



**ECONOPHYSICS EDUCATION: A PANACEA FOR GLOBAL ECONOMIC
RECESSION- THE NIGERIAN ALTERNATIVE**

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Abstract

This paper attempts to investigate the impacts of Econophysics education in solving the problem of global economic recession. Econophysics Education is a field in science education designed to study the dynamic behavior of financial and economic markets. It is an interdisciplinary research field, where the tools of Physics are applied to understand the problem of economics. Economic recession is a period of economic slow-down featuring low output, liquidity and unemployment. This has resulted to numerous bankruptcies, reduced amounts of trade and commerce as well as highly volatile relative currency value of fluctuations, mostly devaluations, financial crises and bank failure. The application of Econophysics education will help in proper organization, coordination and marketing of business which can enhance self-employment. Hence, recommendation was made that Econophysics education should be taught in our tertiary institutions for equipping and preparing students for Econophysical challenges with a bid to tackling the menace of global economic recession

Keywords: *Econophysics, Econophysics Education, Global Economic Recession.*

Introduction

The subject Econophysics is an interdisciplinary research field where the tools of physics are applied to understand the problem of economics. According to Bikas Chakrabarti (2005), the term Econophysics was introduced in 1995 at the second Statphys-Kolkata conference in Kolkata (formerly Calcutta), India by the Physicist H. Eugene Stanley, who was also the first to use it in print (Stanley, 1996).

Meaning of Econophysics

Econophysics, also known as the *Physics of finance*. It is the study of dynamical behavior of financial and economic markets. Econophysics is a new area developed recently by the cooperation between Economists, Mathematicians and Physicists. The origins of the word, which combines the names of the two disciplines Economics and Physics, are the result of Physicists starting to apply statistical Physics to finance: (high-frequency finance, financial risk and (correlations, and complexity in finance). Dacorogna, Gençay, and Olsen (2001), Bouchaud and Potters (2000)

and Mantegna and Stanley (2000). Mantegna and Stanley (2000) define "the multidisciplinary field of Econophysics" as "a neologism that denotes the activities of Physicists who are working on economics problems to test a variety of new conceptual approaches deriving from the physical sciences." Markets and their ongoing economic activity have much in common with the natural processes that are subject of study in Physics. Both Economics and Physics have been trying to find rules for describing complex systems consisting of a large number of elements. Econophysics uses advanced theories and techniques successfully in statistical Physics for understanding and modeling of complex economic phenomena.

According to Ray (2011), Econophysics is a scientific discipline within econosciences that utilizes mathematical models from physics to explain economic and financial behavior. Jovanovic and Schinkus (2012) define it in methodological terms as "a quantitative approach using ideas, models, conceptual and



computational methods of statistical physics applied to economic phenomena" (especially financial phenomena).

In essence, Econophysics is the exchange of methods between natural and socio economic sciences (Mimkes, 2011). For Schinckus (2011), Econophysics "present itself as new paradigm and a new specialty (or even new discipline) using various models and concepts imported from condensed matter and statistical physics to analyze financial phenomena".

Therefore, the aim of Econophysics is to understand the universal behavior of a market (Alessio Farhadi, 2003).

Econophysics Education

Education may be defined as a purposive, conscious or unconscious, psychological, sociological, scientific and philosophical process which brings about the development of the individual to the fullest extent and also the maximum development of society in such a way that both enjoy maximum happiness and prosperity (Lee, 2002). Education can also be seen as both an objective and component of development, as well as "fundamental to the broader notion of expanded human capabilities that lie at the heart of the meaning of development" (Todaro and smith, 2011).

After exploring the meaning of econophysics and education, econophysics education can be termed to be a construct in science education which is designed to study the dynamic behaviour of financial and economic markets. In a broader sense, it can be referred to as a field in science education which improve understanding of mathematical models from physics to explain economic and financial behaviour on the basis of information, instructions and objective advice that enhanced the development of skills and confidence of learners in strengthening information about financial and economic markets on the basis of good information.

