

ISSN 2359-7704

Volume 4 Issue 2 August 2016

EXPERT JOURNAL *of*
ECONOMICS

PUBLISHED BY SPRINT INVESTIFY



Expert Journal of Economics

<http://economics.expertjournals.com>

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Volume 4, Issue 2
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Expert Journal of Economics

Volume 4 • Issue 2 • 2016 • ISSN 2359-7704

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Editor's Introduction to Volume 4, Issue 2 of Expert Journal of Economics

Simona VINEREAN*

Sprint Investify Research Unit

In volume 4, issue 2 of *Expert Journal of Economics*, we have proudly published valuable and original papers, each of which offers new models or frameworks that aim to advance economic models. These manuscripts cover topics such as income and wealth inequality, economic growth and monetary policy in the CEMAC zone, the role of natural resources of economic importance in GDP performance, and Foreign Direct Investments' attracting potential of emerging markets. Further, I present a short portrayal of each paper published in *Expert Journal of Economics*, vol. 4, issue 2.

'*Inequality Fragility Hypothesis*', authored by Sebastian-Ilie Dragoie, analyzes the main outcomes and determinants of income and wealth inequality at global level and especially in U.S. The Author highlights the vicious circles between economic inequality and financial instability, and examines the main determinants of income and wealth distribution in U.S is financialisation because of asset gambling and resource misallocation. This paper presents evidence that structural factors, monetary policy, high leverage and the development of new money substitutes are critical in explaining the inequality trend in advanced countries.

Forgha Godfrey Njimanted, Daniel Akume and Emmanuel Mbella Mukete published their article titled '*The Impact of Key Monetary Variables on the Economic Growth of the CEMAC Zone*', which emphasizes that a stable and sustainable monetary policy stance and policies that enhance income growth are crucial for taming inflationary pressures. The results obtained in their empirical research revealed that shocks to the lending and inflation rate generated substantial destabilising impacts on the economic growth, further suggesting that the monetary authorities should play a critical role in creating an enabling environment for growth. The authors also propose that the Central Bank of CEMAC should have complete instrumental autonomy to operate, depending on a set of in-built targets by the individual countries of the zone.

In '*Truth Behind Economic Performance, Natural Resources and Attracting Foreign Direct Investment*', Arthelo P. Palma used the latest data on GDP (Gross Domestic Product) performance, GOI (Global Opportunity Index), Vulnerability Score, Readiness Score, and the number of resources of economic importance, from 131 countries, to construct a viable model. In this framework, the Author provides evidence that the number of natural resources of economic importance plays a large role in the GDP performance. Additionally, economic growth presents an association with a country's vulnerability to climate change and with the negative impacts argued by the dependency theory. The Author also noted that good governance is a great contributing factor to the country's GDP performance.

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Article History:
Available Online 28 August 2016

Cite Reference:
Vinerean, S., 2016. Editor's Introduction to Volume 4, Issue 2 of Expert Journal of Economics. *Expert Journal of Economics*, 4(2), pp. i-ii

Lucian BELAȘCU and Aleksandar SHIVAROV published their article, '*On the Location Attractiveness of Emerging Countries for Foreign Direct Investments*', in which they examine FDI attracting potential of emerging markets in terms of their location attributes. The authors use the statistical cluster analysis to study the dynamic evolution of emerging markets' clusters, based on country attributes that are relevant for the MNEs location decision. Their results show that countries tend to group based on geography or resources possession, except for China, which was found to cluster independently from the other countries in the analysis.

A Final Thought

On behalf of our Editorial Board, I would like to thank our Authors for choosing our journal as a publishing outlet for their valuable contributions to economics knowledge, our Reviewers for their time, effort and input on the manuscripts, and to all the Readers and Researchers for expanding upon all the articles we publish in open access.



Inequality Fragility Hypothesis

Sebastian-Ilie DRAGOE*

Lucian Blaga University of Sibiu, Romania

The last four decades have been marked by growing inequality. The inequality of income and wealth is one of the most important macroeconomic issues of our time. Inequality contributed to Global Savings Glut and Global Financial Crisis through riskiness channel and a greater propensity to borrow for poor people. This paper presents evidence that besides structural factors, monetary policy, high leverage and the development of new money substitutes are critical in explaining the inequality trend in advanced countries. Increasing economic inequality acts as financial instability enhancer and if left untreated it poses a significant threat to economic sustainability.

Keywords: *inequality, wage share, wealth distribution, debt, financial instability*

JEL classification: *B22, D31, E50*

1. Introduction

Although Piketty's *Capital in the 21st Century* in which he stated that capitalism is prone to inequality, became a commercial success, inequality is still a poor treated subject in literature and a challenge for policymakers. Several books, papers and articles have pointed out the relevance of income and wealth distribution in macroeconomics. Stiglitz (2013) provides a variety of issues caused by inequality. The price of inequality is slower GDP growth, a weakened democracy and a diminished sense of fairness. Rajan (2010) explains how inequality entailed political pressure to ease consumption through credit growth. Kumhof and Ranciere (2010) investigate how changes in income distribution can lead to high leverage and crises. Confronted with declining or stagnant incomes, workers will limit their drop in consumption with credit expansion. Large debt-to-income ratios generate financial fragility. They also find a mechanism to explain global current account imbalances by considering the counterpart of a capital account surplus to be an increase in current account deficit. Berg and Ostry (2011) explore the relationship between income inequality and sustained economic growth. Their research concludes that inequality is the most important factor associated with longer growth spells.

The paper differs from most studies on this topic in that it analyzes inequality from a monetary perspective and its main purpose is to raise awareness regarding distributional effects of monetary policy. This paper claims that rising inequality wasn't just the consequence of structural factors, it also had a monetary cause.

The rest of this paper is structured as follows: In section II I present the role of inequality in disequilibrium economics and a holistic approach of distributional effects, in the third section I present the

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Article History:
Received 20 May 2016 | Accepted 30 June 2016 | Available Online 19 July 2016

Cite Reference:
Dragoe, S.I., 2016. Inequality Fragility Hypothesis. *Expert Journal of Economics*, 4(2), pp.35-53.

main reasons why distribution is an important for economic stability and the resemblance between the Keynesian and a self proposed Kaleckian multiplier. In Section IV I investigate the the link between inflation, wages and unemployment. The following section focuses on recommendations and an analysis of distributional consequences of monetary policy.

The data which was used for Granger causality test to show the substitution between human capital and financialisation was retrieved from Philippon (2014) Supporting Data. For detecting fat tails in loan impulse and testing that an increase in credit precedes an asset price boom I used Federal Board Reserve database and updated Stock market data from Shiller’s book "Irrational Exuberance".

2. Inequality and Disequilibrium

In this paper I propose a new theory called "Inequality Fragility Hypothesis" as a new framework for crises involving four attributes:

1) *As wealth inequality is higher, the gap between aggregate supply and demand is growing.*

There are two types of transactions: GDP and non-GDP, money doesn’t only serve as a mean of exchange, but is also used for wealth accumulation, resulting in an unproductive circuit (non-GDP transactions). Speculations lead to growing inequalities, which means more wealth and more opportunities to speculation for the wealthy. Even in an exchange economy, Say's Law cannot be valid, in case of high unequal wealth distribution, demand would collapse. Say's law is not restored on long-term because is possible to accumulate wealth in excess of the limits of practicable consumption. “Business men habitually aspire to accumulate wealth in excess of the limits of practicable consumption, and the wealth so accumulated is not intended to be converted by a final transaction of purchase into consumable goods or sensations of consumption” (Veblen, 1909). This event is evident because not only the number of billionaires has multiplied since 1987 (see figure 1), but also in 2014 the richest 80 people had amassed as much wealth as the bottom half of the world’s population, down from 388 in 2010 (Oxfam, January 2015).

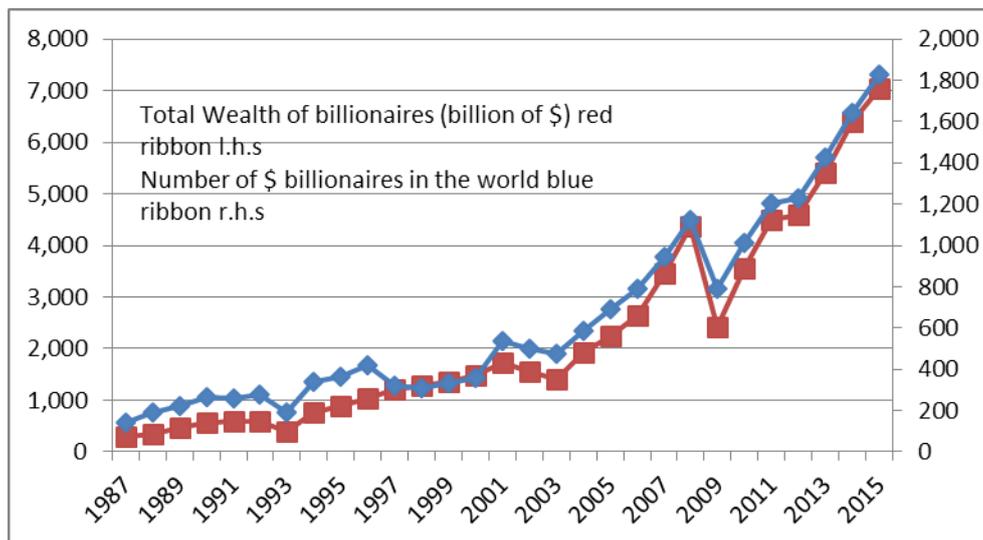


Figure 1. Evolution of World's billionaires

Source: <http://piketty.pse.ens.fr/en/capital21c2> and Forbes

When inequality grows the wealth-income ratio increases and so the top decile/percentile is flooded with excess capital over time. Less and less of all that money will be allocated to productive investment, instead it will be devoted to speculations or lent to speculative and Ponzi units, thus keeping the system away from equilibrium. In U.S. speculations contributed to wealth concentration, which in turn gave rich people more resources to make unproductive gains.

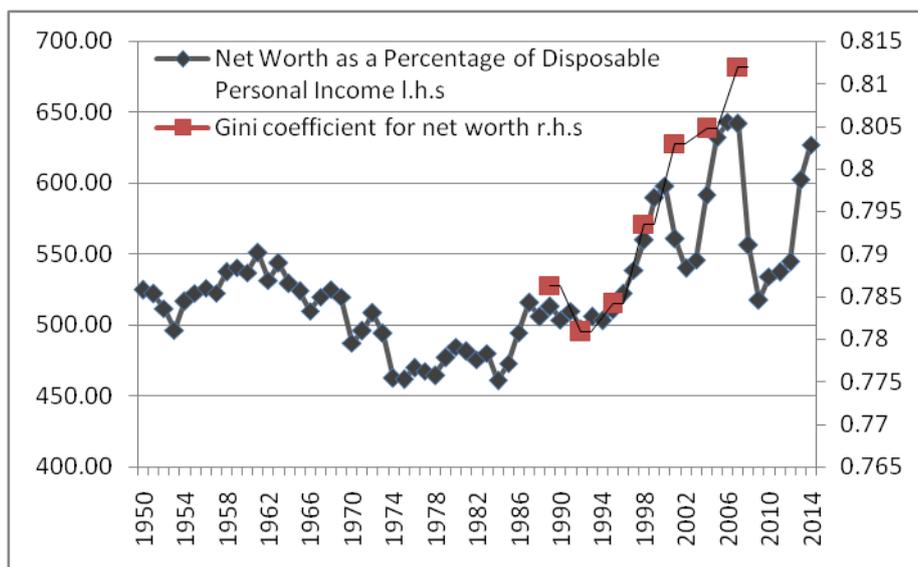


Figure 2. U.S. Households and Nonprofit Organizations Net Worth as a Percentage of Disposable Personal Income and Gini Coefficient for net worth

Sources: Net Worth as a Percentage of Disposable Personal Income from Board of Governors of the Federal Reserve System, Z.1 Financial Accounts of the United States, Series ID HNONWPDPI, Not Seasonally Adjusted, Frequency Annual, Aggregation Method Average, Units Percent, Gini Coefficient for net worth: Kennickell (2009)

This spiral has continued until crises took place (see figure 2). So money is employed in real production (GDP) and in capital gains (do not count in GDP). Fisher's equation of exchange proved to be false.

$$M * V = P * Q$$

M – money supply, V – velocity of money, P – prices, Q – quantity.

Aggregate supply is equal to aggregate demand, if money is used only for consumption purposes (money is used just for exchange, not for wealth accumulation).

Other disturbances, in dynamic equilibrium this time, appear to arise from changes in aggregate demand which produce disruptions in income (future expenditure plans count for determining aggregate demand). "If income is to grow, financial markets, where the various plans to invest and save are reconciled must generate an aggregate demand that, aside from brief intervals, is ever rising. For real aggregate demand to be increasing, given that commodity and factor prices do not fall readily in the absence of substantial excess supply, it is necessary that current spending plans be greater than current received income and that some market technique exist by which aggregate spending in excess of aggregate anticipated income can be financed. It follows that over a period during which economic growth takes place, at least some sectors finance a part of their spending by emitting debt or selling assets. For such planned deficits to succeed in raising income... it is necessary for some of the spending to be financed either by portfolio changes which draw money from idle balances into active circulation (that is, by an increase in velocity) or by creation of new money" (Minsky, p. 6, 1982). Equation (1) is the equation of growth if we ignore the leakages from and injections into the circular flow of income and idle balances (Palley, 2014).

Ex-post definition $AD = Y + \text{Net Bank Credit Creation}$ ex-ante definition

where, AD - aggregate demand (goods and services), Y – nominal income, Net Bank Credit Creation – change in bank credit stock or new bank credit creation minus repayment of debt as only credit from commercial banks creates purchasing power, while in case of bonds, existing purchasing power is transferred between parties.

Therefore, temporarily, income is not equal to aggregate demand with a single exception (point X). X is the point where the change in credit creation is 0 and $Y = Y_{(-n)}$, before that point the flow of credit is negative implying $Y < Y_{(-n)}$, beyond point X, $Y > Y_{(-n)}$. Volatility in credit expansion takes place with a design to fuel speculative booms that aggravate wealth and income distribution, subject treated in section 6.

But, disequilibrium is at its best observed at the microeconomic level, where there can be overproduction or overconsumption.

$$\text{Production} - \text{Consumption} = \text{Change in Stocks} \quad (2)$$

$$\text{Supply}_{t1}(\text{Production}_{t1} + \text{Stocks}_{t0}) - \text{Demand}_{t1}(\text{or Consumption}_{t1}) = \text{Stocks}_{t1} \quad (3)$$

From equation (3) supply seems to be always greater than demand, however there may be also shortages (crops, oil, energy) meaning that demand is greater than its supply. This supply-demand gap can be

covered with fiscal deficits for a short time because on long-term it can lead to indebtedness. The other approach consists in inequality reduction. Relative income hypothesis developed by James Duesenberry states that the propensity to consume of an individual is a decreasing function of his percentile position in the income distribution. As a result, decreasing income inequality can stimulate demand and will avoid misalignments in production structure, as the poor can't afford the same lifestyle after a credit crunch.

