

The Application of Economics DNA Composition (Eco-DNA Composition) on the Chinese Economy

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***Abstract:** The Economics DNA composition (Eco-DNA composition) offers a group of new macroeconomic indicators follow by the economic base (EB) and the general economic structures (GES's). Additionally, the Eco-DNA composition includes a new multidimensional graphical model to observe the composition, size and evolution of the EB and GES. Additionally, the Eco-DNA composition is based on the uses of the DNA helix structure and the infinity physical coordinate space. Finally, the Eco-DNA composition was applied on the Chinese economy from the year 1978 to year 2008.*

***Keywords:** Econographicology, China, teaching economics, DNA helix structure*

***JEL-Classification:** A12*

1. INTRODUCTION TO THE ECONOMICS DNA COMPOSITION (ECO-DNA COMPOSITION)

The Economics DNA composition is a flexible and practical composition that can help to visualize the weaknesses and strengths of any economy (Ruiz Estrada and Yap, 2013). The Eco-DNA composition required the uses of all components from the balance of payment (Kafourus, 2009). The main idea is to observe the expansion or contraction of the main four components of the balance of payment such as consumption, investment, government spending and net exports. Hence, the Eco-DNA composition has basically three specific objectives:

- The first objective is to present a new set of macroeconomic indicators generated by the economic base -EB- and the general economic structures -GES's-. These indicators are totally different from the classic analysis of gross domestic product (GDP), because the Eco-DNA composition includes the GDP into its accounting.
- The second specific objective is the construction of multi-dimensional graphs (Ruiz Estrada, 2011) and a single prototype in order to observe the complex

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composition, dynamic evolution and size of the economic base (EB) (see Figure 2 and Prototype 2) and each general economic structure (GES) (see Figure 1 and Prototype 1) of any country into the same coordinate space.

- The third objective is to maximize the use of information graphically (Beniger and Robyn, 1978; Lafleur, 1960; McClelland, 1975) given by the balance of payments. The information offered by the balance of payments will be divided by general items and sub-items. Additionally, each general item and sub-item from the balance of payments uses growth rates between two periods of time (last year and present year) to build the EB and GES macroeconomic indicators.

However, the Eco-DNA composition theoretical framework is supported by the use of the infinity dimensional coordinate space under the general approach and the DNA helix structure (Watson and Crick, 1953). The infinity dimensional coordinate space (Ruiz Estrada, 2007) opens the possibility of generating a multi-dimensional visual effect to observe the economic base (EB) and several numbers of general economic structures (GESs) in the same coordinate space and time. Each general economic structure (GES) is formed by a large number of structures: the main economic structure (M), economic sub-structures (S), economic micro-structures (Mi), economic nano-structures (N) and economic JI-structures (JI) at different levels (L) and periods of time (T) (see Expression 1). Finally, the economic base (EB) is equal to the interconnection of all economic general structures (GESs) (see Expression 2). The Eco-DNA composition assumes that the economic base (EB) applies the *Omnia Mobilis* assumption (Ruiz Estrada, 2011) to justify the interconnection of all GESs in the same coordinate space. Moreover, the idea considers the use of the DNA helix structure in the construction of the Eco-DNA composition.

2. AN INTRODUCTION TO THE ECONOMICS DNA COMPOSITION (ECO-DNA COMPOSITION)

The Eco-DNA composition is based on a set of macroeconomics indicators generated by the economic base -EB- and general economic structures -GES's-. Additionally, the Eco-DNA composition offers a set of multi-dimensional graphs and a single prototype. Basically, the single prototype shows a cylinder; around the cylinder exists a spiral line, to which is attached a large number of general economic structures (GESs). Each general economic structure (GES) is formed by joining together different main economic structure (M), economic sub-structures (S), economic mini-structures (Mi), economic nano-structures (N) and economic JI-structures (JI) (see Prototype 1). This prototype can show the size, composition and evolution of the economic base (EB) (see Prototype 2) under the union of all GESs in the same graphical space. The Eco-DNA composition assumes that the economic base (EB) and all general economic structures (GESs) can experience different sizes or states within its structures such as expansion, contraction and stagnation. These different sizes or states in all general economic structures (GESs) depend upon the behavior of different growth rates