Global Economic Recession

Economic recession is a period of economic slow-down featuring low output, liquidity and unemployment. It is characterized by its length, abnormal increase in unemployment, fall in the availability of credit, shrinking output and investment, numerous bankruptcies, reduced amounts of trade and commerce as well as highly volatile relative currency value fluctuations, mostly devaluations, financial crises and bank failure. This is in consonance with the definition of National Bureau of Economic Research (NBER), of recession as a significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in a real gross domestic product (GDP), real income, employment, industrial production and wholesale-retail sales.

A global recession is [recession](#) that affects many countries around the world—that is, a period of global economic slowdown or declining economic output. According to International Monetary Fund, global recession is a decline in annual percapita real World GDP, backed up by a decline or worsening for one or more of the seven other global macroeconomic indicators: Industrial production, trade, capital flows, oil consumption, unemployment rate, percapita investment and percapita consumption. The economy sunk deep into recession and many countries suffered across the world (Dir 2008).

Although, in some quarters, there seems to be a glimmer of hope, the dimensions in which the recession manifested itself have made analysts to describe the situation as perhaps the worst economic recession since the Great Depression of the 1930s. Indeed, for the first time, the world economy has witnessed stagnation or minimal growth since more than seven decades. At the root of the recent financial recession was the "search for yield" by financial institutions and



investors. The increasing integration of financial markets and the apparent relative stability of advanced economies, led investors and financial institutions to begin to search for profitable investment opportunities which resulted in over optimism, speculation and leverage. Researches also emphasized that Nigeria has also slipped into recession due to the price of oil which has fallen from heights of about \$112 a barrel in 2014 to below \$50 at the moment. (BBC News, 2007). Fall in Nigeria currency has also hurt economy.

To understand the problem, one needs to throw some light on the background. An analysis of the pre-colonial history of Nigeria reveals a diverse set of people who were engaged in one economic activity or the other. The Oyo Empire, for example, was noted for its commercial prosperity and military prowess up to the 18th century. This prosperity was largely attributed to its agricultural/farm produce which was always in abundance. In the words of Webster (1967) "Oyo's prosperity was the result of its fertile soil and its position as the leading trade centre south of the Niger... Oyo also developed as a manufacturing centre; its high quality cloth, leather and iron products finding ready sale". The West became famous for its cocoa production.

The eastern part of Nigeria equally had a robust economic system which stemmed from the production and sale of palm produce. This was also characteristic of the Delta city-states of Bonny, Itsekiri, Brass and Calabar, among others. "Between 1830 and 1850, when twelve Liverpool firms were buying in Bonny, the price and demand for palm-oil kept rising steadily".

The northern region was famous for its agricultural activities and productivity. The Hausa-Fulani attained fame for the massive

production of groundnut (leading to the famous groundnut pyramids), hides and skin and other essential farm produce like tomatoes, pepper and onions, among others.

The Nigerian economic system continued on this diversified note for a number of decades, up to the middle 1950s, when crude oil was discovered in 1956 and in commercial quantity in 1958 at Oloibiri, in Brass Local government area of Bayelsa State. Subsequently, Nigeria gained independence on October 1, 1960, with a diversified economy, even in the midst of crude oil exploration and exploitation. Unfortunately, not too long after that period, this history of diversification could not be sustained by the emerging ruling elite. The early 1970s witnessed a complete shift of economic focus from other sources of revenue earnings for the state, to a natural resource (crude oil).

This act of abandoning, to a large extent, all other sources of revenue generation and societal sustenance to concentrate on only oil has continued till date. The data available in this regard shows that for the past three decades, oil has accounted for between 80% and 90% of the country's foreign exchange earnings. This practice is not healthy for any nation that must record growth and development in all spheres of human endeavours.

The economy of Nigeria has been declining for the fourth consecutive quarter. According to the National Bureau of Statistics, GDP in Nigeria - the economy of the most populous country in Africa declined by 1.5% at the end of the 2016.