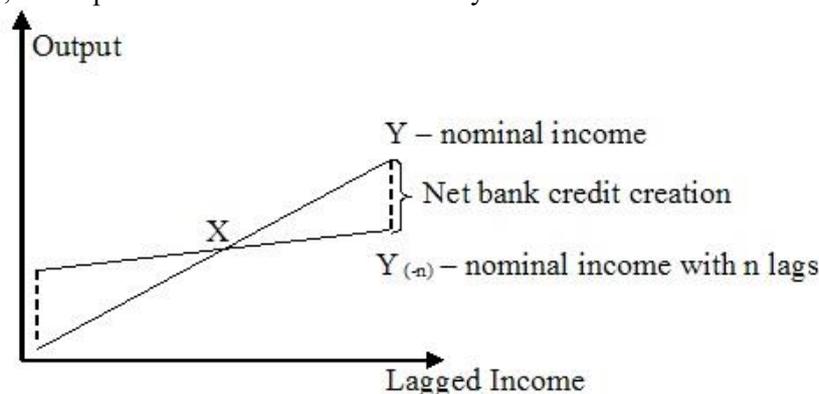


Figure 3. Aggregate demand and credit

From equation (3) supply seems to be always greater than demand, however there may be also shortages (crops, oil, energy) meaning that demand is greater than its supply. This supply-demand gap can be covered with fiscal deficits for a short time because on long-term it can lead to indebtedness. The other approach consists in inequality reduction. Relative income hypothesis developed by James Duesenberry states that the propensity to consume of an individual is a decreasing function of his percentile position in the income distribution. As a result, decreasing income inequality can stimulate demand and will avoid misalignments in production structure, as the poor can't afford the same lifestyle after a credit crunch.

2) Income and wealth inequality amplify financial instability.

Inside deregulated markets, low income households borrow in order to adhere to the same living standards with wealthy individuals. Marginal tax rate cuts on high incomes, a relatively stagnant minimum wage and development of monopsonies have contributed to higher inequality. Public policies have enhanced rent extraction and rent opportunities, especially at the expense of others (Stiglitz, 2013). The most gifted in doing so are the top 0.01% if we take a look at a Taleb's analysis:

"The one percent of the one percent of the population is vastly more sensitive to inequality than total GDP growth (which explains why the superrich are doing well now, and should do better under globalization, and why it is a segment that doesn't correlate well with the economy). For the super-rich, one point of GINI causes an increase equivalent to 6-10% increase in total income (say, GDP). More generally, the partial expectation in the tail is vastly more sensitive to changes in scale of the distribution than in its centering." (Taleb 2013, p. 153)

In addition to financial sector deregulation, U.S government encouraged banks to help meet the credit needs of the communities in which they operate, mainly low income neighborhoods (NINJA loans, NINJA – No Income, No Job or Assets) through credit promotion policies (Community Reinvestment Act):

"The political response to rising inequality – whether carefully planned or an unpremeditated reaction to constituent demands – was to expand lending to households, especially low-income ones. The benefits – growing consumption and more jobs – were immediate, whereas paying the inevitable bill could be postponed into the future. Cynical as it may seem, easy credit has been used as a palliative throughout history by governments that are unable to address the deeper anxieties of the middle class directly. [...] In the United States, the expansion of home ownership – a key element of the American dream – to low and middle-income households was the defensible linchpin for the broader aims of expanding credit and consumption. But when easy money pushed by a deep-pocketed government comes into contact with the profit motive of a sophisticated, competitive, and amoral financial sector, a deep fault line develops." (Rajan 2010, p. 9) As expressed by Austrians (Huerta de Soto 2009, p. 409), the money creation process ensures a redistribution of income and wealth in favor of those who get the new injections of money over the rest of society who will pay higher prices. This did not work in U.S and other developed countries because of low inflation which didn't give them an advantage and as well because of the massive wave of speculations. This inequality and indebtedness trends weren't present just in U.S (see annex 6), it has been to the fore in most developed countries (see annexes 1 and 2).

3) *Inequality worsened current account imbalances. Increasing savings of foreign and domestic investors, due to income and wealth inequality produced current account disequilibrium.*

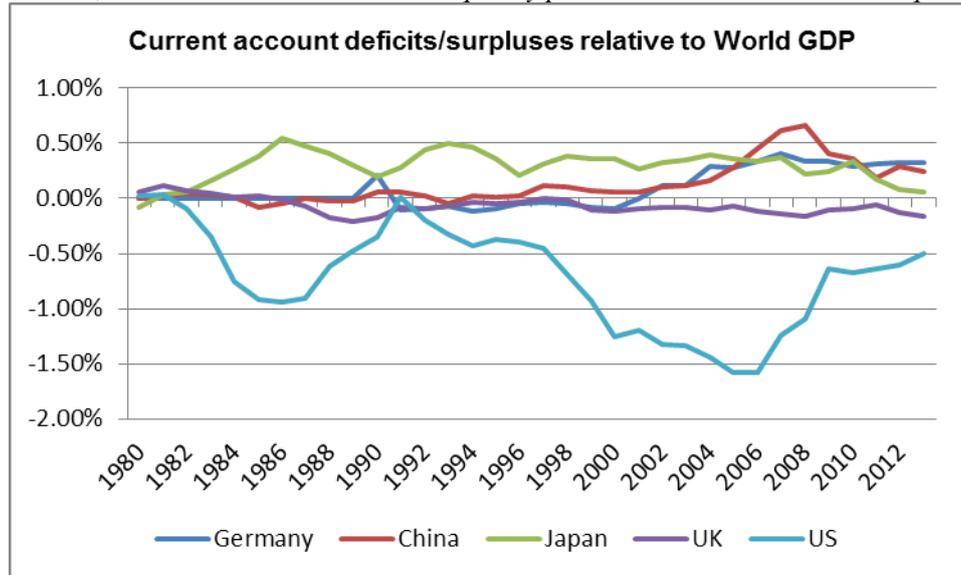


Figure 4. Current account disequilibrium
Source: data from UNCTADstat, author’s calculations

US has become the “deficit of last resort” (Stiglitz, 2012). The reason, behind this phenomenon is the use of dollar as a global reserve currency, thereby, creating a counter-sense force that makes dollars leave United States and leads to a current account deficit (see figure 4). The current account disequilibrium was amplified by wealth and income concentration at the top end across the world. While some papers (Milanovic and Lakner, 2013) claim that global income inequality has fallen by using Global Gini Coefficients, in fact the Top 1 %/Average annual incomes per capita ratio has been climbing over the years (see table 1) and the global wage share followed a downward trend (see annex 3).

Table 1. Income inequality evolution

| Average annual incomes per capita (in 2005 PPP-adjusted USD) Top 1% | | | | | | 1988-2008 change | 1993-2008 change |
|---|----------|------------|----------|----------|-------------|------------------|------------------|
| Year | 1988 | 1993 | 1998 | 2003 | 2008 | | |
| | 38964 | 39601 | 46583 | 51641 | 64213 | 64.8% | 62.1% |
| Average annual incomes per capita (in 2005 PPP-adjusted USD) | | | | | | | |
| | 3295 | 3287 | 3471 | 3631 | 4097 | 24.3% | 24.6% |
| Top 1 %/Average | 11.82519 | 12.0477639 | 13.42063 | 14.22225 | 15.67317549 | 32.54% | 16.78% |

Source: (Milanovic and Lakner, 2013), author’s calculations

Regarding global wealth inequality, there is another story (see annex 4). It may seem that global inequality decreased between 2001 and 2009, yet it could be only a distraction. In general, non-financial assets like housing, land and small business assets make up a relatively large proportion of household wealth in the developing world and in transition countries. In contrast, financial assets form a large proportion of the household balance sheets in developed countries. Within high level wealth groups, the bulk of wealth is represented by financial assets, while at lower wealth levels real assets tend to dominate. Given the real estate booms across the world before Global Financial Crisis, the fact that 49% of the ultra high net worth individuals are from U.S and 3.67% belong to UK while over 46.5% of millionaires are either American or British (Credit Suisse, Global Wealth Databook 2014) and probably similar ratios before crisis, is easy to understand the misleading data. The rising housing prices during boom closed the gap in composition of world gross wealth between financial and non-financial wealth and according to Atkinson (1989) rising house prices reduce the share of the top wealth percentile in the UK and Wolff (2009) reveals that the ratio of equity prices to house prices has a beneficial effect on the wealth share of the top percentile in U.S or as Yellen (2014) expressed „housing wealth is the most important source of wealth for all but those at the very top”, assumption that can be generalized. The 19.55% Compound annual growth rate of Total Wealth of Billionaires (2009-2015) and

the growing wealth share of top percentile occurred due to quantitative easing inflating bubbles on stock market and the poor losing their homes for being unable to pay back mortgage loans.

The consequence is clear: 2 simultaneous booms can hide an unequal accumulation of wealth. Practically, the Global Savings Glut (Bernanke, 2005) that was responsible for the large current account deficit of United States was possible because of global wealth and income inequality widening gap between individuals. Inequality developed current account surpluses in emerging markets and deficits in developed economies (especially in U.S) through what I call riskiness channel: high-income groups usually hold riskier financial assets (for evidence see Kennickell, 2009, Figure A3a). The riches from emerging markets with underdeveloped financial markets and other export-led countries invested their wealth in the major financial centers causing large volatilities in current accounts (mean absolute deviation of OECD countries' current account widened from 2.95% in 1995 to 6.76% in 2007, data from UNCTADstat, author's calculations). Their savings provided means for financing imports, the counterpart of a capital account surplus is an increase in current account deficit (Kumhof and Ranciere, 2010).

4) *Inequality is detrimental to human capital. Rising income inequality inhibit human capital formation (a key point in technology evolution) in poor countries, while in rich countries students must get over-indebted in order to pay university fees through student loans.*

Technology is the key factor in economic development of a nation and it is a function of investment (reinvested profit and credit used in production) and human capital. "Children whose parents are in the top quintile of the wealth distribution have a 36 percent chance of also being in the top quintile and a 60 percent chance of being in one of the two top quintiles in their adult years" (ISAACS, SAWHILL and HASKINS 2008, p.9) and 74% of students in the most selective colleges come from families in the top quartile (Carnevale and Rose 2003, p. 141). Only 29% of highscoring students from low socioeconomic backgrounds had completed a bachelor's degree or higher compared to 30% of low-scoring students with high socioeconomic status, 51% middlescoring students with high socioeconomic status and 74% high-scoring students from high socioeconomic backgrounds (Fox, Connolly and Snyder 2005, p. 51). Education is vital to economic mobility: adult children of parents in all five quintiles who achieve a college degree are much more likely to climb up the ladder seeing that 41% of adult children from the bottom quintile make it to the top two quintiles if they earn a college degree and only 14 percent of the adult children without a college degree from the bottom quintile of parental income reach the top two quintiles (ISAACS, SAWHILL and HASKINS 2008, p. 95). Access to education is clearly a factor of the Great Gatsby curve, term coined by Alan B. Krueger (2012) which involves that higher income inequality is associated with less mobility across the generations. Student loans have an uptrend in general and particularly low level income families (see Annex 5). Given the job polarization in U.S Autor (2010), a student loan crisis would be catastrophic for American economic system.

Another framework for typical crises

Business cycle theory has become a fairy tale. The current view is that GDP presents temporary deviations from its "natural rate" or its trend. The Great Recession proved otherwise, there were no small deviations, this time there was a L-shaped recovery. Credit instability is at the core of business cycles. The spiraling debt incurred in financing speculative investments leads to cash flow problems for investors, which are forced to sell their assets in order to pay their debt. This causes a sudden major collapse of asset values named Minsky Moment. We are all Minskyans now. For all that, his masterpiece (financial instability hypothesis) is incomplete without explaining the way economic inequality (economic inequality is a broader concept than income inequality, see Sen, 1997) amplifies financial instability and in what other manners influences economic cycle.

Inequality also depends on structural factors like urbanization and immigration (at national level immigration will have a negative effect on equality of income whilst on global level will have positively affect income distribution) due to increased labor supply. The annual fitted average growth rate of the share of urban population in total population in 1950 – 2010 In U.S is 0.33%, while on 1790 – 1940 is 1.8% (author's calculations, data from World Urbanization Prospects, 2014 Revision and Historical Statistics of the United States 1789 – 1945). Immigrants as Percentage of the U.S. Population reached its maximum in 1890, 14.8% (data from Migration Policy Institute 1850 – 2013). The highest amount of inequality was registered after the Great Recession top 10% Income Share excluding capital gains - 47.76% and including capital gains - 50.6% in 2012 (see The World Top Incomes Database), but immigration reached its top during 1870-1910. Also there was a decline in immigration for 2 decades before the Great Depression and inequality continued to grow. All these point the existence of other forces with high impact on distribution besides structural factors.

We can find clues in Leverage Cycles introduced by Geanakoplos. “Over the cycle inequality can dramatically increase if the leveraged buyers keep getting lucky and dramatically compress if the leveraged buyers lose out.” (Geanakoplos, 2010) The reverse is also possible. The distinction between leverage cycle and credit cycle is that the latter has a constant LTV (Geanakoplos & Fostel, 2013). Extreme wealth inequality can reduce margins and transform a credit cycle into a Leverage Cycle.

3. Why Inequality Matters

- Increased inequality may shorten growth duration, as one IMF study indicated that longer growth spells (the interval starting with a growth upbreak and finishing with a downbreak) are correlated with less income inequality (Berg and Ostry, 2011)
- Improving income equality will narrow the saving gap between income groups, thereby tightening conspicuous consumption by the rich and emulation by the less affluent.
- Nassim Nicholas Taleb reveals that “In Extremistan, inequalities are such that one single observation can disproportionately impact the aggregate, or the total” using an example related to net worth "Consider by comparison the net worth of the thousand people you lined up in the stadium. Add to them the wealthiest person to be found on the planet—say, Bill Gates, the founder of Microsoft. Assume his net worth to be close to \$80 billion—with the total capital of the others around a few million. How much of the total wealth would he represent? 99.9 percent?" (Taleb 2010, p. 61) The rising income and wealth inequality in the last decades has made our world closer to Extremistan than Mediocristan, making it prone to Black Swans.
- According to Piketty (2012) in the last decades the wealth is inherited
- A more egalitarian approach will improve the health and education of the poor; income redistribution is an investment in human capabilities
- Income inequality and entitlements are the causes behind famine in some parts of the world, not shortage of food, like the Bengal famine of 1943, the Ethiopian famine of 1973, or the Bangladesh famine of 1974. (see Sen, 1988)

In market economies there must be a degree of inequality in order to function, but what is the reason for such great inequalities? There is a competition between capitalists and workers (in fact there is a third type of participant, the managers who get paid with wage and shares, but for simplicity I will use only 2 classes: capitalists and workers). There seems to be a labor market conflict, thus during the economic boom the wage share in G7 countries has fallen, as shown in Annex 7 while during crunch, the share of wages in GDP increased, since profits and output have collapsed and profits are the last paid. A Kaleckian income distribution model is a useful tool for this purpose.