running into the main economic structure (M), economic sub-structures (S), economic mini-structures (Mi), economic nano-structures (N) and economic JI-structures (JI) (see Expression 1). The process of drawing each general economic structure (GES) by level (L) and period of time (T) is based on enclosing the main economic structure (M), economic sub-structures (S), economic mini-structures (Mi), economic nano-structures (N) into a large circle until we arrive at the last economic JI-structure (JI) (see Figure 1). The main reason to separate each general economic structure (GES) is to observe this specific period of time (T) in the respective analysis (see Figure 2). Nevertheless, the size of each structure at different levels (L) and periods of time (T) depend on the growth rates (Δ). The growth rates (Δ) play an important role in defining the diameters of each main economic structure (M), economic sub-structures (S), economic mini-structures (Mi), economic nano-structures (N) and economic JI-structures (JI) by level (L) and time (T) respectively.

In the initial stage of the Eco-DNA composition, this composition assumes that each level of structure sizes (main economic structure -M-, economic sub-structures -S-, economic mini-structures -Mi-, economic nano-structures -N- and economic JI-structures -JI-) are influenced by its growth rates (Δ) respectively (see Expression 2). Additionally, the changes of all growth rates (Δ) at different levels of structures will directly affect each GES size. GES sizes can determine if expansion, contraction or stagnation exists between two periods of time, making it possible to observe how all these changes at different level of structures can strike within each GES behavior and finally affect the economic base (EB) in the same coordinate space. The Eco-DNA composition also assumes that each general economic structure (GES) has a single dependent growth rate and "n" number of independent growth rates at the same time; each independent growth rate has "n" number of sub-independent growth rates, "n" number of mini-independent growth rates, "n" number of nano-independent growth rates and "n" number of JI-independent growth rates (see Expression 1). Moreover, the economic base (EB) is limited by "n" number of GESs that are changing from the first period of time (T_0) from the bottom of the prototype until the last period of time (T_n) on the top of the prototype (see Prototype 2). Hence, all the general economic structures (GESs) are interconnected ($\frac{\text{---}}{\text{---}}$) and follow successively the same spiral line attached to the cylinder. All these growth rates are constantly changing in different magnitudes of time (see Expression 2). The Eco-DNA composition also assumes that time is not linear; it has a spiral behavior within the economic analysis. Therefore, the economics DNA composition can analyze the economy of any country as a whole from a multi-dimensional perspective. The Eco-DNA composition is a flexible and practical composition that can help to visualize the weaknesses and strengths of any economy. The Eco-DNA composition required the uses of all components from the balance of payment. The main idea is to observe the expansion or contraction of the main four components of the balance of payment such as consumption, investment, government spending and net exports. Hence, we are using growth rates between two periods of time (e.g. last year - t - and present year -

t+1 -) into each component of the balance of payment (see Expression 1). This growth rates (R) are helping to calculate the volume of each sphere to build the general economic structures (GES's).

$$R = \delta Vi(t + 1) - \delta Vi(t) / \delta Vi(t) \tag{1}$$

In fact, the final construction of the Eco-DNA composition is based on the construction of serial of spheres with different sizes and locations. In our case, we are using the volume of each sphere. The measure of the volume of any sphere is equal to multiply 4/3 by the constant Π (3.1415926535898) by the radius square (see Expression 2). Therefore, we assume that each growth rate is equal to the radius for each sphere respectively.

