of patents registered ($\int\Sigma\alpha_i$) plus the total sum of the technologies sells ($\Sigma\int\beta_j$) plus the total sum of all projects related to R&D ($\int\Sigma\theta_k$) (See Expression 3). Hence, the variable "t" represents time, in my model I calculate time based on a growth rate between two years. To measure the technological development speed (T^2), I applied the original formula of speed that is equal to distance divided by time (D/t); but in this case I replace distance by the final technological output "δV". I assume that the technological development speed (T^2) is not a constant variable into the equation such as the speed of light is explained into the formula $E=MC^2$. I suggest that to measure the energy of economics (Ë), to keep the technological development speed (T^2) variable because the constant challenges of research, development and innovation (RDI) always might generate a constant transformation in the production of new goods and services into the market. Secondly, why the T^2 needs to be a variable is because natural phenomenon can be measured with accuracy based on experimentation such as the speed of light (C^2), but in the case of social phenomenon, like economics, cannot be measured with accuracy based on the experimentation at the same level of a natural phenomenon, it is more a case of technological development. However, another reason for the technological development speed (T^2) to be an exponential square is because I assume that the technological development speed can generate a double spillover effect on the final amount of energy of economics (Ë) in the short and long term. In this part of my model, I insert the application of the partial differentiation into the measure of the δV and δT (See Expression 4 and 5).

$$T^2 \equiv (\delta V/\delta t)^2$$
$$V = \int^{\infty}\alpha_i + \int^{\infty}\beta_j + \int^{\infty}\theta_k$$
$$\delta V = \delta V_{t+1}/\ \delta V_t$$
$$\delta T = \delta T_{t+1}/\ \delta V_t$$

Finally, the formula of the Energy of Economics (Ë) is equal to:

$$\ddot{E}=UT^2$$

The formula of the energy of economics (Ë) can show four possible scenarios as follows: First, if I have low rate of unemployment (U) multiplied by high technological development speed square (T^2) then UT^2 together can convert into a very large amount of energy of economics (Ë).

Second, if I have high rate of unemployment (U) multiplied by low technological development speed square (T^2) then UT^2 together can convert into a very small amount of energy of economics (Ë).

Third, if I have high rate of unemployment (U) multiplied by high technological development speed square (T^2) then UT^2 together can convert into a very small amount of energy of economics (Ë).

Fourth, if I have low rate of unemployment (U) multiplied by low technological development speed square (T^2) then UT^2 together can convert into a very small amount of energy of economics (Ë).

To measure the Energy of Economics (Ë), I apply the application of the *Omnia Mobilis Assumption* translated from Latin means "everything is moving".[2] The *Omnia Mobilis assumption* gives the freedom to our equation of energy economics (Ë) to use less ceteris paribus assumption into our modeling. Simultaneously, I assume also that the market always is in a "*Constant Dynamic Imbalanced State*" under lack of control and high vulnerability.[3] In fact, the concept of *equilibrium* in economic modeling of energy of economics (Ë) is considered as a leak momentum of balance among unemployment growth rate (U) and the technological development speed (T^2) that can appear any time/ However, I cannot predict when exactly this synchronized balance is going to appear. From a graphical perspective, I suggest the application of surfaces to visualize the behavior of the four possible scenarios into the energy of economics equation explained by $Ë=UT^2$.

The Application of Energy of Economics (Ë) in China

Applying the energy of economics (Ë) to China's economy will give us a much better idea of how the model works. Before I do so, it is useful to have a closer look at the local economic data about China. Such data includes the contribution of each of the country's region to the final energy of economics (Ë) of the country as its geographical distribution of unemployment and technological development speed. In terms of the geographical distribution of contribution to the country's energy of economics (Ë), I find that North China contributes around 0.0021 and East China with the highest share of 0.00043, while Northeast China has the least contribution of 0.0015. Therefore, the major contributors to the country's energy of economics (Ë) are the Central South China and Southeast China regions that collectively account for 0.0041 of the country's overall output. While the Northeast region contributes 0.0015, Central South China and East China account for about 0.00057 of the country's overall output. Similar trend could be observed with the country's energy of economics (Ë) by regions where North China accounts for 0.0012 and Northeast China 0.0010, East China 0.0013) Central South China 0.000330, and Southeast China 0.00035 respectively. Therefore, I conclude that two regions generate huge levels of energy to support the Chinese economy. They are

2 Mario Arturo Ruiz Estrada, "Policy Modeling: Definition, Classification, and Evaluation," *Journal of Policy Modeling*, Vol. 33, No. 4, pp 523-536, 2011.

3 Mario Arturo Ruiz Estrada,. and Yap, S.F.,"The Origins and Evolution of Policy Modeling," *Journal of Policy Modeling*, Vol. 35, No.1, pp 170-182, 2013.

these Central South China 0.000330, and Southeast China 0.00035. According to our research, these two regions indicate the rate of unemployment to be low and the speed of technological development continues to expand faster when compared to other regions of China that indicate higher unemployment rates and lower technological development speed respectively.

Conclusions and Policy Implications

Unemployment obviously has a significant negative impact on economic performance but measuring such impact with any degree of certainty is a Herculean task. In this article, I proposed a new indicator for evaluating the impact of energy of economics (Ë) on economic performance. The underlying presentiment is that the economic impact of energy of economics (Ë) depends on a country's vulnerability to unemployment and speed of technological change, which jointly determines the leakage in economic growth and hence, the impact on growth. I am of the belief that my model will contribute to a better and deeper understanding of measuring the economic impact of unemployment.

A more useful measurement of the energy of economics (Ë) is conducive for appropriate policies, both for dealing with the effects of energy of economics (Ë) and also for anticipatory policy measures, which seek to lessen the impact of unemployment before they occur. For example, on one hand, underestimating the impact may lead to the government allocating too much resources for addressing improvement of energy of economics (Ë) – e.g. public investment in physical infrastructure and research & development (R&D) support for households most affected by unemployment. By the same token, determining the appropriate level of anticipatory investments to limit the impact of future unemployment would benefit from an accurate ex-ante assessment of their impact. At a broader level, results confirm that energy of economics (Ë) can have a significant economic impact even in advanced countries with good speed of technological change and high level of preparedness.

The inescapable policy implication for developing countries, which tend to suffer the bulk of unemployment, is that investing in anticipatory measures may yield sizable benefits in the medium and long term even though they can be costly in the short run. Anticipatory measures can reduce the extent of unemployment damage. Better measurement allows for more efficient and better targeted use of monetary and fiscal resources. One interesting direction for future research is to examine the importance of effective communication in mitigating the adverse impact of unemployment. It is widely believed that more effective communication by the Chinese government with the general public, for example about the magnitude and nature of the unemployment damage, could limit the damage from unemployment. Therefore, more and better information is likely to reduce the impact of unemployment, and looking at the role of information would contribute to a more accurate measurement of its impact.

Finally, this paper concludes that the energy of economics (Ë) shows that countries should strive for keeping low unemployment growth rates (U) and higher and faster expansion of the technological development speed (T^2) in the short and long term. This can generate a larger amount of economics of energy (Ë) into any country.