$Y = C+I$ where Y = national income; C = Consumption; I = Investment

$Y = S+P$ where S = Salaries; P = Profits

$C = C_p+C_s$, C_p = capitalists' consumption, C_s = workers' consumption

$C_p = \alpha*P$, α - fraction of consumed profits

$C_s=S$, Workers are presumed to consume all they earn.

$S + P = C+I$, therefore $S + P = S + \alpha*P+I$

$P = I + C_p$

Aggregate investments together with capitalist consumption determine aggregate profits and consequently also the savings that they require, and not the reverse. Also, Investment determines Savings through changes in Income via the multiplier principle developed by Richard Kahn, and via the newly created purchasing power (loans) for the investment to carry on, will eventually become someone's savings.

$P*(1-\alpha) = I$

$P = I/(1-\alpha)$, $Y = S+P$, $Y = S+I/(1-\alpha)$, s = employees' income share in GDP, $S=s*Y$

$Y*(1-s) = I/(1-\alpha)$

$Y = I/(1-s)(1-\alpha)$

The Kahn–Keynes multiplier will be greater as the marginal propensity to consume is higher. The marginal propensity to consume c can be approximated by the share of wages in national income and the Kahn–Keynes multiplier $1/(1-c)$ can be replaced with the Kaleckian multiplier expressed as $1/(1-\text{marginal distribution towards wages})$. A greater distribution towards wages implies higher economic growth. While

these two models seem to resemble, in fact in the last decades in most developed countries, the consumption of workers was financed by loans not by income, hence the kaleckian model proves to be a sustainable alternative.

| | |
|---|--|
| <p>Kaleckian multiplier</p> $\Delta Y = \Delta S + \Delta P; P=f(I), P = I + C_p, \Delta P \approx \Delta I$ $\Delta Y = \Delta S + \Delta I$ $\Delta Y = g_s * \Delta Y + \Delta I,$ <p>G_s – distribution of growth to wages, $g_s = \Delta S / \Delta Y$</p> $\Delta Y * (1 - g_s) = \Delta I$ $\Delta Y / \Delta I = 1 / (1 - g_s) \text{ which means } K \approx 1 / (1 - g_s)$ | <p>Keynesian multiplier</p> $\Delta Y = \Delta C + \Delta I$ $\Delta Y / \Delta I = K, K - \text{multiplier}$ $K = \Delta Y / (\Delta Y - \Delta C)$ $K = \Delta Y / (1 - \Delta C / \Delta Y)$ $K = 1 / (1 - c), c \text{ is MPC, marginal propensity to consume}$ |
|---|--|

Figure 5. Kaleckian and Keynesian multipliers

Blinder (1974) indicates that income inequality variation is greater than MPC’s variation. However, Blinder has conducted its research in a period (1947-1972) with low inequality and strong bank regulation. The elasticity of MPC to wage share (% of GDP) for the 1973-2007, period chosen for deregulation and great income inequality variance) is -1.979, whereas the elasticity of Compensation to employees/GDP is for the same period is -4.960. Both Keynes (2009) and Kalecki (Osiatynski 1990, p. 372) were wrong, redistributing income to the less affluent won’t reduce propensity to save, at least this wasn’t the trend in U.S. A more equal distribution of income will make the contact with higher consumption individuals decrease, resulting a reduced propensity to consumption (Duesenberry 1949, pp. 44-45).

A decline of Kahn multiplier will not follow because less money will be available to speculate and more money will be utilized for purchases of goods and services (wealth to income ratio will also decrease), income and consumption will gain a stronger pace on real terms, while the consumption-income ratio will drop (as the consequence of previous psychological explanation and a smaller wealth effect - an increase in wealth will cause an increase in consumption). I conducted a Granger causality test in order to analyze the relationship between wage share (% of Personal Income) and financialisation in U.S, characterized by the size of financial sector. I used Augmented Dickey-Fuller and Phillips-Perron tests to examine the series (the first difference of logarithms) for stationarity. In both cases and for both series, the test value is less than the critical value for any of the levels of relevance therefore, the null hypothesis is rejected. The data samples match a normal (Gaussian) distribution (Jarque-Bera test).

For autocorrelation of errors I conducted Correlogram of Residuals (Q-Statistics) for a Bivariate AR (one lag) OLS regression with DL_WAGE_SHARE as dependent variable and Breusch-Godfrey Serial Correlation LM Test for DL_VA_FIN as dependent variable. The performed tests indicate that errors are independent. The Correlogram Squared Residuals revealed that error terms don’t present heteroskedasticity. The residuals are normally-distributed (Jarque-Bera test). The correlation between wage share and the value added by financial (raw data) is ≈ -0.94 and $R^2 = 0.88$.

$$Va_fin_t = \alpha + \sum \beta_i (Va_fin_{t-i}) + \sum \psi_j (s_{t-j}) + \varepsilon$$

$$s_t = \Phi + \sum \varphi_i (s_{t-i}) + \sum \omega_j (Va_fin_{t-j}) + \varepsilon, i=1, n \ \& \ j=1, n$$

Table 2. Granger Causality

| Pairwise Granger Causality Tests | | | |
|--|------------|--------------------|--------------|
| Date: 08/30/15 Time: 20:24 | | | |
| Sample: 1947 2009 | | | |
| Lags: 2 | | | |
| Null Hypothesis: | Obs | F-Statistic | Prob. |
| DL_WAGE_SHARE does not Granger Cause DL_VA_FIN | 60 | 3.87182 | 0.0267 |
| DL_VA_FIN does not Granger Cause DL_WAGE_SHARE | | 3.37679 | 0.0414 |

Source: wage share from BEA, author’s calculations, VA_FIN from Philippon (2014)

The p – values are under 0.05 (selected significance level) meaning the relationship is mutual and the past values of wage share predict the current level of of value added by the financial sector and viceversa. In export-led countries like Germany the Private Consumption/GDP decreased because the middle class with

declining incomes didn't get indebted as the reference group represented by top-end households raised their saving rate indirectly through corporate net saving and thanks to bank lending practices in Germany which are more conservative than in US (Treec, Treec and Sturn, 2012). The same goes for China, the share of consumption in GDP depressed (Treec and Sturn, 2012). It seems that rising inequality in debt-led countries leads to declining savings and viceversa for export-led countries.

States are open economies and countries where foreign trade is an important part of the economy, can be profit-led. But, the global economy is a closed economy since exports and imports cancel each other, therefore the global GDP is wage-led (high trade openness of economies leads to greater competition, it should not be a competition between states, but between companies). Mercantilism affects not only the economy that provides global reserve currency, but also global aggregate demand: when reserve accumulation is the result of current account surpluses, there is a reduction in global aggregate demand as highlighted by UN Commission of Experts on Reforms of the International Monetary and Financial System. That's why Keynes Plan involved a system that taxed surplus countries. Plus it is not possible for the majority of the export-seeking countries to grow out of a pro-capital redistribution of income, when this strategy is applied in many other large economies at the same time.

Here we can also add the well-known fact that during and post-recession, current accounts are more balanced because enterprises reduce their production costs and consumers (except the richest, but they do not make up the majority) don't afford anymore high value added products made abroad as result of falling incomes and low credit availability. The concepts „wage-led” and „profit-led” were introduced by Bhaduri and Marglin (1990) and their model measures the impact of 1 per cent point increase in the profit increase over private aggregate demand (private consumption, investment and net exports). The results of researches (Onaran and Galanis, 2012) using this model are paradoxical inasmuch as the private consumption/disposable income ratio in U.S. has grown, despite the upward trend of income inequality. Even more, there can't be permanently wage-led or profit-led economies, as maximum growth would be reached when the wage or the profit share is zero. Clearly, this is a false statement. Logically an economy goes through stages of wage-led and profit-led growth. We can find evidence in this case following the events after The Great Depression. The crisis led to a redistribution policy in favor of wages after World War II, this period was named the Golden Age. This system has exhausted its synergy three decades latter ending in the Great Stagflation. The crisis was a reason for income redistribution in favor of profits that has taken place since and caused the current crisis.

As both regimes have failed, I can conclude that the assumptions made above are correct and because in average growth was more robust over the Golden Age than during the Great Moderation (and due to generally negative net exports), without any calculations we can say that U.S. is wage-led upon long-term. Seeing that two totally different systems had taken place one after the other resulting in different crisis we can draw another set of conclusions:

- the stronger each class becomes, the greater is its capacity to further increase its share of income until a crisis or a political change occurs
- there is no optimum wage share or profit share, because of the never ending war between classes, the distribution of income is unstable and pursuing wage-led growth will make the economic growth less sensitive to wage share growth. Likewise pursuing profit-led growth on long term will undermine GDP growth.

Nevertheless, the long distribution waves are mostly in favor of capitalists. The introduction of managers in this story shows us that top incomes earners today are CEOs or new entrepreneurs, not “rentiers” (Saez, 2013) doubling the pressure for low-income earners. In the same time, bailouts with lack of regulations and punishment (leaders are rewarded for their incompetence) threaten recovery and set the foundations of future crisis and the next long distribution wave in favor of the rich.

4. The Link between Inflation, Wages and Unemployment

The conventional belief is that unemployment is a consequence of high wages, an outcome of downward wage rigidity. This is wrong. Wages don't exhibit rigidity in either direction, they are changed only at fairly long stretch (Leijonhufvud, 2012) and if wages were flexible it would make things much worse during a debt-deflation (Leijonhufvud, 2002) as the fall of wages would exacerbate deflation and real debt, or during a stagflation where rapid increase in wages would amplify inflation. Even in normal times, extreme volatile wages would be detrimental for not providing stability to employees and for reducing the ability of enterprises to adapt to new circumstances.

The classical view that rising unemployment is the result of high wages was reinforced in the 1970s, when the wage share hit record high in developed countries. However, in the subsequent decades,

unemployment was on average higher (compared to unemployment recorded during Golden Age of Capitalism) whilst real wages were far behind productivity growth. Wages should not be viewed as an impediment for investment, but as a source of stable demand. Wages would be detrimental to economic growth just in a profit squeeze situation, conjuncture that seems far away from our days. Wage increase could make the transition to a moderate rate of inflation. A moderate inflation can avoid liquidity trap entrance. Minsky argues that if the rate of inflation is high at the time of the crisis, even though the bust causes investment to slump, rising cash flows enable the repayment of debt incurred before the economic collapse. The result is slow growth and high inflation, but few bankruptcies. This is a self-correcting mechanism because prolonged slump is avoided (Keen, 1995).

A moderate inflation may improve economic performance: it can melt away the debt and reduce unemployment (the latter is a consequence of the first one and of the money illusion which holds true at low and moderate inflation). Inflation is influenced by wages and money among other factors. The relationship between inflation and money supply growth is weak when the inflation is low (Stiglitz). Improving income inequality by rising wages could help the transition to moderate inflation and it can be further improved after the completion of this phase without creating inflationary pressures. For reducing income inequality and not giving rise to further inflationary pressures it is required a policy that would encourage faster wage growth for poorly paid jobs relative to growth of wages for highly paid work. This means that at the bottom, wage growth will exceed productivity growth, while at the top, productivity growth will surpass wage growth (Minsky, 1968), in this way repairing the inequalities made during Great Moderation.

5. Fiscal and International Solutions

The following fiscal and international solutions are note-worthy:

- Progressive taxes ameliorate income inequality and reduce the expansion of budget deficit in case of public wage growth
- Increase fiscal pressure and improve redistribution. Post taxes Gini Index (gini_net) is on average lower than Gini before taxes (gini_market) see Solt, 2009. The most important public expenses is education, it will reduce frictional unemployment and it will lessen social immobility. Job matching and public services are crucial, not welfare spending.
- Another idea is the inheritance tax. It is implemented in few states, but in emerging states it could chase away investors
- A better collection of taxes by eliminating loopholes in tax law
- More bargaining power for workers and increase minimum wages. The last measure would also reduce tax evasion since many employers conclude work contracts to the minimum wages (gray tax evasion area).
- Liberalize migration so that poor people can move to richer countries

6. Monetary Solutions

Some of the fiscal solutions have obvious drawbacks and must be doubled by monetary policies who likewise influence wealth and income distribution.

Nassim Nicholas Taleb and Daniel G. Goldstein (2007) showed that the ratio of standard deviation and mean absolute deviation is about 1.25 if the series of variables is Gaussian and greatly increases in a world of fat tails. As we can see in figure 7, the loan impulse in U.S. between 1947M01-2015M03 is highly unstable. The leptokurtotic distribution obtained with an excess kurtosis > 7 , exhibit volatility clustering, meaning that “large changes tend to be followed by large changes – of either sign” (Mandelbrot, 1963).

The inexistence of neutrality in the long term entails distributional effects of monetary policy. We must underline that Austrians reject the idea of long-run neutrality of money since credit expansion will always distort the structure of production (Huerta de Soto, 2009, pp. 540-541). The essence of Inequality Fragility Hypothesis is the spiral between financial markets and economic inequality. Finance can quickly degenerate into a rent-seeking activity thanks to the flexibility provided by financial engineering (Zingales, 2015).

Between 1960 and 2009 the financial industry doubled its share in GDP. Besides rent-seeking, there is another reason for this increase in financial industry: GDP grew slower because of more and more money being oriented to asset markets instead of being allocated to business, while financial industry had to grow to support the creation of securities. Aggregate demand (GDP) is formed of basic aggregate demand and the demand generated solely by speculative bubbles (Croitoru, 2015). But, even the bubble before Great Recession could not produce any excess in aggregate demand (Summers, 2013). Inequality has contributed via riskiness channel.

