*IJER, Vol. 10, No. 2, July-December, 2013, pp. 257-263*

# THE GLOBAL ECONOMIC CRISIS SMASH EFFECT SIMULATOR (GECSE-SIMULATOR)

**Mario Arturo Ruiz Estrada**
*Institute of China Studies (ICS) & Faculty of Economics and Administration (FEA), University of Malaya, 50603 Kuala Lumpur, Malaysia, (E-mail: marioruiz@um.edu.my)*

**ABSTRACT**

This paper proposes the uses of the global economic crisis smash effect simulator as a theoretical framework to evaluate the final effects of any global financial crisis on the world economy. We present different scenarios and results according to different levels of devastation that the global financial crisis can generate on world economy. It is based on the evaluation of unemployment and world wide poverty dissemination. The global economic crisis smash effect simulator requires the use of economic modeling in real time and multi-dimensional economic modeling to visualize different scenarios and evaluate the final impact of any global financial crisis.

**Jel:** B40.

**Keywords:** Econographicology, Multidimensional Coordinate Spaces and Graphical Modeling for Economics.

## 1. INTRODUCTION TO THE GLOBAL ECONOMIC CRISIS SMASH EFFECT SIMULATOR (GECSE-SIMULATOR)

The construction of the global economic crisis smash effect simulator (GECSE-Simulator) is based on the application of economic waves modeling (Ruiz Estrada, 2009). To build each economic wave in our simulation, we suggest the simultaneous application of the inter-linkage coordinate space and economic modeling in real time. Initially, the GECSE-simulator uses n-number of economies "E" in its analysis. Each economy has its general axis; at the same time, each general axis can show a large number of sub-axes. All these sub-axes are interconnected by straight lines until they reach the last sub-axis. A reminder: each sub-axis runs with different multi-dimensional partial differentiation(s) ($\partial Y/\partial X$) in real time (☼) (Ruiz Estrada, 2009). The idea of applying a large number of partial differentiation(s) successively is to generate an effect of movement of different economic waves in the same graphical space.

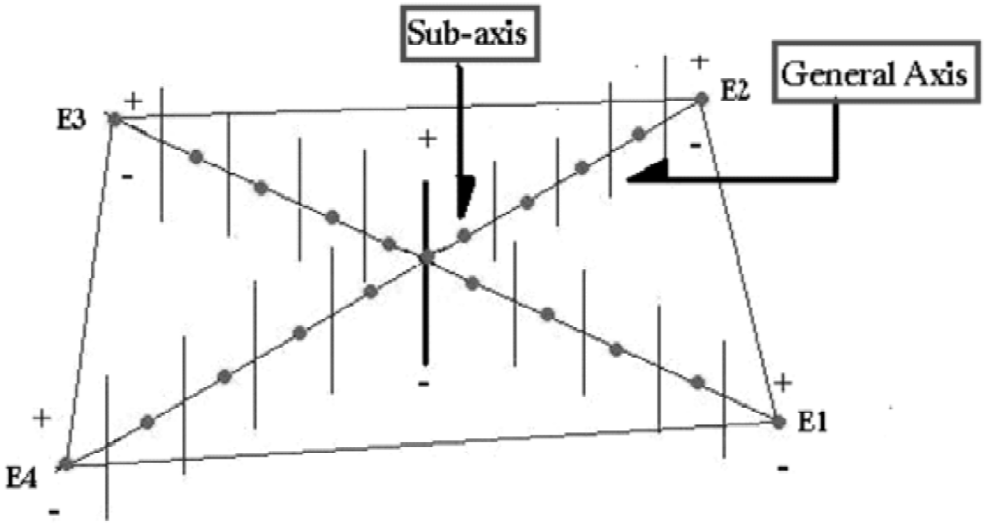
According to the GECSE-simulator, each sub-axis is interconnected into the same general axis by the application of the inter-linking sub-axis system "╬". The function of this is to join each sub-axis into the same general axis. Finally, all general axes and

sub-axes are joined at all levels of analysis under the application of the fixed exponential "λ" in different periods of time (t+1). However, the assumption is that all sub-axes and the general axis are moving under the application of economic modeling in real time "☼" (see Expression 1). We also suggest the application of the *Omnia Mobilis* assumption (Ruiz Estrada, Yap and Nagaraj, 2008) to help in the relaxation of each sub-axis. This is to reduce the use of the *Ceteris Paribus* assumption in our simulator. Finally, we observe a large number of surfaces (economic waves) in permanent movement using the GECSE-simulator. The movement of these surfaces starts from the epicenter of the inter-linkage coordinate space until its end in the last sub-axis into the same general axis. The real impact of this simulator is located on the last sub-axis (see Figure 1). The final analysis in the GECSE-simulator is based on the analysis of different surfaces displayed in different parts of the inter-linkage coordinate space.