$$r = (4/3)\pi R^2 \tag{2}$$

Thus, the general economic structure (GES) is equal to:

$$\begin{array}{c}
 \Delta J_i^{L:T:S:SS:MS:NS:JI} \\
 \parallel \\
 \Delta N^{L:T:S:SS:MS:NS} \\
 \parallel \\
 \Delta M_i^{L:T:S:SS:MS} \\
 \parallel \\
 \Delta S^{L:T:S:SS} \\
 \parallel \\
 \Delta J_i^{L:T:S:SS:MS:NS:JI} = \Delta N^{L:T:S:SS:MS:NS} = \Delta M_i^{L:T:S:SS:MS} = \Delta S^{L:T:S:SS} = \Delta M^{L:T:S} = \Delta S^{L:T:S:SS} = \Delta M_i^{L:T:S:SS:MS} = \\
 \Delta N^{L:T:S:SS:MS:NS} = \Delta J_i^{L:T:S:SS:MS:NS:JI} \\
 \parallel \\
 \Delta S^{L:T:S:SS} \\
 \parallel \\
 \Delta M_i^{L:T:S:SS} \\
 \parallel \\
 \Delta N^{L:T:S:SS:MS:NS} \\
 \parallel \\
 \Delta J_i^{L:T:S:SS:MS:NS:JI}
 \end{array}$$

(1.) The economic base (EB):

$$\begin{array}{cc}
 \Delta J_i^{0:0:0:1:0:0} & \Delta J_i^{\infty;\infty;\infty;1;\infty;\infty} \\
 \parallel & \parallel \\
 \Delta N^{0:0:0:1:0:0} & \Delta N^{\infty;\infty;\infty;1;\infty;\infty} \\
 \parallel & \parallel \\
 \Delta M_i^{0:0:0:1:0} & \Delta M_i^{\infty;\infty;\infty;1;\infty} \\
 \parallel & \parallel \\
 \Delta S^{0:0:0:1} & \Delta S^{\infty;\infty;\infty;1} \\
 \parallel & \parallel
 \end{array}$$

$$\begin{aligned}
 \Delta N_{0:0:0:4:0:0} &= \Delta Mi_{0:0:0:4:0:0} = \Delta S_{0:0:0:4} = \Delta M_{0:0:0} = \Delta S_{0:0:0:2} = \Delta Mi_{0:0:0:2:0} = \Delta N_{0:0:0:2:0:0} \parallel \dots \parallel \Delta N_{\infty:\infty:\infty:4:\infty:\infty} \\
 &= \Delta Mi_{\infty:\infty:\infty:4:\infty} = \Delta S_{\infty:\infty:\infty:4} = \Delta M_{\infty:\infty:\infty} = \Delta S_{\infty:\infty:\infty:2} = \Delta Mi_{\infty:\infty:\infty:2:\infty} = \Delta N_{\infty:\infty:\infty:2:\infty:\infty} \\
 &\parallel \\
 \Delta S_{0:0:0:3} & \parallel \Delta S_{\infty:\infty:\infty:3} \\
 &\parallel \\
 \Delta Mi_{0:0:0:3:0} & \parallel \Delta Mi_{\infty:\infty:\infty:3:\infty} \\
 &\parallel \\
 \Delta N_{0:0:0:3:0:0} & \parallel \Delta N_{\infty:\infty:\infty:3:\infty:\infty} \\
 &\parallel \\
 \Delta JI_{0:0:0:3:0:0:0} & \parallel \Delta JI_{\infty:\infty:\infty:3:\infty:\infty:\infty} \\
 EB = \Delta GES_{0:0:0} \parallel & \dots \parallel \Delta GES_{\infty:\infty:\infty} \tag{3}
 \end{aligned}$$

3. APPLICATION OF THE ECONOMICS DNA COMPOSITION ON THE CHINESE ECONOMY (1978-2008)

In this section of the paper, we analyze the behavior of the Eco-DNA composition of China from the year 1978 to year 2008. Initially, we are using four main components of the Chinese balance of payments such as consumption, investment, government spending and export nets. Additionally, we are using forty sub-components that are originated from these four main components of the balance of payment. Our final target is to measure the economic base (EB) and the general economic structures (GES's). We like to remark that we are using the growth rates such as radius rates (r) to calculate the different spheres in the economic base (EB) and the general economic structures (GES's). All these spheres are changed size and position into different periods of time according to figure 3 and prototype 2. The final results in this research shows that the Chinese economy is keeping a constant economic growth (Barro,1991) on its investment, exports, government spending and private consumption from year 1978 to year 2008. However, in the year 2001 the investment and exports of China grew three times more under a moderate openness (Deb, 2001) in certain sectors and the negotiation of possible free trade preferences with different developing and least developed countries and regions (Baldwing, Cohen, Sapir, and Venables, 1999; Deardorff and Stern, 1994). The main reason **WHY** China increase its openness partially, it is originated for its adhesion to the World Trade Organization (WTO) since year 2001. Hence, we can assume that the large and fast expansion in the Eco-DNA composition of China is originated from the globalization that is part of the new economic, political, technological, and social world order (Held and McGrew, 2000; Hettne, Sapir, and Sunkel, 1999). Additionally, we can observe in our final results that in the case of private consumption and government spending of China only grew two times more. Something interesting to be mentioned here is that each