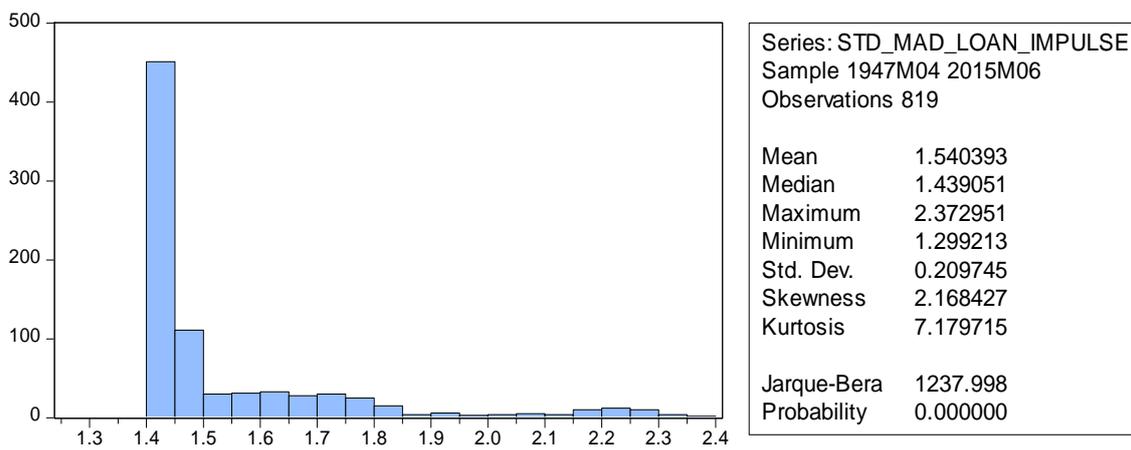


Figure 6. Credit Instability

Source: Federal Reserve Board, H8, Loans and leases in bank credit, all commercial banks, Monthly data, not seasonally adjusted

Since 1997Q3 M2 velocity has recorded an almost permanent drop signaling the development of an overtrading economy. If money supply grows faster than nominal GDP, the consequences will be the development of speculative bubbles and decreasing velocity. The upward drift in credit demand came from inequality and the advance in supply of credit was driven by financial innovation (securitization) “in many cases the expansion of credit resulted from the development of substitutes for what previously had been the traditional monies” as asserted by Charles Kindleberger (2005, p. 64). We can test the hypothesis of credit-driven asset prices by using S&P Composite as proxy for financial asset prices. Its dependence on Debt Margin can be plotted with HP filter.

$Y_t = G_t + K_t$, Y_t is the analyzed variable, in this case, debt margin and SP Composite, G_t – growth component (trend) and K_t – cyclical component

$$\sum_{t=1}^T K_t^2 + \lambda \sum_{t=1}^T [(G_t - G_{t-1}) - (G_{t-1} - G_{t-2})]^2 - \text{the minimizing equation to smooth trend, } \lambda = 14400$$

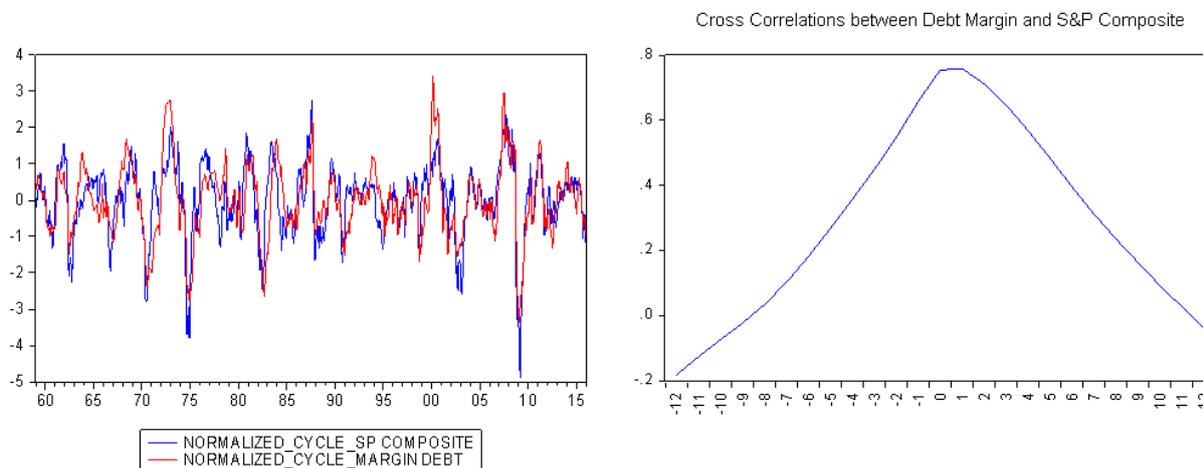


Figure 7. Credit and financial asset prices

Source: Margin Debt, Monthly data, New York Stock Exchange, 1951M01 – 2016M01, S&P Comp. P data from Shiller, Robert J., *Stock Market Data Used in "Irrational Exuberance"* Princeton University Press, 2000, 2005, 2015, updated, Monthly Data

The normalized debt margin log deviations from HP trend are correlated with normalized asset prices log deviations and the mutual causality is obvious it as the correlation with one lag (asset pricing depending on debt margin) is 0.6572 while the correlation with one lead is 0.7589.

Residence property prices are too dependent on debt (see annex 8) in most developed countries except for Germany.

Monetary policy has two main channels that influence economic inequality in contrary sense: the riskiness channel, an expansionary monetary policy will put upward pressure upon equity prices, therefore raising the wealth of the rich and credit channel which benefits the first to get the new injections of money (the

poor have higher debt ratios relative to income and wealth), only if inflation is high enough to gain advantage over others and to meltdown their debt without affecting purchasing power (real incomes are rising).

$$C_{lih} = a * Y_{lih} + b * W_{lih}$$

$C_{hih} = \rho * a * Y_{hih} + \rho * b * W_{hih}$, C_{lih} – consumption of low-income households, C_{hih} – consumption of high – income households, $0 < a < 1$, $0 < b < 1$, $0 < \rho < 1$, $a < b$

$$W = W_{lih} + W_{hih}$$
, W – household wealth

$R_a = \theta * W_{lih} + \rho * \theta * W_{hih}$, R_a – riskless assets (money, T-bills, real assets without mortgage). When inequality rises, R_a / W will drop and credit to money and loans to money ratios will grow. Because money is not neutral, the influence of money and near-monies on distribution can modeled as:

$I = I_0 + MI$, I_0 – inequality independent of monetary evolutions, MI – monetary inequality represented by capital gains, their distribution and

$W_t / Y_t = [W_{t-1} * (1 - \text{Depreciation}) + \text{Investment}] * (1 + e_t) / Y_{t-1} * g$, e_t – existing assets price inflation in excess over GDP deflator, g - real growth, (modified version of Piketty’s two-good model wealth accumulation model)

$$Y = Y_{ww} + Y_{we}$$
, Y_{ww} – aggregate demand without wealth effect, Y_{we} – wealth effect

$$Y_{we} = b * (W_{lih} + \rho * W_{hih})$$
, W_{lih} - low income households, W_{hih} – high income households

$$W_{lih} / W_{hih} = X$$

$Y_{we} = X + Y_{EA}$, Y_{EA} – demand for existing assets, wealth effect is dependent on demand for existing assets and on the distribution of wealth.

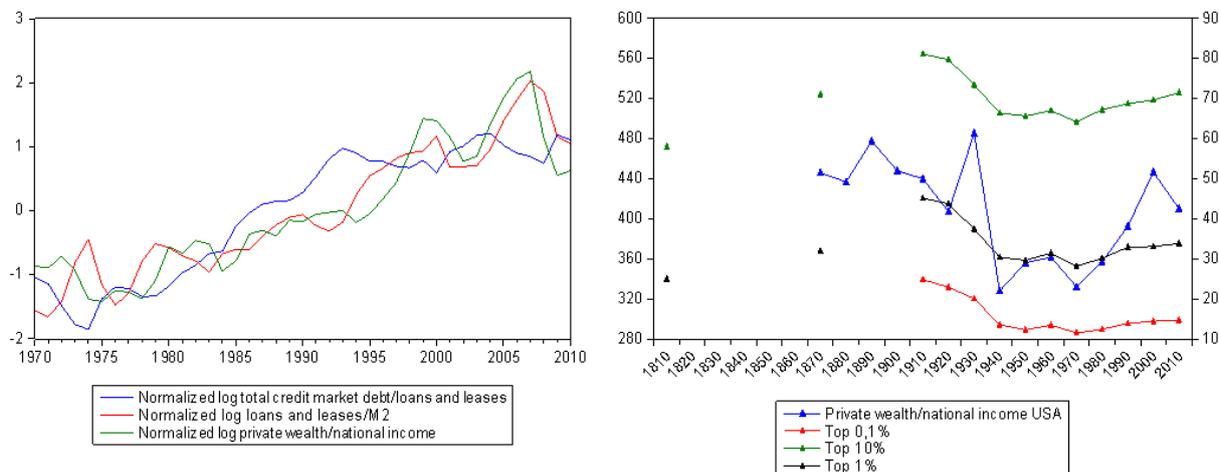


Figure 8. Relationship between wealth and credit

Source: Piketty, T., Technical appendix of the book « Capital in the 21st century

The Circular relationship between development of non-bank credit, decoupling loans from money, wealth and wealth inequality is obvious in the previous figure.

Inflating asset prices with excessive credit is a wealth inequality driver. Afterwards wealth supplies collateral for more borrowing. Generally, low income households own more riskless asset such as money and real asset, but they use their homes mostly not as a source of income or speculation, but as residence. Inflation doesn’t erode the wealth of the poor because their propensity to save is reduced. It is possible that asset price downturns are the natural way of the economic system of correcting distribution by whipping fortunes achieved through monetary gains without added value, given that during recessions inflation falls less than the relative price of assets, acting as automatic stabilizers against inequality. Debt becomes the income of financial sector. After the Great Recession, the household debt to GDP ratio has shrunk in size, yet financial income and the share of top 10% income share continued their upward trend. These are the results of quantitative easing. Policymakers are trying to cheat the business cycle, but it won’t work. The weak economic grow is a by-product of asset gambling and resource misallocation of an overly large financial sector. In general, is believed that credit impulse influences only investment, the stock of credit equals stock of capital (Biggs, Mayer and Pick, 2009). Investment is a flow and is linked to the flow of credit therefore the change in investment and thus, economic growth is dependent on credit impulse.

$$\Delta I = \Delta \Delta Cr$$
, ΔI – change in investment, $\Delta \Delta Cr$ – credit impulse

Textbooks describe financial intermediation like this: households save and companies invest their savings. It is wrong. Commercial banks create money (other financial intermediaries perform a transfer of purchasing power) and in the last decades household debt went through the roof. Capital is divided into

productive capital and financial capital (existing assets trading). Credit impulse is also related to financial capital. Curbing credit impulse and preserving credit flow at sustainable levels plus targeting a moderate and stable inflation will smooth asset price bubbles and inequality. With these policies it will be less probably that borrowing will be based on the collateral value rather than on expected cash flows.

The actions needed to mitigate credit impulse: use a form of capital requirements (Equity/Total Assets) for all financial institutions to counter credit impulse fluctuations (prohibit securitization because it allows avoidance of capital requirements and decouples credit from money or at least include off balance sheet items in formula and impose restrictions on preferred shares as financial corporations can raise capital without slowing credit creation), impose loan to value ratios and debt thresholds for all borrowers (homeowners, margin buyers and businesses) during boom. This proposal should not be confused with the Basel III regulatory framework. It doesn't involve risk-weighted assets. All Basel Agreements have been procyclical. Another error of Basel regulation structure is that stress testing implies that macroeconomic shocks affect financial institutions. In reality is quite the opposite: the inverted yield curve affects the profitability of financial intermediaries. The future reduction in credit supply will have a negative impact on real activity (see Adrian, Estrella and Shin, 2010).

A greater distribution towards high income households led to a smaller wealth effect in comparison to the period before crisis. This under potential growth has sparked controversy among theorists. The two mechanisms provided by Keynes, 2009 (interest rates) and Kalecki (income distribution) for equilibrating Savings and Investments, can provide an explanation. It is possible that decreasing wage share over long periods of time would contribute among other factors to higher ex-ante savings than ex-ante planned investment because capitalists and corporate sector save more. Corporations are sitting on piles of cash and have become net holders of financial assets, exerting more stress on real interest rates to fall in order to reach equilibrium, which combined with low inflation favored search for yield and build-up of large debt. Anyway, regardless of accepted theory, secular stagnation, global savings glut, debt supercycle or Gordon's headwinds, they all have one common element: increasing inequality.

7. Conclusions

The paper analyzes the main outcomes and determinants of income and wealth inequality at global level and especially in U.S. The vicious circles between economic inequality and financial instability are highlighted by increasing debt-to-income ratios for low income households that borrow in order to adhere to the same living standards with wealthy individuals and by riskiness channel: high-income groups usually hold riskier financial assets. The Global Savings Glut and current account volatilities were the result of increasing inequality. The riches from countries with weak financial markets and export oriented nations invested a great percentage of their wealth in U.S. transforming it in the deficit of last resort. Rising inequality in debt-led countries leads to declining savings and viceversa for export-led countries. Social immobility is yet another negative consequence of high income inequality because access to education is restricted for students from low income families.

One of the main determinants of income and wealth distribution in U.S is financialisation because of asset gambling and resource misallocation. My analysis reveals that human capital is substituted with financialisation in an overtrading economy. Asset prices depend on credit as credit log deviations from HP trend are correlated with normalized asset prices log deviations and precede it and if the leveraged buyers are lucky inequality will rise. Because of non-neutrality of money, inequality can be classified into inequality independent of monetary evolutions and monetary inequality. Central bankers can ameliorate monetary inequality by targeting moderate inflation and curbing credit impulse. This study can be further developed by comparing the actual income and wealth inequality with the results produced by a life cycle model, the difference being identified as monetary inequality and simulating the impact of monetary policy on it.