$$☼\lambda_{t+1}\begin{pmatrix} E_1 = ☼[\partial Y^i_{1\text{-}0}/\partial X^i_{1\text{-}0}]*L_j \Vdash ☼[\partial Y^i_{1\text{-}1}/\partial X^i_{1\text{-}1}]*L_j \Vdash ☼[\partial Y^i_{1\text{-}2}/\partial X^i_{1\text{-}2}]*L_j \Vdash \ldots \Vdash ☼[\partial Y^i_{1\text{-}\infty}/\partial X^i_{1\text{-}\infty}]*L_j \\ E_2 = ☼[\partial Y^i_{2\text{-}0}/\partial X^i_{2\text{-}0}]*L_j \Vdash ☼[\partial Y^i_{2\text{-}1}/\partial X^i_{2\text{-}1}]*L_j \Vdash ☼[\partial Y^i_{2\text{-}2}/\partial X^i_{2\text{-}2}]*L_j \Vdash \ldots \Vdash ☼[\partial Y^i_{2\text{-}\infty}/\partial X^i_{2\text{-}\infty}]*L_j \\ \bullet \\ E_\infty = ☼[\partial Y^i_{\infty\text{-}0}/\partial X^i_{\infty\text{-}0}]*L_j \Vdash ☼[\partial Y^i_{\infty\text{-}1}/\partial X^i_{\infty\text{-}1}]*L_j \Vdash ☼[\partial Y^i_{\infty\text{-}2}/\partial X^i_{\infty\text{-}2}]*L_j \Vdash \ldots \Vdash ☼[\partial Y^i_{\infty\text{-}\infty}/\partial X^i_{\infty\text{-}\infty}]*L_j \end{pmatrix} \quad (1)$$

Partial differentiation: $i = \{o,1,2,3\ldots\infty\}$ and Level: $j = \{o,1,2,3\ldots\infty\}$

**Figure 1**
**The GECSE-Simulator Coordinate System**



## 2. THE APPLICATION OF THE GECSE-SIMULATOR

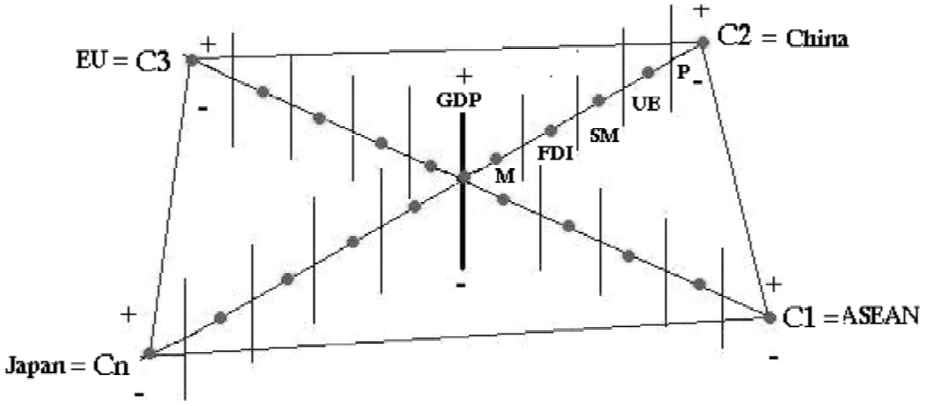
The GECSE-simulator will be applied to five different economies simultaneously. These five economies are preceded by the first one, the United States economy, which is fixed as the epicenter in the GECSE-simulator. Additionally, we include the other four economies distributed into four general axes respectively; these four economies are the ASEAN economy ($E_1$), Chinese economy ($E_2$), European economy ($E_3$) and Japanese economy ($E_4$) (see Expression 2). Basically, the GECSE-Simulator uses six variables: the GDP growth rate(s) of the United States economy ($GDP_{US}$), the imports growth rate(s) of the United States from these four economies (M), the foreign direct investment growth rate(s) (FDI) from the United States to these four economies and vice versa, the stock market exchange growth rate(s) between the United States and these four economies (SM), the unemployment growth rate(s) from these four economies (UE) and finally the poverty growth rate(s) of these four economies (P). Each sub-axis is multiplied by a coefficient that is called the level of devastation of the global financial crisis (L).