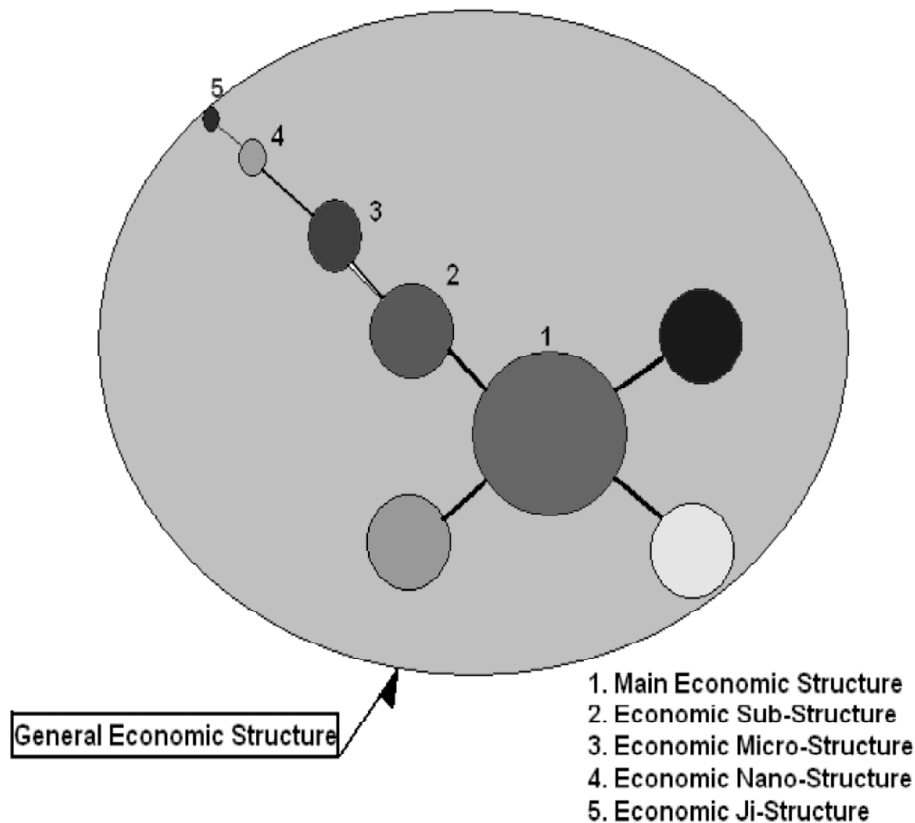
general economic structure (GES) from the year 1978 to year 2008 into the Chinese economy was experienced a constant expansion that it is based on the fast international trade expansion under the abolition of tariffs (Winters, 1997). On the other hand, we can observe that exist weaknesses in the income distribution among different far regions of China (Ruiz Estrada and Park, 2013; Ruiz Estrada and Yap, 2006) that make the private consumption growth of China is expanding in less proportion than the public consumption. It is possible to be observed between the periods 1977/1978 and 2007/2008 respectively (see Figure 3 and Prototype 3). In the figure number four can show clearly how the general economic structures (GES's) of the Chinese economy change dramatically in so short periods of time. This is possible with observe the expansion of 62% of the general economic structures of the Chinese economy, if we compare the period 1977/1978 and 2007/2008 then the Chinese economy can show a deep and fast transformation that never have been experienced before in this country. The main reason of this deep and fast transformation of China can be originated by the economic and political reforms that China (Veselin, 2008) has been implemented in the past forty years. Hence, we can divide the Chinese economy transformation into four different periods: (i) 1978-1984 (by promoting an open investment policy and the generation of special economic zones (Lopez, 1990); (ii) 1984-1993 (decentralization and financial market openness such as the opening of Shanghai stock market (Huang and Wong, 1996); (iii) 1993-2005 (privatization and more trade openness (Edwards, 1997) until China join the WTO since the year 2001; iv) 2005-2011 (new trade and investment incentives together with more social welfare programs to help in the redistribution of the income among far regions at mainland China. If we compare the economic base (EB) in the year 2009 then we can observe that the U.S. economic base (EB) is decreasing and the Chinese economic base (EB) is increasing considerably. This is possible by observe the two economic bases that are represented through two large spheres. Therefore, we can visualize that the U.S. economic base (EB) shows 2½ times more large than the Chinese economic base (EB). At the same time, we can observe that the U.S. economic base (EB) is suffering a constant contraction in more short periods of time (Tavory and Eliasoph, 2013). The huge contraction of the U.S. economic base (EB) is originated from the financial crisis of the year 2008. According to this research the financial crisis in the year 2008 (the collapse of real states market and speculation) hit strongly on the U.S. economic base (EB) that finally generate a strong contraction in the U.S. economic base by generating high unemployment, the massive immigration of European and American capitals to China. In fact, this massive inflow of capitals from Europe and U.S. to China is generating a large and fast expansion of the Chinese economic base (EB) respectively.