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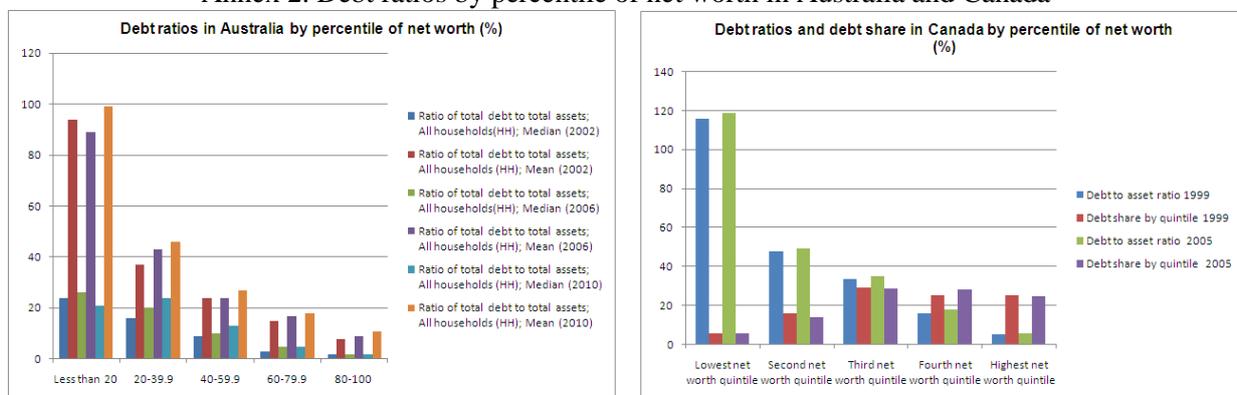
Appendices

Annex 1. Financial fragility In Euro Area (2010)



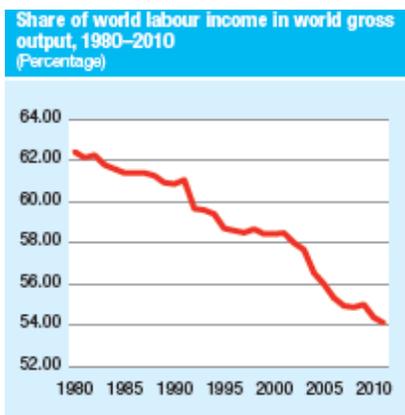
Source: Statistics Paper Series NO 2 / April 2013 The Eurosystem Household Finance and Consumption Survey Results from the first wave, pp. 65, Year of reference 2010 (Belgium (2010), Germany (2010), Greece (2009), Spain (2008), France (2010), Italy (2010), Cyprus (2010), Luxembourg (2010), Malta (2010), Netherlands (2009), Austria (2010), Portugal (2010), Slovenia (2010), Slovakia (2010), Finland (2009))

Annex 2. Debt ratios by percentile of net worth in Australia and Canada



Source: Australia RBA, Publication date 15-mar-2012 and Canada Survey of Financial Security Statistics Canada (2005), author's calculations

Annex 3. Share of labour income in world gross output



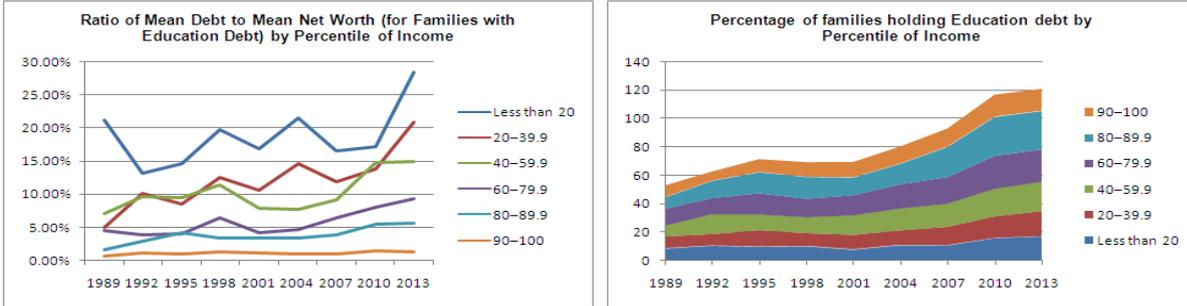
Source: POST-2015 POLICY BRIEF, No.02, 29 NOVEMBER 2013, GROWTH AND POVERTY ERADICATION: WHY ADDRESSING INEQUALITY MATTERS

Annex 4. Wealth share of top percentile in the world, 2000-15 (%)

| | | | | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 2200 1 | 2200 2 | 2200 3 | 2200 4 | 2200 5 | 2200 6 | 2200 7 | 2200 8 | 2200 9 | 2201 0 | 2201 1 | 2201 2 | 2201 3 | 2201 4 | 2201 5 |
| 448. 4 | 446. 9 | 446. 3 | 446. 3 | 446. 9 | 446. 1 | 444. 7 | 444. 2 | 444. 0 | 444. 4 | 445. 0 | 446. 0 | 447. 1 | 448. 2 | 550. 0 |

Source: Global Wealth Databook 2014, 2015, Credit Suisse

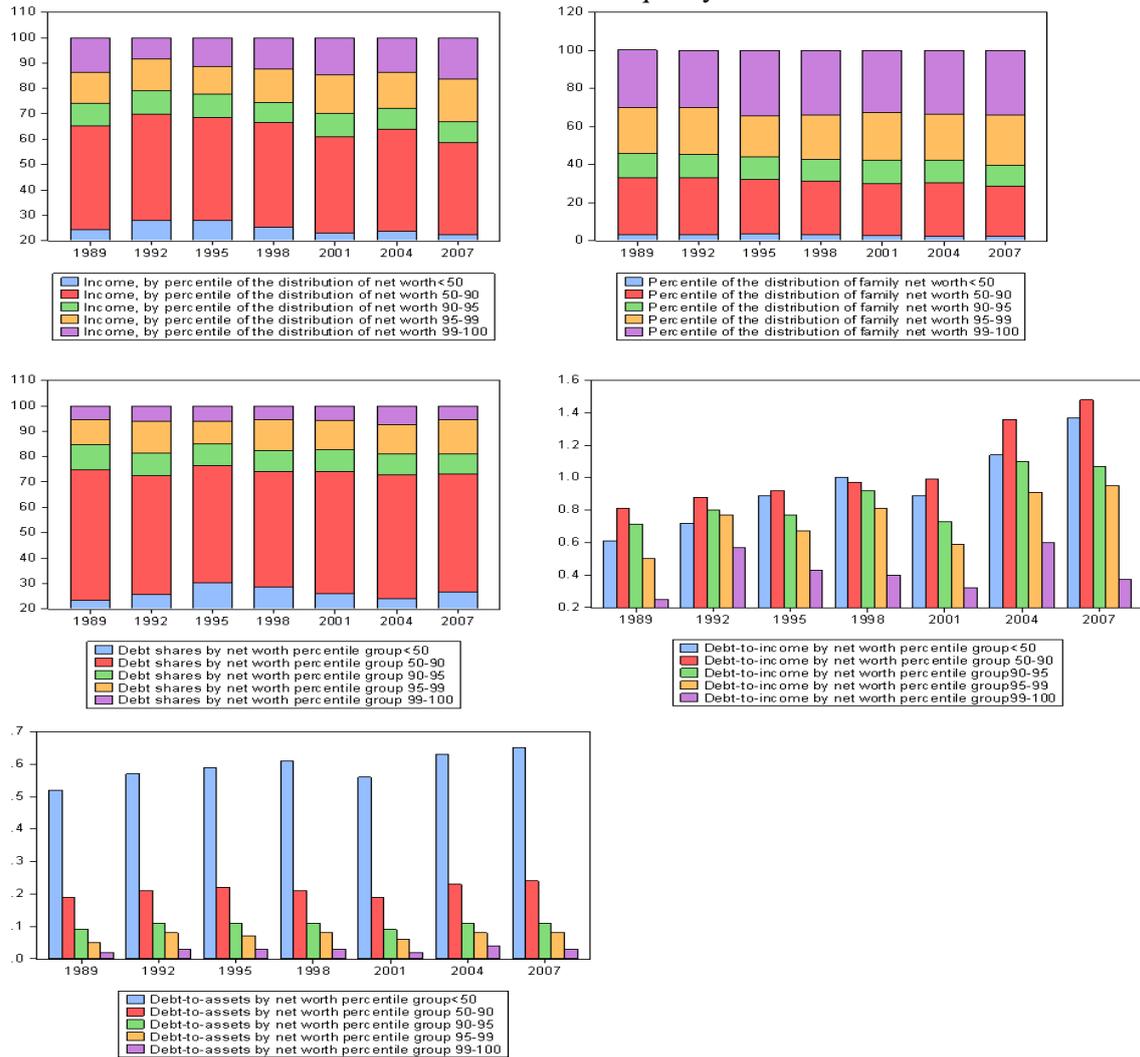
Annex 5. Evolution of Education Loans in U.S (1989-2013)



Source:

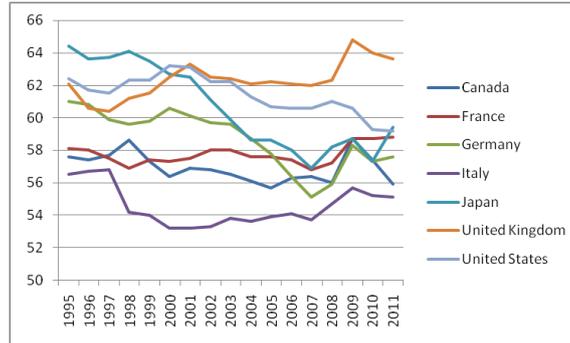
Survey of Consumer Finances 2013, author's calculations

Annex 6. Growth of inequality in U.S



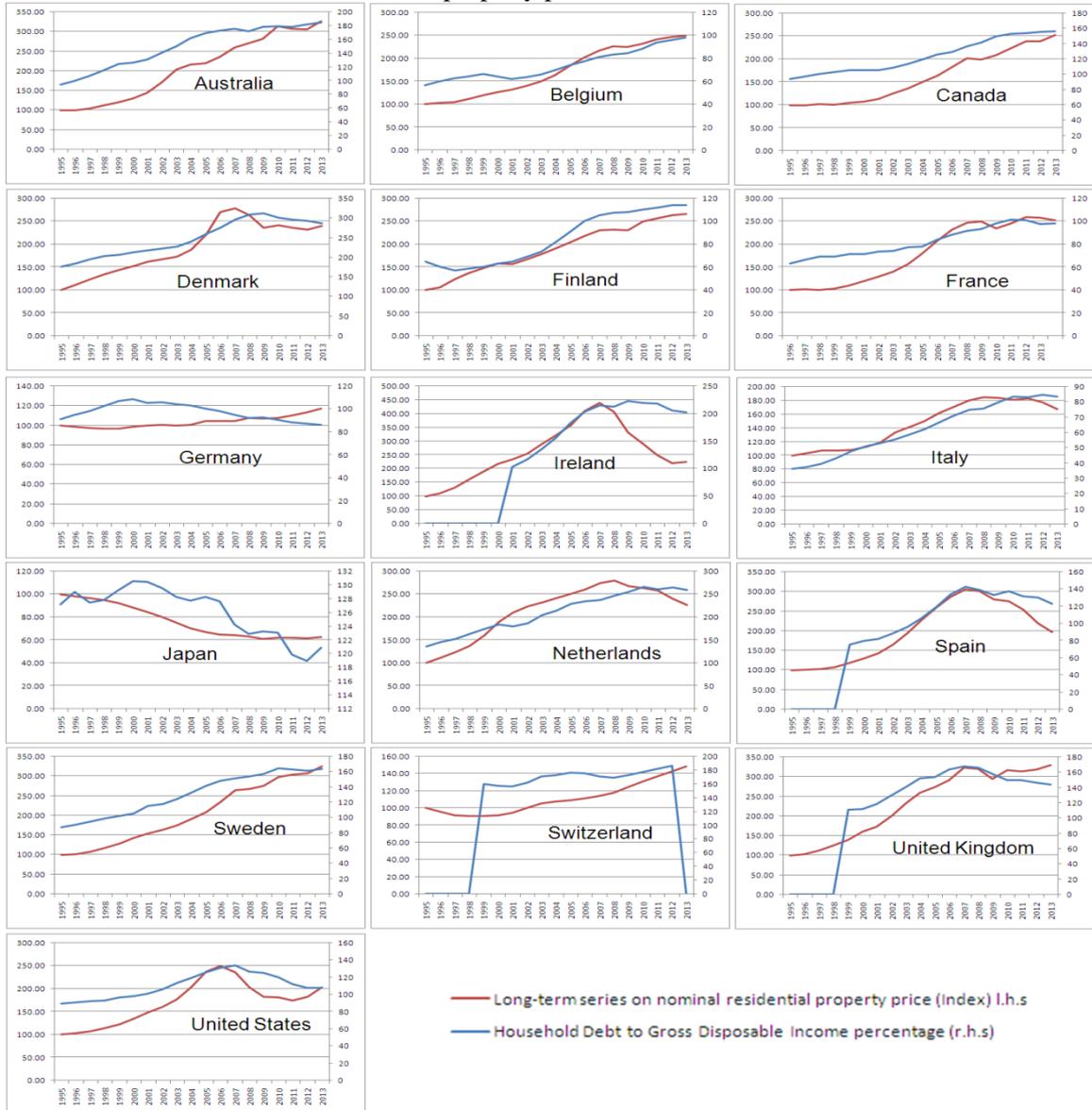
Source: Kennickell (2009), author's calculations

Annex 7. Labour income share in Gross Domestic Product (GDP) - adjusted



Source: Global Wage Report Collection from ILOSTAT

Annex 8. Residential property prices and Household debt/GDI



Sources: National sources, BIS Residential Property Price database (<http://www.bis.org/statistics/pp.htm>), OECD Financial statistics



The Impact of Key Monetary Variables on the Economic Growth of the CEMAC Zone

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This study seeks to empirically explore the impact of key monetary policy variables on the economic growth in the CEMAC zone from the period of 1981 to 2015. Carried out using the Ex post facto research design based on the principal components selection approach, the study interacts money supply, interest rate, economic growth, and inflation rate, among themselves and their lagged values using the Vector Autoregressive (VAR) analytical technique. The Classical quantity theory of money, the Cambridge Cash Balanced, the liquidity preference theory and the Monetarists as theoretical frameworks were explored to appreciate the time trends of the selected variables on the economic growth of the CEMAC zone. Based on the (VAR) methodology, the study reveals that key monetary policy variables influence economic growth of the CEMAC zone in different ways with inflation rate as the impact factor. On the basis of the above findings and the evidence from other studies, lending and inflation rate generated substantial destabilizing impacts on the economic growth, suggesting that the monetary authorities should play a critical role in creating an enabling environment for growth. The determination of the optimal lending rate should reflect the overall internal rate of returns in the productive sectors with due attention to market fundamentals. In line with this, the Central Bank of CEMAC should be given complete instrumental autonomy to operate depending on a set of in-built targets by the individual countries of the zone. Effective monetary targeting and accommodating monetary policies should be designed and implemented as the need arises with little or no political motives.

Keywords: Money Supply, Interest Rate, Inflation, Economic Growth, Effectiveness, Vector Autoregressive

JEL Classification: B22, C52, E12, E40, E50

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Article History:

Received 19 August 2016 | Accepted 17 September 2016 | Available Online 24 September 2016

Cite Reference:

Njimanted, F.G., Akume, D. and Mukete, E.M., 2016. The Impact of Key Monetary Variables on the Economic Growth of the CEMAC Zone. *Expert Journal of Economics*, 4(2), pp.54-67.

1. Introduction

In recent years, the impact of money supply, interest rate and inflation rate on economic growth has been at the centre of attention more so than other topics related to monetary economics due to its present direct effects in the world. The importance of economic growth as a main macroeconomic objectives of developing and developed countries, has been encompassed by monetary economists such as McKinnon (1973), Shaw (1973), Mathieson (1980), Odedokun (1996), Levine (1997) and Asogu (1998) who have all dedicated their studies in examining the influence money supply and interest rate on output, with mixed findings. As some authors conclude that the most important influence of economic growth is the variations in the quantity of money, other researchers state the nations that pay particular attention to examining behaviour of aggregate money supply rarely experience high levels of variations in their economic activities (Handler, 1997, Mansor, 2005, Townsend and Ueda, 2005, Owoye and Onafowora, 2007), as such are sceptical about the role of money or gross national income (Robinson, 1952, pp. 547-582).