The devastation of the global financial crisis (L) is a coefficient is a discount rate that aids in observing the final impact of the global financial crisis in different economies and the global economy. We apply partial differentiation(s) in real time between the GDP growth rate(s) of the U.S. and imports growth rate(s) (M) on the first sub-axis, GDP growth rate(s) of the U.S. and foreign direct investment growth rate(s) (FDI) on the second sub-axis, GDP growth rate(s) of the U.S. and the stock market exchange growth rate(s) (SM) on the third sub-axis, GDP growth rate(s) of the U.S. and unemployment growth rate(s) (UE) on the fourth sub-axis, GDP growth rate(s) of the U.S. and poverty growth rate(s) (P) on the fifth sub-axis in the same general axis. Each partial differentiation(s) is multiplied by the level of devastation of the global financial crisis (L). This is to generate different scenarios under different levels of impact of the global financial crisis on each economy in the analysis simultaneously. At the same time, we suggest applying an exponential of real time ($\lambda_{t+1}$) to join all partial differentiation(s) in each sub-axis and general axis until we can build a single surface. If we observe this on a large screen, it is possible to observe a large number of surfaces (economic waves) moving like waves in the same space and at the same time from the epicenter to the last sub-axis in the same general axis.

The final objective for using the GECSE-simulator is to show different scenarios and the impact of the global financial crisis according to the level of devastation of the global financial crisis (L). Now it is possible to visualize the negative effects of a global financial crisis from a global perspective. Hence, this simulator permits the representation of different scenarios and effects of the global financial crisis on the world economy within the same graphical space and time (see Figure 3).

$$\text{☼}\lambda_{t+1} \left( \begin{array}{l} E_1 = \text{☼}[\partial GDP_{us}^{i}/\partial M_1^{i}]^{*}L_j \text{╬} \text{☼}[\partial GDP_{us}^{i}/\partial FDI_1^{i}]^{*}L_j \text{╬} \text{☼}[\partial GDP_{us}^{i}/\partial SM_1^{i}]^{*}L_j \text{╬} \text{☼}[\partial GDP_{us}^{i}/\partial UE_1^{i}]^{*}L_j \\ \quad \text{╬} \text{☼}[\partial GDP_{us}^{i}/\partial P_1^{i}]^{*}L_j \\ E_2 = \text{☼}[\partial GDP_{us}^{i}/\partial M_2^{i}]^{*}L_j \text{╬} \text{☼}[\partial GDP_{us}^{i}/\partial FDI_2^{i}]^{*}L_j \text{╬} \text{☼}[\partial GDP_{us}^{i}/\partial SM_2^{i}]^{*}L_j \text{╬} \text{☼}[\partial GDP_{us}^{i}/\partial UE_2^{i}]^{*}L_j \\ \quad \text{╬} \text{☼}[\partial GDP_{us}^{i}/\partial P_2^{i}]^{*}L_j \\ \text{☼}s = \quad E_3 = \text{☼}[\partial GDP_{us}^{i}/\partial M_3^{i}]^{*}L_j \text{╬} \text{☼}[\partial GDP_{us}^{i}/\partial FDI_3^{i}]^{*}L_j \text{╬} \text{☼}[\partial GDP_{us}^{i}/\partial SM_3^{i}]^{*}L_j \text{╬} \text{☼}[\partial GDP_{us}^{i}/\partial UE_3^{i}]^{*}L_j \\ \quad \text{╬} \text{☼}[\partial GDP_{us}^{i}/\partial P_3^{i}]^{*}L_j \\ E_4 = \text{☼}[\partial GDP_{us}^{i}/\partial M_4^{i}]^{*}L_j \text{╬} \text{☼}[\partial GDP_{us}^{i}/\partial FDI_4^{i}]^{*}L_j \text{╬} \text{☼}[\partial GDP_{us}^{i}/\partial SM_4^{i}]^{*}L_j \text{╬} \text{☼}[\partial GDP_{us}^{i}/\partial UE_4^{i}]^{*}L_j \\ \quad \text{╬} \text{☼}[\partial GDP_{us}^{i}/\partial P_4^{i}]^{*}L_j \end{array} \right) \quad (2)$$