4. CONCLUDING REMARKS

The general economics DNA composition (Eco-DNA composition) offers a set of alternative macroeconomic indicators and multidimensional graphical model

positioning under the construction of multidimensional graphs and prototype. It provides a way to easily visualize the composition, size and evolution of each general economic structure (GES) and the economic base (EB). Finally, the constant expansion of the Eco-DNA composition of China is not a miracle or isolated phenomena. This is a long process of evolution of its economy and a deep political transformation by using a new vision from the central government of China. We conclude that the highest booming of the Chinese economic base (EB) was in the period 2007/2008 according to the Eco-DNA composition of China. Therefore, the origin of this booming of the Chinese economic base (EB) starts exactly in the period 2001/2002, when China became an official member in the world trade organization (WTO) since year 2001. Finally, we can also observed that the Eco-DNA composition of China needs to be improved by keep a constant economic growth together with the reduction of the inequality of income distribution among different far regions of China respectively.

Figure 1: The General Economic Structure (GES)



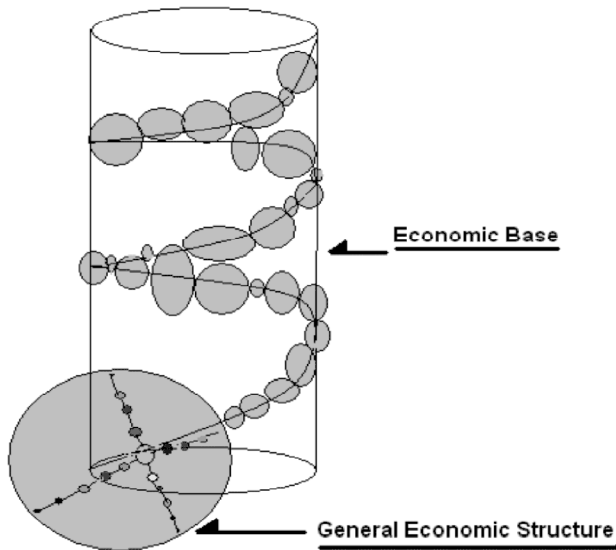
Source: Author

Prototype 1: The General Economic Structure (GES)