The agency states that the decline in the Nigerian economy was facilitated by the fall in oil prices and reduction in the production of "black gold" because of insurgents attacks on oil infrastructure facilities. As a result of this, the exchange rate of the local currency, which is an



indication of inflation, reached their maximum for more than a decade. To tackle this, the Central Bank of Nigeria had to raise the key rate to 14%. In addition, Nigerian economic problems were aggravated by a five-month delay in approving spending plans for 2016. It was done in order to stimulate business activity.

The Nigerian government, however, believes that thanks to higher oil prices and rehabilitation and stability in the Niger Delta, the situation will change for the better through an increase in the level of oil production. Also, oil prices have experienced some negative changes - \$112 for a barrel in 2014 to \$50 for a barrel now.

Importation of goods that are considered unimportant for the official currency market has been restricted, thus the marketers have been forced to buy dollars at the black market, where the currency is approximately 30% more expensive. The budget of N 7.3 trillion (\$ 23.2 billion) has a deficit of N 2.36 trillion.

Devastating Effects of Economic Recession

Economic recession affected the economy. It reduced the ability of the economy to fight off the underlying sicknesses of unevenly distributed wealth, agricultural depression and banking problems. With the crash, it was apparent that the Nigerian economy faces the crippling effects of global economic recession resulting to breakdown and decline in economic vigor. Opeyemi (2008) observed that there are cases of unemployment, retrenchments, downsizing and layoffs, which served as indications to a troubled economy. According to her "What is worse is that individuals have nowhere to turn to..." except indulging in misconduct and societal condemned activities such as militancy, armed robbery, advanced fee

fraud, ritual practices for fetish money among other things, and our leaders sit almost helpless. In her words, "there have become a wide spread of distrust in the competency of the financial sector as the question of fund availability in banks pervades the minds of right thinking Nigerians." More specifically, the economic recession has brought enormous increase in the level of unemployment.

The global financial recession has led to a global unemployment recession resulting in millions of redundancies. In the US for instance, about 2.2 million jobs have been lost so far and still counting. Statistics Canada reports that unemployment moved up from 0.6% to 7.2% in January 2009 marking the highest level of job loss in several decades. Japan is in its longest, deepest and most severe recession in the post-war period, as the economy has shrunk for a third straight quarter in the three months to December 2008 as the global slowdown crushed demand for Japanese exports, a key pillar of the world's number two economy. Similarly, Asian stocks also began to melt like sugar in a tea cup and according to another report, several Asian companies, mostly financial companies, have also declared redundancies in order to survive the present recession. The situation is not different from Europe where many factories and companies are folding up, sending more employed citizens into the already swollen labour market.

The impact of the global financial recession has sent chilly winds into corporate Nigeria. There is a season of job losses as the Nigerian economy is playing host to the visit of the economic slowdown. For instance, the manufacturing sector in the country is already affected by massive decline in capacity utilization resulting from



high exchange rate of the Naira and congestion at the ports.

The recession has compounded the challenges faced by the manufacturing sector. In 2008, Dunlop Nigeria Plc. the only surviving tyre manufacturing company, shut down its plants and laid off hundreds of its workers and put some others on half remuneration. In the textile sector, about 5,000 workers were forced out of job in late 2008. Recently, the Nigerian auto assembly company, Peugeot Automobile Nigeria (PAN), sacked 565 workers of its 753 workforce and placed the remaining staff on half salary. Similarly, the confectionery maker, Cadbury Nigeria Plc. has fired 300 staff, while in the banking sector which seemed to be the worst hit; massive sacks have been carried out and it is still on going. The International Labour Organization (ILO) recently revealed that as many as 51 million workers were fired in 2010 globally, while 30 million more jobs are at risk. The United Nations, meanwhile, predicts that 200 million workers mostly in developing economies could be pushed into extreme poverty. The global unemployment rate is estimated at 7.5 percent in 2010, up from 6.5 percent in 2009 and 6.7 percent in 2008.

Apart from the unemployment that global economic recession creates for the youths, the impact of economic recession can also be felt on:

1. **High interest rates:** High interest rates limit the amount of money available to invest.
2. **Inflation:** Inflation makes the prices of goods and services rise over a period of time. As inflation increases, the percentage of goods and services that can be purchased with the same amount of money decreases.
3. **Price instability and rising costs:** The economic recession brought about an increase in

production costs while stifling the selling price of goods produced. Recession increases the prices of both raw materials and ready-made goods. In addition, utility costs for gas, electricity and transportation rose.