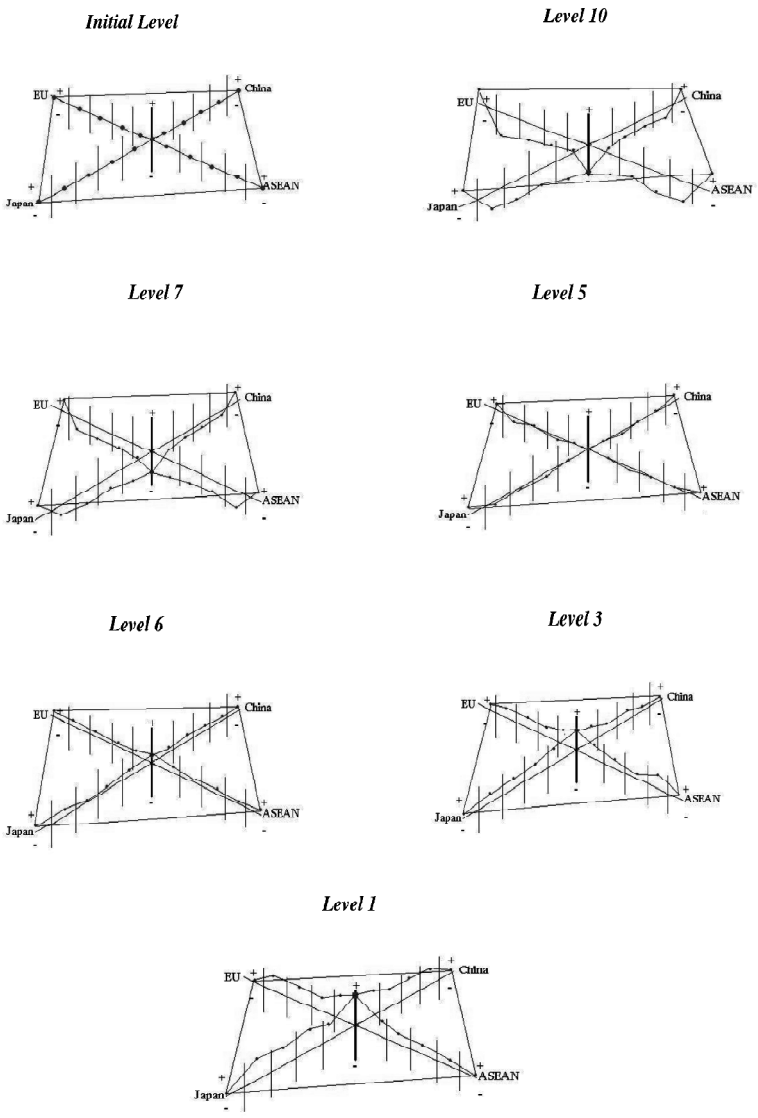
**Figure 2**
**The GECSE-Simulator: Graphical Modeling**




The level of devastation of the global financial crisis (L) is classified into ten levels, from Level 1 (low impact) to Level 10 (high impact). We observe in Figure 3 that a Level 10 impact is the highest level of devastation brought about by the global financial crisis on the world economy. We can also observe that the levels of unemployment growth rates among the four economies in analysis such as the ASEAN economy ($E_1$), Chinese economy ($E_2$), European economy ($E_3$) and Japanese economy ($E_4$) are located between 15% to 20% and the poverty growth rates are located between 20% and 25%; both indicators show the higher levels of unemployment and poverty rates in case of a deep global financial crisis. The economies which are more affected by the global financial crisis at Level 10 are the European economy and the Japanese economy. This is due to the strong trade and investment relationship that exists between them and the American economy according to the GECSE-Simulator. The Chinese economy and ASEAN economy show large amounts of unemployment and poverty but this is proportionately less than the European economy and the Japanese economy. In the case of the Chinese economy and ASEAN economy, the unemployment growth rates are located between 9% and 11% respectively, but the poverty growth rates for both economies is equal to

15% and 16% (see Figure 3) If we continue analyzing up to Level 7, it is possible to observe a better performance of the GDP growth rate of U.S. economy than at Level 8. At the same time, the American economy experiences a better performance in its unemployment growth rate with 12% and a poverty growth rate of 15%. The Chinese economy and the ASEAN economy cannot show any improvement of unemployment growth rates and poverty growth rates at Level 7 (see Figure 3).