Monetary policy comprises a combination of strategies and instruments used by the monetary authorities to control money supply in an economy consistent with a desired level of short term interest rate, inflation and economic growth. In a changing economic environment, the choice of a monetary policy strategy is intertwined with the objectives of monetary policy which include ensuring price (inflation, exchange rate and interest rate) and financial stability. Thus, the conduct of monetary policy and the goal of price stability lie within the mandate of central banks (CBN, 2007).

A majority of independent nations have their own currencies. At a global level, there are only four groups of countries that issue a common currency and conduct joint monetary policy (Gulde and Tsangarides, 2008). The four monetary unions are CEMAC, WAEMU, the Euro area, and the Eastern Caribbean Currency Union (ECCU). As it can be observed, two of these four monetary unions are located Africa, namely the Central African Economic and Monetary Community (CEMAC) and the West African Economic and Monetary Union (WAEMU). Even though CEMAC and WAEMU have their own distinct currency, they do have similarities, as Gulde and Tsangarides (2008) assert: “both unions peg their currencies to the euro at the same level, they share certain institutional features, and they are commonly referred to as the CFA franc zone”.

The Central African Economic and Monetary Community (CEAMC) was established by a Treaty signed in 1972 and revised in March 1994 and 1996. It was ratified by six states: Cameroon, the Central African Republic, Chad, the Republic of Congo, Equatorial Guinea and Gabon. The Treaty was based on the monetary co-operation arrangements in effect under the common central bank since 1959 and on those of the Customs and Economic Union of Central Africa (UDEAC) established in 1966. This organisation has four main priorities: development of abilities to keep peace, security and stability; development of physical, economic and monetary integration; development of culture integration; and establishment of an autonomous financing mechanism for the Economic Community of Central African States (ECCAS). To achieve these objectives, the CEMAC adopted in 2001 a matrix of four macroeconomic convergence criteria: a zero or positive budget balance by 2002, a public debt/GDP ratio below 70%, overdue payments to be settled by 2004, and an inflation rate to be maintained below 3% per year (Strauss Kahn, 2003).

To facilitate the conduct of the monetary policy in CEMAC and to achieve price stability, two monetary policy rules are incorporated in its statutes: the BEAC limits the stock of total advances to governments to 20 percent of the previous year’s fiscal revenues; and the BEAC designed to keep gross foreign reserves for each Central Bank above 20% of sight liabilities. The economic performance of CEMAC countries had experienced improvements following the devaluation of the FCFA in 1994, although there were occasional droppings, according to Zafar and Kubota (2003): “Gabon’s fiscal crisis during the 1998 election year; Congo’s civil war of 1997-1999, several army mutinies in the Central African Republic in 1990 and 2002, and the impact of oil price volatility among others”. Price stability has been partially kept since the FCFA devaluation from 1994. The BEAC’s member governments comprehended the fact that devaluation could bring back competitiveness and macroeconomic stability only if the price level (including wages) did not proportionately increase (Zafar and Kubota, 2003).

According to trends observed during the first half of 2011, macro-economic estimates tend to be favourable, with an expected increase in real GDP to the tune of 4.3% against 4% in 2010. Inflation rate dropped to 2.8% as against 3.6% in 2010, extra gifts base commitment budget surplus evolved from GDP 4.2% in 2013 to 10% one year later, while current account balance turned positive, settling at GDP 3.8% in 2014, against GDP 0.6% deficit in 2010 (IMF, 2015). Over the period 1963–1985, the BEAC adjusted its intervention rate (discount rate) only five times, and the interest rate differential between the CEMAC and France remained largely negative. This period was characterised by sustained economic development– with regional GDP

growth averaging more than 6% annually. The ratio of broad money to GDP (M2/GDP) increased from 15% in 1963/64 to over 20% in 1984/85 (Nachega, 2001).

The period 1986-94 was characterised in the CEMAC Zone by a severe economic and financial crisis, with real GDP growth averaging negative 4% annually and the ratio of broad money over GDP declining from 24% in 1991/92 to less than 17% in 1993/94. Thus, broad money velocity, which had been on a downward trend since the 1960s with the exception of the late 1970s and early 1980s, when it somewhat temporarily stabilised experienced a structural break in 1992. Owing to significant banking sector problems and devaluation expectations, the steady decline observed since the early 1960s in the share of currency in broad money came to a halt with the ratio stabilising around 21% over 1986-94

The period 1994-2014, presents positive records for CEMAC and its member states. RGDP growth rate increased by 1.2% per year though individual country performances varied considerably, with Gabon having the highest annual average GDP per capita growth rate of 2.7% and Chad having the lowest at -0.7%. Average inflation rate declined to 3.1% in 2014 from an average of 4% between 1997 and 2013. The stock of broad money (M2) rose by 25.3 % a year on average, between 1997 and 2011 as a result of large capital inflows, particularly owing to increases in aid inflows and revenues from the export of oil. In general, there has been a marked improvement in most macroeconomic indicators. Improvements in the public finance management, better trade performance and greater price stability which have resulted from both better macroeconomic management and external factors such as favourable oil prices.

However, the economic performance of CEMAC raises important problems that need to be discussed. First, economic growth needs to surpass the growth of so that the benefits of economic growth can reach a greater number of people (Zafar and Kubota, 2003). Secondly, the amount of liquidity has been growing rapidly owing to increase in M_2 and in the absence of an active sterilisation policy by the BEAC, excess liquidity increases further. Furthermore, the Bank of Central African States (BEAC) organises monetary policy in the framework of a fixed exchange rate against the Euro. According to Laurens et al. (2006) "while the BEAC formulates common monetary policy targets, systemic liquidity management remains largely country-based due to the lack of integration of the money market". Moreover, the financial relations between the BEAC and CEMAC governments do not necessarily mean a clear divide between money creation and budget financing, and the growing fiscal surpluses in several nations have highlighted the issue of BEAC remuneration of government deposits (Laurens et al., 2006). Therefore, the continued use of country-specific monetary instruments reflects the reality that the product and factor markets of CEMAC members are not well integrated (Masson and Patillo, 2005). The case of the 25,000 new jobs recently advertised by the government of Cameroon clearly substantiates this fact. Thirdly, because of the recent improvement in the economic outlook in many countries in the CEMAC region there is now increasing concern that the growth of liquidity poses significant inflationary risks.

Following the deterioration in the economic and financial situation in the CFA franc zone after 1986 and with the necessity of maintaining a positive net foreign assets position, the BEAC adopted a more active interest rate policy, such that the interest rate differential with France became positive or null at the minimum thereafter. During the period 1989 - 1993, the BEAC shifted from direct to indirect instruments of monetary policy; interest rates were liberalised and credit controls lifted in order to influence monetary outcomes. In September 2001, BEAC decided to impose minimum reserve requirements on commercial banks in order to contain the rise in liquidity in the region. BEAC decided in July 2004 to introduce differentiated reserve requirements across countries with a higher reserve ratio in Cameroon, the Republic of Congo, and Equatorial Guinea than in Chad, Gabon, and the Central African Republic (CAR). Reserve requirements in the CAR were temporarily suspended in May 2003 in response to the difficult economic situation in the country.

Member states reacted to the macroeconomic imbalances by pursuing an "internal adjustment strategy" as an alternative to devaluation. This was to deflate domestic prices in order to achieve the required depreciation in the real exchange rate. The consequence of the strategy was a severe recession in the region with per capita GDP falling by 3.9% between 1985 and 1993 (Magnus, 2006). The significant restrictions on international payments that were imposed during this period did not help improve this situation. (Zafar and Kubota, 2003).

In March 1994, the Heads of States and Governments were left with no option than to devalue the CFA Franc at an exchange rate of 1FF = 100FCFA allowing the economies in the region to recover (ECA, 2008). Other efforts made by CEMAC member states to enhance economic growth include the adoption of the Growth and Employment Strategy Paper (GESP) whose objectives include raising the average annual growth rate to 5.5% over the 2010-20 periods and reducing the monetary poverty rate from 39.9% in 2007 to 28.7% in 2020.

Despite these efforts, an assessment of CEMAC's economic performance over the last several decades presents dismal economic growth. This therefore reveals that the root cause or causes of poor growth determinant(s) in the CEMAC Zone is still to be identified and solved. Therefore, this study aimed at providing answers to the following research question: how does money supply, inflation and interest rate systematically influence the economic growth of the CEMAC zone. This is done by examining the effect of money supply, inflation rate, and interest rate on the economic growth in the CEMAC region. The rest of this paper is organised as follows; section two explores the review of literature. The methodology employed is discussed in section three. Results are presented and discussed in section four while section five gives the recommendations and conclusion of the paper.

2. Literature Review

Nnanna (2001) defines monetary policy as the instruments at the disposal of the monetary authorities to influence the availability and cost of credit/money with the ultimate objective of achieving price stability. Depending on the mandate of the monetary authorities, the objectives of monetary policy may well go beyond price stability. More often than not, monetary authorities particularly in developing countries are saddled with the dual mandate of price stability and sustainable growth. In such a situation, monetary policy is used to achieve both objectives.

In designing monetary policy, the BEAC reviews developments in the economy over a period, articulates the major pressure for and risk to price stability and formulates a framework which will guide its monetary policy implementation. The framework which is essentially an approach to monetary management is based on a programme which sets out future trends in macroeconomic aggregates. The monetary programme defines the quantitative targets to be attained. The BEAC uses the IMF financial programming framework in a medium term framework. This programme is updated from time to time to take account of developments in the course of the semi - annual programme period. The Monetary programming exercise enables the BEAC's Monetary Policy Committee (MPC) to set semi-annual targets on the net international reserves coverage of the monetary base and the growth rates of bank credit to the economy and broad money (M_2) in each member state.

The programming exercise is based on real sector projections from the supply side of national accounts, which drives the outlook for the balance of payments. These are combined to form an estimate of the expected change in net foreign assets of the central bank and commercial banks. The growth of broad money is assumed to follow the nominal GDP projection with constant velocity. The aggregate money projection is then broken down into currency in circulation and sight and term deposits using historic patterns. The change in net domestic assets is obtained from the monetary survey identity; ($\Delta M = \Delta NFA + \Delta NDA$); Where; ΔM = aggregate money projection; ΔNFA = change in net foreign assets; ΔNDA = change in net domestic assets.

The modifications projected in net domestic assets, that are derived from fiscal budgets and their mid-year execution, are utilized to establish targets for government use of statutory advances from the BEAC; the change in banking sector domestic credit to the rest of the economy (ΔDC^P) is then obtained as a residual from the monetary survey identity ($\Delta NDA = \Delta NDA^G + \Delta NDA^P$) and used to set targets on BEAC refinancing of commercial Banks.

Money Supply here is defined as the amount of currency in actual circulation as well as on deposit at financial institutions (where the money is often held in a more or less virtual form, since usually the bank never physically holds 100% of the money on deposit). There are three measures of the total money supply known as the monetary aggregates. They are designated M_1 , M_2 , and M_3 with higher numbers containing a wider variety of assets. "M" stands for money; the numbers represent increasing levels of liquidity. M_1 - is the sum of currency (and coins) issued by government and held by the nonbank public and checkable deposits issued by banking institutions. M_2 - is the sum of M_1 (currency and checkable deposits) and a collection of financial assets termed near monies. M_3 - is the sum of M_2 (currency, checkable deposits, and saving near monies) and another group of slightly less liquid near monies. Interest is the price paid for the temporary provision of funding. In a state of equilibrium it aligns supply ("saving") and demand ("investment") on the capital market. Interest rates control the flow of money in the economy. High interest rates curb inflation, but also slow down the economy. Low interest rates stimulate the economy, but could lead to inflation. Therefore, we need to know not only whether these rates are increasing or decreasing, but the other economic indicators which jointly influence economic activities in the CEMAC economy.

To connect money supply to economic growth, authors have paid attention to role of the financial structure in relation to economic growth literature (Ogunmuyiwa and Ekone, 2010). Montiel (1995), Osikoya

(1994) all established that, the possible influence of financial depth (namely money in circulation) on economic growth can be established in three routes: “improved efficiency of financial intermediation; improved efficiency of capital stock; and, increased national savings rate” (Ogunmuyiwa and Ekone, 2010). Moreover, according to Ogunmuyiwa and Ekone (2010) raise two issues: “First, to examine if money could forecast output given predictive power of past values of output. Secondly, examine whether such a relationship if any is stable over time or not. Some researchers have found evidence of the predictive ability of monetary aggregates” (Beckett and Morris, 1992; Krol and Chanian, 1993).

Asogu (1998) examined the influence of money supply and government expenditure on Gross Domestic Product. He adopted the St Louis model on annual and quarterly time series data from 1960 -1995. He finds money supply and export as being significant. This finding according to Asogu corroborates the earlier work of Ajayi (1974) and Nwaobi (1999) while examining the interaction between money and output in Nigeria between the periods 1960-1995. The model assumed the irrelevance of anticipated monetary policy for short run deviations of domestic output from its natural level (Ogunmuyiwa and Ekone, 2010). The finding showed that an unanticipated growth in money supply would have positive influence on output. A more specific examination indicated that there is no general consensus on the determinant of economic growth in the Nigerian economy (Ogunmuyiwa and Ekone, 2010).

Claude Nachega (2001) investigates the behaviour of broad money demand in Cameroon using data spanning from 1963/64 – 1993/94. He applies cointegration analysis and error – correction modelling and finds that the estimated long – run broad money demand function has both unitary income elasticity and a strong effect and is relatively sensitive to opportunity costs. The finding of a sufficiently stable money demand function in Cameroon provides a useful guide for the conduct of monetary policy by the BEAC.

In the CEMAC zone however, the influence of money supply on economic growth can only be taken with mixed reactions. Several studies have confirmed the significant impact of money supply on economic growth. Samba (2010) examined the liquidity effect of monetary policy in the CEMAC countries using data spanning from the first quarter of 1990 to the fourth quarter of 2006. He adopted a methodology advocated by Christiano and Eichenbaum (1992) which seems appropriate in the special case of the CEMAC countries and found that the conventional wisdom which states that a cornerstone for the central bank to stimulate the economy is to lower interest rates by increasing the supply of narrow money holds both on individual level and on a regional basis when the monetary aggregate measures the stance of monetary policy.

Tabi and Atangana (2011) analysed the relationship between economic growth, inflation and money in circulation using a VAR model for the period 1960-2007. They found that increase in money supply increases growth and that growth causes inflation.