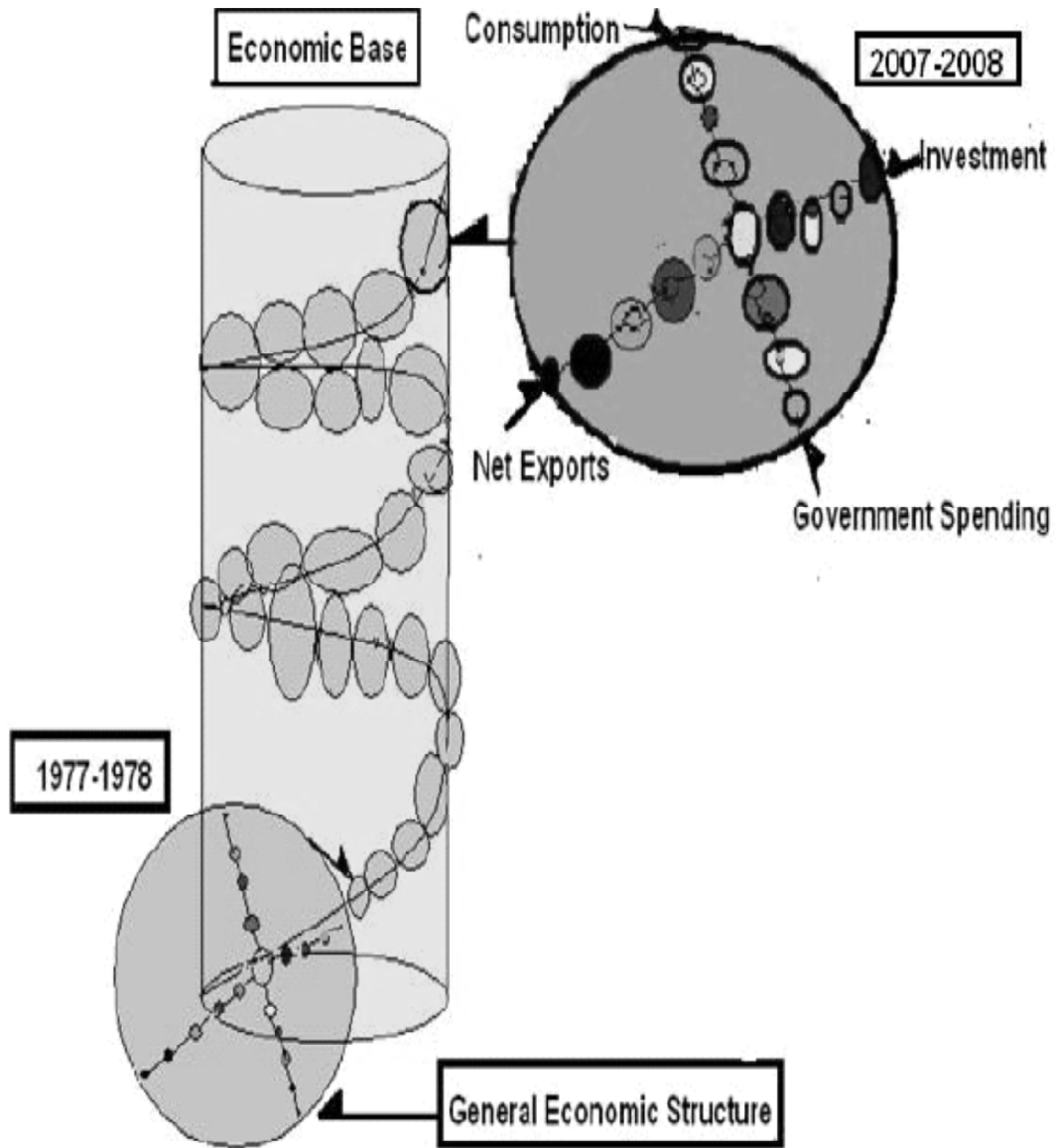
Source: Author

Figure 2: The Economic Base (EB)