4. **Reduced consumer confidence:** If consumers believe the economy is bad, they are less likely to spend money. Consumer confidence is psychological but can have a real impact on any economy.

Economic Recession: Way-Forward

Nigeria faces a major problem of graduate unemployment (Ojeaga, 2011). Young men and women leave the Universities, Polytechnics and Colleges of Education every year with little hope of securing jobs (Inegbenebor, 2005). He noted that the most significant factor that has complicated the problem of graduate unemployment is the slow growth of the economy. A graduate of Physics, Economics, Mathematics and other related field can establish a school since he or she already has a background in education. One may also venture into the establishment of allied school, these includes: special class in Physics, Mathematics, Economics consultancy outfit (home services) as home tutors to teach Physics and Mathematics, Economics, etc. If well-organized, one can employ teachers and organize them into the various homes, thereby becoming an employer of labour.

There are some aspects of Physics education curriculum that are vocation-related. For instance, electronics and circuit network are concepts that had direct bearing with electrical, electronics and computer jobs. A Physics graduate can go for further training through apprenticeship to learn the acts of repairing radio, television, handsets, generators, computers and other electronic and mechanical devices. Physics education has provided the pre



requisite knowledge of the mechanics of these devices. Electronics courses offered are enough to provide the theoretical backgrounds for these gadgets. Electrical and circuit network also provide all theoretical knowledge of computer and electrical works. Physics graduates veered into computer engineering and Internet networking as self-employed individuals. Also the knowledge of economics will help in proper organization, coordination and marketing of the business.

In addition to the above solutions, the graduate of Econophysics education can be self-employed and at the same time provide numerous jobs for others in this global economic recession through the following:

1. Music tutoring: Musical instruments are aspects in Physics subject in which a graduate of Physics education and other disciplines can teach people how to play wind instruments (like flute, trumpet, saxophone, etc) and string instruments (such as piano, electric guitar, etc.). A lot of people learn better in a one-on-one environment rather than in a classroom. If the basic is known by the Physicist and he has the patience to teach the students, this can work very well for him.

2. Freelance writing: The Internet has opened up all kinds of opportunities to write on a freelance basis. There are millions of websites and blogs, and many of them need content to drive traffic. If an Econophysics educator has solid writing skills, and he/she can write intelligently on several topic areas, he/she can quickly earn a living as a freelancer. Even beyond blogs and websites, he/she may also step into marketing type emails, advertising copy and even ghostwriting e books. This is the kind of business venture that can start small, and grow into a

six-figure income as he/she gets better at it.

3. Freelance web designing: Almost everybody wants to start a website but most people lack the skills to make it happens. An econophysics educator can build simple websites and he /she can turn that into a full - fledged business. He/she can prepare simple websites for upstart businesses that have limited budgets. As his/her business grows and he/she skills level increases, he/she can begin doing more complicated websites for higher fees.

4. Repairing any kind of work: We live in a society of machines, and sooner or later every one of them is in need of repair. But we also live at a time when very few people choose careers based on repair work. If Econophysics can repair cars, computers, furniture, appliances or homes/buildings, he/she can start a repair business.

5. Mobile repairs: If repair work represents a viable business idea, then mobile repairs are potentially even more lucrative, one prominent example of this is *mobile mechanics*. Rather than having the customer bring their vehicle to a repair shop, the mobile mechanic instead goes to the customer's home. It is easy to see how this will be a valuable service for the customer whose vehicle will not start. But mobile mechanics aside, virtually any repair business that will come to the client's home will be a welcome relief to people whose schedules is already stretched too tightly.