There exist two opposing debates on the causes of inflation. We have the monetarist dominated by the works of Friedman (1953; 1960) and the structuralists dominated by the works of Bruno (1978) and Cordon (1988). According to the monetarist, the immediate cost of inflation is an increase of the quantity of money with respect to the volume of production. Thus, inflation is an excess aggregate demand problem stimulated by an expansionary monetary policy. The structuralists observed that, neither monetary policy nor fiscal policy cause inflation; rather, it is caused by the economic structures of developing countries. Price mechanism functions in a framework of structures and these structures exist in imperfect markets. Thus, sectors like agriculture and international trade are characterised by institutional rigidities that increase prices. This upward pressure of prices transforms into a general inflationary process through propagation mechanisms (Argy, 1970).

Empirical studies do not seem to differentiate between these two schools of thought. For many years now, studies have not been able to offer a clear empirical relationship between economic growth and inflation (Hwang, 2007). For example, during the periods of inflation and deflation, the economy of United States and a number of other countries witnessed high and low growth rates. One of the first studies on the relationship between economic growth and inflation was conducted for 17 industrialised countries between 1958 and 1967. The findings show that growth is positively correlated with low rates of inflation (below 8%). However, during the same period on a sample of 7 developing countries, high rate of inflation (above 8%) negatively influence growth (Thirwall and Barton, 1971).

Fernandez, Gerling and Valdovinos (2011) focus on inflation in the West African Economic and Monetary Union (WAEMU). They highlight the importance of keeping inflation low to reduce inflation uncertainty and relative price variability, which could lead to resource misallocation in the context of a currency union. Baldini and Poplawski-Ribeiro (2011), in turn, analyse the fiscal and monetary determinants of inflation for a sample of Sub-Saharan African (SSA) countries. These authors find that countries within the CFA franc arrangement (including CEMAC countries) were more successful in achieving price stability and single-digit inflation in 1980–2005.

Many economists agree that a positive shock to money growth brings about two opposing effects on the nominal interest rate. The Liquidity Effect View follows that money and interest rates are negatively related while the Anticipated Inflation View which follows from the Fisher equation is that money and interest rates are positively related. There are a lot of empirical studies (Bernanke and Mihov (1998), Dow (1995), and Cochrane (1989)) on how monetary policy shocks affect interest rates. Recently, Braun and Shioji (2006) showed little support for the liquidity effect in Japanese and U.S. data. Monnet and Weber (2001) present the empirical evidence that is consistent with both views by using annual data from 40 countries. Thoma (1994), using band spectral techniques, shows that there are two sets of cycles in the change in the nominal interest rates that correspond to these two effects.

2.1. Theoretical Literature

The quantity theory of money forms the cornerstone of monetarism. Monetarists believe that the source of inflation is fundamentally derived from the growth rate of the money supply and that an increase in money supply leads to a proportional increase in inflation. Consequently, these groups of Economists are of the view that money supply should be kept within an acceptable bandwidth so that the levels of inflation can be controlled. Money growth that surpasses the growth of economic output results in inflation as there is too much money behind too little production of goods and services. On the other hand, less orthodox monetarists state that an expanded money supply will not exhibit any influence on real economic activity, namely production, employment and spending (Heakal, 2005). However, for a majority of monetarists, any anti-inflationary policy will originate from the basic notion that there should be a subtle and gradual decrease in money supply. Monetarists also insist that as an alternative to the governments' regulations of economic policies (i.e. government spending, and taxes), it may be better to let non-inflationary policies lead an economy to full employment.

Notwithstanding its criticisms, the quantity theory of money was very popular in the 1980's as it was rooted in monetarism. Until recently, most political leaders and economists applied its principles, to economies where money growth targets were set. However, a new realization arises that a strict adherence to controlled money supply may not provide the cure for the economy (Heakal, 2005). John Maynard Keynes was the one who disputed this theory in the 1930s, stating that a rise in money supply causes a reduction in the velocity of circulation, and meanwhile real income, the flow of money to the factors of production rises. These propositions constitute the basis of what is now referred to as the Liquidity Preference Theory.

In 'Liquidity Preference Theory', Keynes provides explanations regarding people's desire to hold cash. Keynes states three motives that support this desire of people to have liquid cash, namely transaction motive, precautionary motive, and speculative motive (Keynes, 1936). The transaction motive is relative to the desire of individuals to hold money to meet up with day to day activities like food, shelter, clothing and taxi to work. Precautionary motive is related to people's desire to have money for unforeseen contingencies, illness, accidents, unemployment and other unforeseen events or situations. Similar to individuals, businessmen hold reserves of cash for business situations that are not favourable to daily operations or for deals that may arise unexpectedly. Keynes stated that these transaction and precautionary motives are highly elastic in relation to income, and relatively inelastic in relation to interest. The amount of cash money held based on the transaction and precautionary motives (M_1) is a function (L_1) of the level of income (Y) in the equation form of $M_1 = L_1(Y)$ (Keynes, 1936).

The speculative motive refers to the desire to have liquid resources to profit future modifications in interest rate or bond prices (Keynes, 1936). Bond prices and interest rate are in an indirect relationship. If bond prices are expected to rise, i.e., the rate of interest is expected to fall, people will buy bonds to sell when the price later actually rises. Keynes (1936) states that if the interest rate is high, then the speculative demand for money will be lower, also the inverse relationship applies: if the interest rate is low, then the speculative demand for money will be higher. This takes the form of equation $M_2 = L_2(r)$. Furthermore, if M nominates the total liquid money, M_1 nominates transactions plus precautionary motives, and M_2 the speculative motive, we have $M = M_1 + M_2$. While $M_1 = L_1(Y)$ and $M_2 = L_2(r)$, then total liquidity preference function takes the form of equation $M = L(Y, r)$ (Keynes, 1936).

However, it has been highlighted that the interest rate of is not entirely a monetary concept and phenomenon. Other real factors, such as capital productivity and savings, also have a major part in determining interest rate. Keynes' theory of liquidity preference does not provide explanations for different interest rates that appear in the market simultaneously. It also ignores sayings as a means of investible fund. To part with liquidity without there being any saving is meaningless.

The Austrian Business Cycle Theory expresses that a business cycle can be altered, and even forecasted, by different analysts particularly when a Central Bank aims to control the monetary policy by

artificially modifying the interest rate. This theory further states that this kind of control can cause a boom in the economy, but it can also lead to a crash. Therefore, a Central Bank, for example the Central Bank of the CEMAC region (BEAC), keeps up a tight control on the rate of interest or, all the more fittingly, a few distinctive interest rates.

This is done to stimulate and control the so that it does not get too hot too quickly. To goad the economy and avert a long haul downturn in business cycles, the BEAC may bring down the interest rates. This causes credit to be facilitated. In any case, since this is an artificial credit easing, it does not usually last for a long period of time. Once the economy begins to warm up, interest rates must also ascent to forestall undesirable inflation.

The economy tends to falls harder after an endeavour to ease credit through decreases of interest rate because of the created effect of bubble. Regularly, amid a business cycle, when a downturn arises it does so bit by bit. However, while in a bubble, organizations tend to have concerted activities. As per the Austrian Business Cycle Theory, this can bring about a genuine rapid downturn. Actually, in light of the fact that the downturn takes a longer time to be created, it is enhanced. The best way to maintain a strategic distance from Mises' hypothesis might be to trust that the monetary downturn is fought off sufficiently long to permit a natural increment in subsequent economic activities. Be that as it may, given the way that bubbles tend only to mask symptoms in the economy, this will be harder to fulfil. All things considered, if the economy looks sound, there will be less endeavours to alter it.

3. Analytical Methodology

This study covers the period between 1981-2015 based on monetary policy indicators adopted by the Central Bank of the CEMAC zone in view of sustaining economic growth. Our choice for this period is also on the ground that the period exists during which the economy of the CEMAC zone faced several challenges. Some of these challenges include, the recession in the mid-1980s resulting to serious economic contraction, the adoption of the Internal Adjustment Strategy in 1986 in response to severe external shocks that struck the region, the devaluation of the CFA in March 1994, the adoption of the Structural Adjustment Programme (SAP), the Poverty Reduction Strategy Paper (PRSP), and the Highly Indebted Poor Country Initiative (HIPC). Furthermore, the reason for this timeframe is due to data availability from different sources as listed below.

3.1. Model Specification

The Vector Autoregressive (VAR) model adopted by Christiano and Eichenbaum (1992b) and Tabi and Atangana (2011) was used in analyzing the impact of monetary variables on economic growth in Cameroon from 1960 to 2007. In assessing the goal of this study, we considered that the Gross Domestic Product (GDP) is at the same time controlled by money and real factors. Money in circulation represents a function of GDP's growth rate and public revenue. Inflation (P) is a monetary instrument. An expansion of money (M_2) in circulation should lead to a higher general price level and could also increase economic activity.

Inflation affects the nominal interest rate via the fisher effect and the nominal interest rate affects money demand. Therefore, in line on our study the choice of the variables were based on the Austrian Business Cycle Theory, Liquidity Preference and the monetarists' views of the transmission mechanism. We estimate a series of four-variable VAR equations as

$$GDP_t = f(M_{2t}, IR_t, INFLA_t) \quad (2a)$$

$$M_{2t} = f(GDP_t, IR_t, INFLA_t) \quad (2b)$$

$$IR_t = f(GDP_t, M_{2t}, INFLA_t) \quad (2c)$$

$$INFLA_t = f(GDP_t, M_{2t}, IR_t) \quad (2d)$$

In the relation (2a) to (2d), exogenous variables can influence endogenous variables at time t, at time t-1 and at time t-2. Relation (2) therefore specifies a VAR model which can be represented by the equations (3.1 to 3.4). The two years lagged is designed following the Koyck's geometric lag-scheme which suggested that more recent values of an event exert greater influence on itself or others than more remote values. Thus:

$$GDP_t = A_0 + A_1GDP_{t-1} + A_2GDP_{t-2} + A_3M_{2t-1} + A_4M_{2t-2} + A_5IR_{t-1} + A_6IR_{t-2} + A_7INFLA_{t-1} + A_8INFLA_{t-2} + U_1 \quad (3.1)$$

$$IR_t = B_0 + B_1IR_{t-1} + B_2IR_{t-2} + B_3GDP_{t-1} + B_4GDP_{t-2} + B_5M_{2t-1} + B_6M_{2t-2} + B_7INFLA_{t-1} + B_8INFLA_{t-2} + U_2 \quad (3.2)$$

$$M_{2t} = C_0 + C_1M_{2t-1} + C_2M_{2t-2} + C_3IR_{t-1} + C_4IR_{t-2} + C_5GDP_{t-1} + C_6GDP_{t-2} + C_7INFLA_{t-1} + C_8INFLA_{t-2} + U_3 \quad (3.3)$$

$$INFLA_t = D_0 + D_1INFLA_{t-1} + D_2INFLA_{t-2} + D_3M_{2t-1} + D_4M_{2t-2} + D_5GDP_{t-1} + D_6GDP_{t-2} + D_7IR_{t-1} + D_8IR_{t-2} + U_4 \quad (3.4)$$

Where, GDP_t is GDP growth rate in percentage in current period, IR_t is interest rate in percentage in current period, M_{2t} is money supply (M_2) in percentage of GDP, $INFLA_t$ is inflation rate in percentage in current period. U_1 to U_4 are Stochastic error terms and A_0 to A_8 , B_0 to B_8 , C_0 to C_8 , and D_0 to D_8 are structural parameters of the variables for estimation.

3.2. Sources and Method of Data Collection

This study has made use of substantial statistical information much of which are generated from the UNCTAD database and World Bank Development Indicators online. Data are also gotten from the CEMAC Central Bank (BEAC) Annual Reports. Therefore, the study depends intensively on library research on which secondary time series data are generated and analysed.

3.3. Estimation Techniques

This study therefore, adopts the multivariate systems of equation approach (VAR models) as technique to estimate the various parameters specified in equations (3.1) to equation (3.4). VAR methodology superficially resembles simultaneous-equation modeling in that we consider several endogenous variables together. But each endogenous variable is explained by its lagged values and the lagged values of all other endogenous variables in the model; usually, there are no exogenous variables in the models. It is advantageous in the sense that the VAR methodology avoids the imposition of potentially spurious a priori constraints that are employed in the specification of structural models and also there is no issue of simultaneity (Njimanted and Mukete, 2013).

3.4. Validation of Results

As an economic and financial study, a series of tests are carried out to validate the VAR findings starting by testing the stationarity of the time series data included in the models by employing the Univariate Augmented Dickey-Fuller (ADF) test which assumes that the error term U_t is uncorrelated. That is the $COV(U_t, U_{t-1}) = 0$. There is the breakdown in any system especially when results from such systems have their $COV(U_t, U_{t-1}) \neq 0$. A solution to this is provided when an added lagged value is introduced in the Dickey and Fuller test called the Augmented Dickey-Fuller unit root test given as:

$$\Delta Y_t = b_0 + \delta Y_{t-1} + \sum_{i=1}^n \alpha \Delta Y_{t-i} + \sum t \quad (3.5)$$

Where $\sum t$ is a white noise process. It is expected that the value of calculated δ should be more negative than those obtained from the table t-value at 10% or less. A confirmatory test is also conducted using the Phillips-Perron (PP) unit root test. This is carried out because the ADF test assumed that the error terms U_t and U_{t-1} are independent and identically distributed, which is empirically not true. The PP unit root test also has added advantage in that it uses non-parametric statistical methods to take care of the serial correlations in the error term without adding lagged difference terms. Furthermore, the use of the PP unit root test replaces the use of lags in the ADF test which has been criticised as being arbitrary (Nyong, 2005). Further tests such as those of the Kwiatkowski-Phillips-Schmidt-Shin (1992) (KPSS) test for stationarity, which are strongly related to the lagrange multiplier (LM) test are not conducted since the graphs of the variables not presented due to space are not truncated. The Johansen (1988); Johansen and Juselius (1990) methodology based on SVAR approach to test for the Cointegration of the variables in our models were not adopted in this study due to the fact that the monetary agreements by CEMAC member countries is still not very strong as such any finding obtained from them will be misleading. More so, because of the fact that serial correlation is a major problem when using the VAR technique, this study uses the Braisch LM statistics and the Portmanteau test, to test for the existence of serial correlation and not the D.W test due to the lags introduced in the models.

4. Presentation and Discussion of Results

Since our study involves the use of time series data, there is need for us to check for stationarity by examining the graphs of the variables (GDP, money supply, inflation and interest Rate) to see if they have deterministic or stochastic trend. This has not been presented here because of space, however the graphs exhibit no particular trends within our period of study, initially the period of study is mentioned under the analytical methodology to span from 1981-2015, and not 1980-2014 instead they are stochastic with drift. This implies that they are non-stationary. Therefore, testing for stationarity of the variables and order of integration

without trend but with drift strongly support the hypothesis that the variables used in our models are non-stationary at levels but they however, achieve stationary after their first difference as shown below.