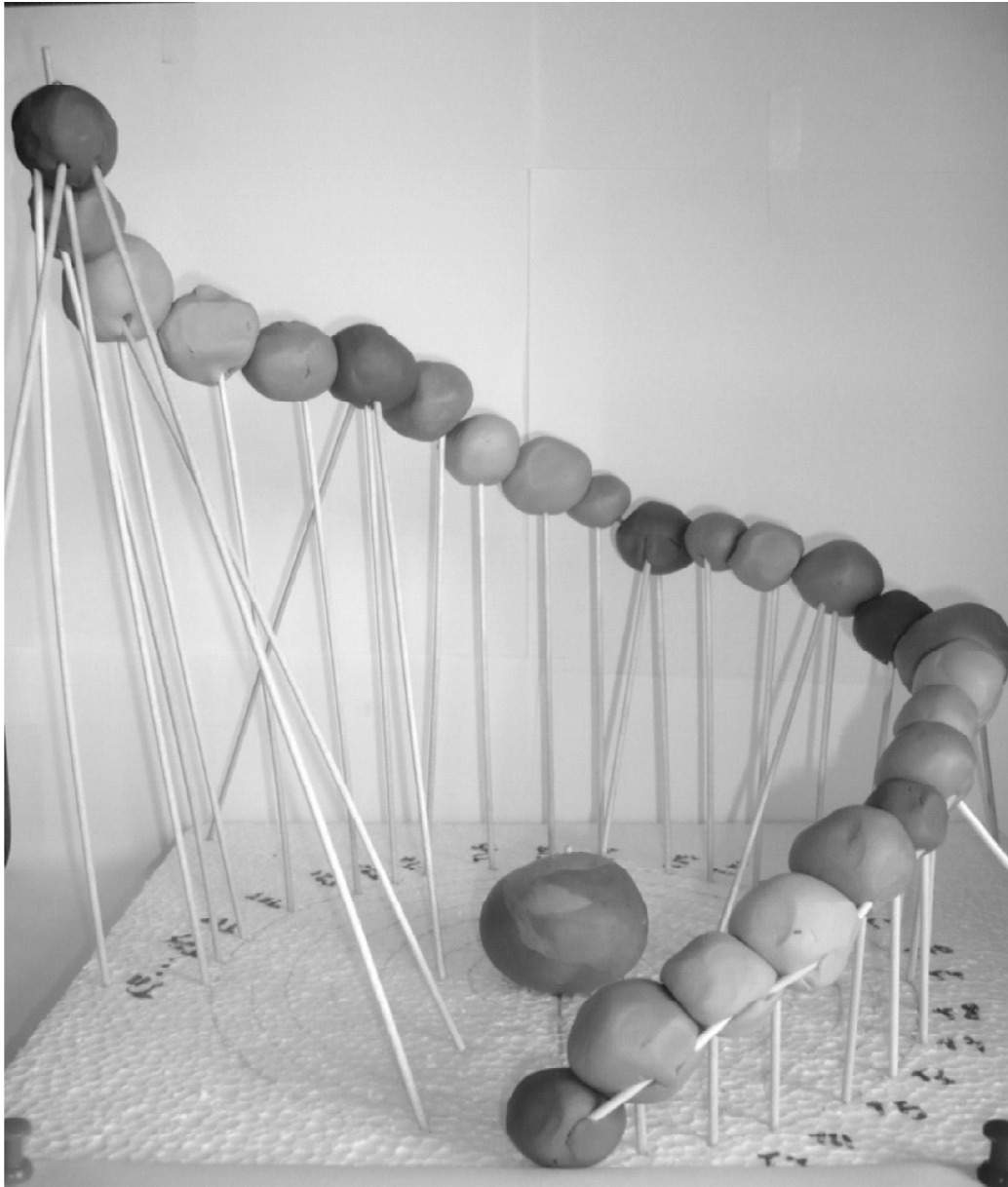
Source: Author

Figure 3: The Economic Base (EB) and General Economic Structures (GES) of the Chinese Economy (1978-2008)