**Figure 3**
**The Global Economic Crisis Smash Effect Simulator at Different Levels**



At Level 5, it is possible to observe that the GDP growth rate of the U.S. economy is equal to 0. But the unemployment growth rate of the U.S. is equal to 8% and the poverty growth rate of the U.S. economy is 13%. Level 5 also shows a minimum impact on the European economy and Japanese economy with insignificant reductions in the unemployment and poverty growth rates located between 15% and 17%. But in the case of the ASEAN economy and Chinese economy the impact is less because the unemployment and poverty growth rates only show 10% and 15%. We can say that the European economy and Japanese economy have a high dependence upon the good performance of the GDP growth rate of the U.S. economy than upon the Chinese and ASEAN economies (see Figure 3). According to the simulation, Level 6 shows a positive but weak GDP growth rate of the U.S. economy: the levels of unemployment and poverty growth rates in the American economy show a better performance, but are only a little higher, with 7% for unemployment growth rates and 11% for poverty growth rates. The Chinese economy and ASEAN economy show a better performance than before but the unemployment growth rates only decrease from 10% to 8% respectively (see Figure 3).

Finally, the simulation at Level 3 and Level 0 show the lowest devastation rates of the global financial crisis on the world economy. These levels are exceptional but hard to be aspired to by the American economy because we are referring to a huge expansion of the GDP growth rates, i.e. between 11% and 15%, annually. And the final impact of a huge expansion of the GDP growth rate of the U.S. economy on the European economy and Japanese economy can reduce its unemployment growth rates to between 0.5% and 1.5% and the poverty growth rate to levels of 5%. We can observe that among the four economies mentioned, those who receive the most benefit from a higher performance of the GDP growth rate of the U.S. economy are, in order, the European economy, Japanese economy, Chinese economy and the ASEAN economy respectively. Under Level 3 and Level 0, both the Chinese economy and the ASEAN economy can decrease their unemployment growth rates to between 3% and 5%, but the level of poverty growth rates in the Chinese economy and ASEAN economy can only decrease from 12% to 7% (see Figure 3) according to this simulation.

## 3. CONCLUDING REMARKS

This paper offers policy makers, central banks, academics and students of economics an alternative multi-dimensional graphical modeling approach to analyze the final impact of a global financial crisis from a multi-dimensional perspective. The GECSE-simulator can generate a large number of scenarios originating from a global financial crisis, according to the level of devastation of the global financial crisis (L) coefficient. The main objective of this is to create different simulations and measure the catastrophic(s) effect(s) of any global financial crisis upon the world economy within the same graphical space.

## REFERENCES

*Printed Sources*

Ruiz Estrada, M.A., Yap, S.F. and Nagaraj, S. (2008), "Beyond the Ceteris Paribus Assumption: Modeling Demand and Supply Assuming Omnia Mobilis", *International Journal of Economic Research (IJER),* 5(2), pp. 185-194.

Ruiz Estrada, M.A. (2009), "*The Economic Waves Effect of the U.S. Economy on the World Economy*", FEA-Working Paper No. 2009-2, pp. 1-5.

Ruiz Estrada, M. A. (2009), "Multi-dimensional Economic Modeling", FEA-Working Paper No. 2009-7, pp. 1-10.

*Electronic Sources*

ASEAN (2009), General Information and Database Statistics.

*http: www.aseansec.org*

Asian Development Bank (2009), General Information and Database Statistics. *http://www.adb.org*

European Union (2009), General Information and Database Statistics. *http://www.europa.eu.int*

International Monetary Found (2009), General Information and Database Statistics. *http:// www.imf.org*

NBER (2009), National Bureau Economic Research. *http://www.nber.org*

The Federal Reserves System (2009), General Information and Database Statistics. *http:// www.federalreserve.gov/pf/pf.html*

United Nations (2009), General Information and Database Statistics. *http://www.un.org*

World Bank (2009), General Information and Database Statistics. *http://www.worldbank.org*