6. Blogging: If Econophysics educator has a topic areas that are passionate about he could turn it into a business by starting his/her blog. Thousands of blogs come and go each year, but the ones that offer topics in information that adds value to the readers tend to stick around, and also tend to be profitable. The way to [make money from blogging](#) comes from advertising



revenue. Advertisers love to place advertisements on specialized blogs, and those advertisements generate revenue, either as one-time payments, or as ongoing cash flows provided by pay-per-click advertising. He/she can also add affiliate programs to his/her blog. These are advertisement offers in which he/she paid either a flat fee or a percentage of the sale amount any time a visitor makes a purchase from that vendor from his site. He can also sell his own products and services from his blog. E-books are especially popular offerings from blogs, as long as they provide valuable information that his readers would be willing to pay for. The best blogging niches are in areas like investments, credit cards, autos and auto repair, computers, real estate, travel, fashion, or even entertainment. Any topic area that is relevant to a large number of people can turn into a profit generating blog.

7. Grocery delivery: There are people who spend so much time on their jobs that they have little time to perform even necessary chores, such as grocery shopping. Econophysicists can make money in a business that handles that job for them. And with the Internet, it's pretty easy to automate that business. People can simply email or text their orders to, and then he/she can arrange delivery. He/she can even set up an online payment arrangement, such as PayPal. Once he/she gets large enough to have multiple customers, he/she could probably even combine shopping trips, by shopping for several customers at the same store and time frame. He/she can charge a flat fee, or one based on a percentage of the grocery order.

8. Buying and selling: If Econophysicists educators are good at locating bargains at places like thrift stores, estate sales, garage sales, or even online, they can start a business of buying and selling. The basic idea is to buy items on the cheap and sell them at a healthy profit. This is something like running

a pawn shop in their homes and online. They can sell their merchandise on websites such as eBay, Amazon.com, and Craigslist. They can also opt to sell them at garage sales from their homes or even at flea markets and swap meets.

9. Being a professional speaker: If an econophysics educator is comfortable speaking in front of large groups, this is a potential business. There is a lot of flexibility with this type of business. He /she can give specialized talks to businesses and industry groups, talking about specific topics, or even just providing motivation. He/she can even become a pitch man for certain products. A lot of businesses are looking at presentations as a way to market their businesses. But if business owners don't have the ability or courage to do so, they may hire a professional speaker to do it for them.

10. Being a voice-over specialist: This is another business idea that's growing with technology. Companies often hire a voiceover specialist to do podcasts on their websites. They may also want a voiceover specialist to handle the audio on any videos they are preparing. At the higher end, there is also voiceover work doing commercials. This is a growing field since commercials are no longer limited to just the TV. Thousands of commercials are popping up all over the Internet, especially on YouTube.

11. Home staging: One of the major requirements for real estate agents selling homes is making sure that the interior of the house is sales-worthy. That means converting someone's home from a place where people live to one that's almost like a museum. That involves removing clutter, rearranging furniture and even adding helpful touches here and there, such as a house plant in a corner, a picture on the wall, or a coffee table in just the right place. Most property sellers - being emotionally attached to their



own homes - lack the objectivity to be able to stage their homes for sale. At the opposite end of the spectrum, it could involve putting a tasteful amount of furniture and decorations in an unoccupied home, in order to help prospective buyers to visualize themselves living in the property. He mostly markets this kind of business to real estate agents, but he may also find willing clients among builders and even people who are trying to sell their homes on their own. For keeping and increasing the wealth of each individual it is important that he has the knowledge of econophysics which can be acquired through education in order to provide skills to manage with his financial means.

Conclusion

The recession is not merely a challenge but also an opportunity to diversify and re-position the economy for steadier long-run growth. Nigeria has been hit by the global recession. However, Nigeria has significant strengths and must respond to the challenges it faces transparently and in a way that engenders confidence in the private investor community while at the same time repositioning its economy into a more diversified growth path after the recession subsides. This can definitely be done and there no is doubt that as a country, we shall rise to the occasion. Hence, if all the suggested way forward can be fully and duly implemented, it will minimize global economic recession, specifically in Nigeria.

Recommendation

It is recommended that econophysics education should be taught in our tertiary education for equipping and preparing learners for econophysical challenges, such as inflation, reduced consumer's confidence, price instability and rising cost and unemployment.

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