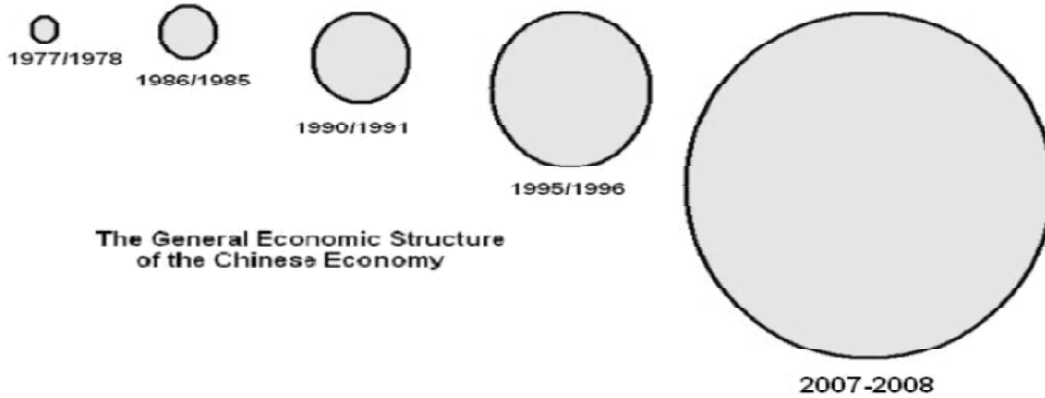
Source: ADB; Ministry of Finances of People's Republic of China; Ministry of Commerce of People's Republic of China; Ministry of Finance of China; Ministry of Commerce of China; Ministry of National Development and Reform Commission of China; National Audit Office of China; People's Bank of China.

Prototype 2: The Economic Base (EB) and General Economic Structures (GES) Prototype of the Chinese Economy (1978-2008)



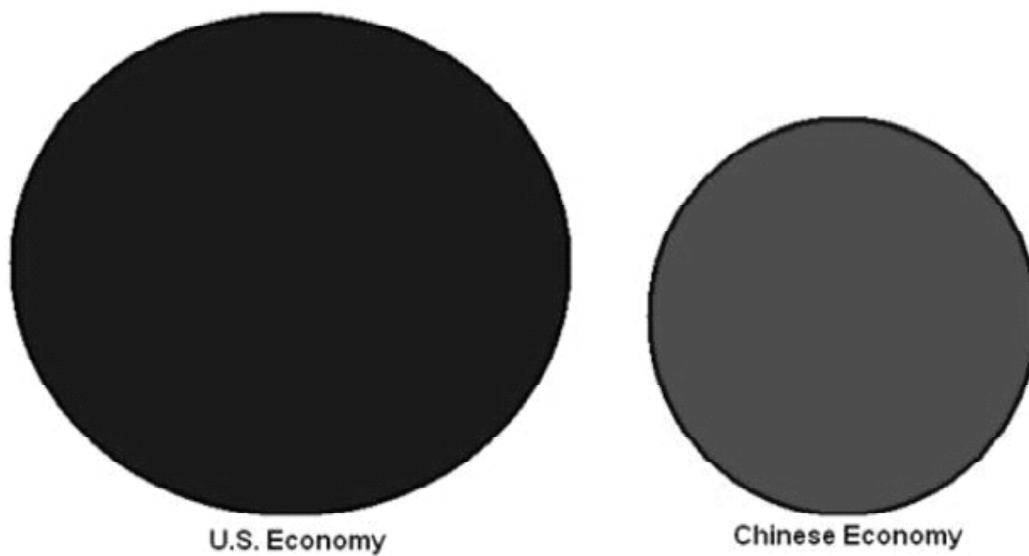
Source: ADB; Ministry of Finances of People's Republic of China; Ministry of Commerce of People's Republic of China; Ministry of Finance of China; Ministry of Commerce of China; Ministry of National Development and Reform Commission of China; National Audit Office of China; People's Bank of China.

Figure 4: The General Economic Structures (GES) of the Chinese Economy



Source: ADB; Ministry of Finances of People’s Republic of China; Ministry of Commerce of People’s Republic of China; Ministry of Finance of China; Ministry of Commerce of China; Ministry of National Development and Reform Commission of China; National Audit Office of China; People’s Bank of China.

Figure 5: The General Economic Structure of the U.S. and the Chinese Economy (2008)



Source: ADB; Ministry of Finances of People’s Republic of China; Ministry of Commerce of People’s Republic of China; Ministry of Finance of China; Ministry of Commerce of China; Ministry of National Development and Reform Commission of China; National Audit Office of China; People’s Bank of China; NBER; United Nations; World Trade Organization (WTO); International Monetary Fund.

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