Looking at the VAR estimates for Economic growth in the CEMAC zone shows that while last year's inflation rate influenced current year GDP positively, the year before last year's inflation rate had a negative effect on current year GDP. The important implication of this result is that holding other independent variables constant, every one per cent increase in last year's inflation rate decreased current year GDP by 0.59731 per cent and, every one per cent increase in the inflation rate of two years ago increases current year GDP by 0.44608 per cent all things being equal. The coefficient of multiple determinations is low indicating that the explanatory variables included in the model have approximately 49 percent ability to predict the behaviour of GDP in the CEMAC zone and a non-statistically significant F-ratio which connotes that the model is not reliable in determining the outcome of economic growth in CEMAC. The GDP regression is also tested for autocorrelation at five per cent level of significance and found that there is no autocorrelation.

Table 1. Unit Root Test

| | Variable | ADF Test | PP Test | Remark |
|-------------------------------------|----------|------------|------------|---------|
| CEMAC Zone | DLGDP | -7.052893* | -8.679091* | I(1) |
| | DLINFLA | -5.271510* | -7.708473* | I(1) |
| | DLM2 | -5.523122* | -11.13674* | I(1) |
| | DLINRATE | -3.901078* | -5.413379* | I(1) |
| *Asymptotic critical values: | | | | |
| | 1% | | | -3.6852 |
| | 5% | | | -2.9705 |
| | 10% | | | -2.0242 |

Note: implies significant at 1% level, * implies significant at 5% level and *** implies significant at 10% level.

From the result presented above the VAR equations for CEMAC are generated thus:

Economic Growth Equation for CEMAC

$$\begin{aligned} \text{DlogGDP} = & -1.859 + 0.103\text{DlogGDP}(-1) + 0.532\text{DlogGDP}(-2) + 0.002\text{DlogM2}(-1) \\ & + 0.495\text{DlogM2}(-2) - 0.597\text{DlogINFLA}(-1) + 0.446\text{DlogINFLA}(-2) + \\ & 1.971\text{DlogINRATE}(-1) - 1.497\text{DlogINRATE}(-2) \end{aligned}$$

| | |
|--------------------------------------|-------------------------------------|
| t-value of constant = -0.53168 | |
| t-value of DlogGDP(-1) = 0.30161 | t-value of DlogGDP(-2) = 1.03367 |
| t-value of DlogM2(-1) = 0.00518 | t-value of DlogM2(-2) = 0.896 |
| t-value of DlogINFLA(-1) = -1.569*** | t-value of DlogINFLA(-2) = 1.889*** |
| t-value of DlogINRATE(-1) = 1.559*** | t-value of DlogINRATE(-2) = -0.812 |
| R ² adjusted= 0.494948 | |
| F – Statistics = 0.734995 | |
| Portmanteau Statistics = NA* | |

Note: significance level: * = significant at 1%, ** = significant at 5% and *** = significant at 10%

In this study we have adopted both the statistical significant criteria as well as the theoretical expectation criteria for accepting or rejecting the null hypothesis which states that “key monetary policy indicators have no significant impact on the economic growth of the CEAMC zone”. The findings reveal that M₂ has a positive effect on economic growth in the CEMAC zone. However, issues such as discipline, confidence and credibility on the part of monetary authorities as argued by Dordunoo and Njinkeu (1997) are essential but apparently lacking in the CEMAC zone as partly reflected in the IMF (2006) Financial Systems Stability Assessment (FSSA) for the CEMAC region in which the IMF found that the BEAC had only limited transparency regarding monetary policy's execution. This effect is consistent with status-quo or theoretical expectation. It is also in line with studies by Ngoa and Ondoa (2011) in Cameroon, Samba (2010) for the CEMAC, Ogunmuyiwa and Ekone (2010) in Nigeria, Alain and Cruz (2007) in the Philippines and Daniela and Cociuba (2010) in Romania who reported a positive influence of expansionary monetary policy on economic growth. Although our empirical results support the existence of economic growth in the CEMAC zone as caused by money supply, the effect is not statistically significant. By implication the volume of monetary expansion over our period of study has not been substantial to influence real output significantly.

Further responding to our hypothesis, we investigated whether or not there is any statistically significant influence of inflation rate on economic growth in the CEMAC zone. The growth equation for

CEMAC shows that inflation rate for the previous year has a negative impact on economic growth. Furthermore, the findings are statistically significant at 10% confidence interval for CEMAC giving us 90% degree of reliability of this result on its impact on economic growth. These findings are also consistent with theoretical expectations and are in line with studies by Mamalepot (2004) on CEMAC, Qayyum (2007) in Pakistan and Ngoa and Ondoa (2011) in Cameroon who reported a negative influence of inflation on economic growth.

It is also in line with the findings of Motley (1994) and Taylor (1995) who reported that a 1% increase in inflation reduces productivity by 0.03% and 0.25% respectively. We equally noticed that the inflation rate of the year before last [INFLA(-2)] is having a positive significant impact on economic growth. Although this influence is neither robust nor in line with theoretical expectations (as supported by the monetarists hypothesis) the statistically significant “t-values” shows that inflation is a strong explanatory variable in the economic growth equations. Given the economy of the CEMAC zone in general and the quantity theory of money in particular, we accept our alternative hypothesis that inflation has some effects on the level of economic growth in the CEMAC zone.

This concern reflects the thinking that low inflation is an important requirement for sustained economic growth. Consequently, we maintain that whether economic growth is measured by aggregate demand or by real output, inflation still remains an important factor in enhancing economic growth. In the short run, faster real growth may be associated with more rapid inflation. Often, this is because strong growth is the result of a rise in aggregate demand that causes real output to increase at the same time as it bids up prices (Tabi and Atangana, 2011).

Money Supply Equation for CEMAC

$$\text{DlogM2} = 6.920 - 0.367\text{DlogM2}(-1) - 0.070\text{DlogM2}(-2) + 0.0552\text{DlogGDP}(-1) - 0.480\text{DlogGDP}(-2) + 0.025\text{DlogINFLA}(-1) - 0.239\text{DlogINFLA}(-2) - 1.980\text{DlogINRATE}(-1) + 1.263\text{DlogINRATE}(-2)$$

| | |
|---------------------------------------|------------------------------------|
| t-value of constant = 2.548* | |
| t-value of DlogM2(-1) = -1.069 | t-value of DlogM2(-2) = -0.164 |
| t-value of DlogGDP(-1) = 0.20769 | t-value of DlogGDP(-2) = -1.601*** |
| t-value of DlogINFLA(-1) = 0.084 | t-value of DlogINFLA(-2) = -1.635 |
| t-value of DlogINRATE(-1) = -1.629*** | t-value of DlogINRATE(-2) = 0.883 |
| R ² adjusted = 0.554984 | |
| F – Statistics = 4.935333 | |
| Portmanteau Statistics = NA* | |

Note: significance level: * = significant at 1%, ** = significant at 5% and *** = significant at 10%

The above equation represents the Broad Money Supply (M₂) regression for the CEMAC region. The results show that previous year GDP positively influenced current year M₂ while the GDP result of two years lagged negatively influenced current year M₂. The implication of this result is that holding other explanatory variables constant, every one per cent increase in previous year GDP increased current year M₂ by 0.0552 per cent while everyone per cent increase in the year before last's GDP decreased current year M₂ by 0.4802 per cent all things being equal. In the M₂ regression, only the 2-period-lagged GDP term is statistically significant at 10 per cent. The estimated parameter for inflation rate shows that the two year's inflation rate has a negative significant impact on current year money supply. This implies that everyone per cent increase in the inflation rate of two years ago could have retarded current year M₂ by 0.239 per cent all things being equal. Evidence from the M₂ regression depicts a negative influence of the previous year's interest rate on current year money supply. The coefficient of the adjusted R² shows that above 55 per cent of the variation in money supply in the CEMAC zone is explained by the estimated relations. This finding shows that the observed F– ratio is significant at 1 per cent confidence level. The M₂ regression is also tested for autocorrelation at five per cent level of significance and found that there is no autocorrelation.

Inflation Equation for CEMAC

$$\text{DlogNFLA} = 5.59 + 0.429\text{DlogINFLA}(-1) - 0.227\text{DlogINFLA}(-2) + 0.394\text{DlogGDP}(-1) - 0.751\text{DlogGDP}(-2) + 0.642\text{DlogM2}(-1) - 0.153\text{DlogM2}(-2) + 0.0636\text{DlogINRATE}(-1) - 1.877\text{DlogINRATE}(-2)$$

| | |
|-----------------------------------|------------------------------------|
| t-value of constant = 1.688 | |
| t-value of DlogINFLA(-1) = 1.191 | t-value of DlogINFLA(-2) = -0.962 |
| t-value of DlogGDP(-1) = 1.215 | t-value of DlogGDP(-2) = -1.541*** |
| t-value of DlogM2(-1) = 1.529*** | t-value of DlogM2(-2) = -0.293 |
| t-value of DlogINRATE(-1) = 0.043 | t-value of DlogINRATE(-2) = -1.076 |
| R ² adjusted= 0.706239 | |
| F – Statistics = 1.803095 | |
| Portmanteau Statistics = NA* | |

Note: significance level: * = significant at 1%, ** = significant at 5% and ***= significant at 10%

The inflation equation reveals that, the two-period-lagged GDP term has a negative significant effect on current year inflation rate. The implication of this finding is that if all other explanatory variables are held constant, a one per cent expansion in the 2-period-lagged GDP term retards current inflation by 0.7517 per cent. The impact of previous year expansionary monetary policy on current year inflation rate is positive at the first lag. Consequently a one per cent increase in previous year M₂ increases current inflation rate by 0.1539 per cent. The coefficient of multiple determinations (R² adjusted) is 0.706239. This means that the regression line captures more than 70 per cent of total variations in inflation rate explained by the variations in the explanatory variables. The findings also show that the observed F–ratio is significant at 10 per cent confidence level. Finally but not the least, tested for autocorrelation at five per cent level of significance reveals that there is no autocorrelation.

Interest Rate Equation for CEMAC

$$\text{DlogINRATE} = 0.263 + 0.827\text{DlogINRATE}(-1) + 0.051\text{DlogINRATE}(-2) - 0.00365\text{DlogGDP}(-1) - 0.049\text{DlogGDP}(-2) + 0.083\text{DlogM}_{2(-1)} + 0.0822\text{DlogM}_{2(-2)} - 0.071\text{DlogINFLA}(-1) + 0.0801\text{DlogINFLA}(-2)$$

| | |
|--|-------------------------------------|
| t-value of constant = 0.608 | |
| t-value of DlogINRATE(-1) = 4.264* | t-value of DlogINRATE(-2) = 2.223 |
| t-value of DlogGDP(-1) = -0.086 | t-value of DlogGDP(-2) = -0.782 |
| t-value of DlogM2(-1) = 1.523*** | t-value of DlogM2(-2) = 1.69964*** |
| t-value of DlogINFLA(-1) = -1.52329*** | t-value of DlogINFLA(-2) = 2.59283* |
| R ² adjusted= 0.926297 | |
| F – Statistics = 9.425934 | |
| Portmanteau Statistics = NA* | |

Note: significance level: * = significant at 1%, ** = significant at 5% and ***= significant at 10%

The interest rate regression for the CEMAC zone presented above explains that the past years interest rates have positive significant influenced on current year interest rate. This implies that a one per cent increase in previous years' interest rate increased current year interest rate by 0.8277 and 0.051 per cent respectively, all things being equal. From our findings, previous years expansionary monetary policy would have positively and significantly affected current year interest rate precisely by 0.0837 per cent and 0.08226 per cent respectively all things being equal these findings are in agreement with the financial liberalisation thesis. The inflation rate of last year has a negative influence on current year interest rate and is statistically significant at 10 per cent. The inflation rate of year before last has a positive impact on current year interest rate and is statistically significant at 1 per cent level of significant. Specifically, a 1 per cent increase in previous year inflation rate caused current year interest rate to drop by 0.07188 per cent all things being equal. In like manner, a one per cent increase in the inflation rate of two years ago increased current year interest rate by 0.0801 per cent all things being equal. The adjusted coefficient of multiple determinations (R²) is 0.926297. This means that the regression line captures more than 92 per cent of total variation in interest rate explained by the variations in the explanatory variables. The results also show that the observed F–ratio is significant at one per cent confidence level.

The finding also shows that an increase in interest rate causes economic growth in the CEMAC zone. This finding is in line with the McKinnon and Shaws Financial Liberalisation Thesis of 1973. This is due to the fact that in third world countries where CEMAC zone is found there is the absence of strong capital market and financial markets and the utilities from consumption in these countries are very high at the expense of investment. As a result, high interest rate crowd- out investment decisions in favor of those with positive

internal rate of returns, positive net-present values leading to economic growth. This effect is not in line with the study of Samba (2010) in CEMAC, and Nelson (2000) in the UK.

5. Recommendations and Conclusion

Since evidence has shown that low inflation is an important requirement for sustained economic growth, research efforts should therefore be directed at examining the reason for this relationship. Although an attempt has been made by the Central Bank of CEMAC to elucidate this aspect and the preliminary results are insightful, further efforts need to be geared towards this direction. Besides, by drawing inferences from the review of related literature and our VAR models, a stable and sustainable monetary policy stance and policies that enhance income growth are crucial for taming inflationary pressures.

Evidence from the study further revealed that shocks to the lending and inflation rate generated substantial destabilising impacts on the economic growth, suggesting that the monetary authorities should play a critical role in creating an enabling environment for growth. The determination of the optimal lending rate should reflect the overall internal rate of returns in the productive sector with due attention to market fundamentals. This could be achieved along with appropriate monetary growth targeting that would not destabilise the price formation process. In line with this, the Central Bank of CEMAC should be given complete instrumental autonomy to operate depending on a set of in-built targets by the individual countries of the zone. Effective monetary targeting and accommodating monetary policies should be designed and implemented as the need arises with little or no political motives.

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Truth Behind Economic Performance, Natural Resources and Attracting Foreign Direct Investment

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Using a preliminary investigation and analysis on the latest data on GDP (Gross Domestic Product) performance, GOI (Global Opportunity Index), Vulnerability Score, Readiness Score, and the number of resources of economic importance, exploratory or preliminary SEM (structural equation modelling) was prompted on the recent available data of the 131 countries (n=131). The model was robust, addressing concerns about multivariate assumptions and other measures on the goodness of fit. It was found that the number of natural resources of economic importance plays a large role in the GDP performance. Thus, the preliminary symptom of Dutch disease continues to manifest for as long as each country aims for development, with their resources as ultimate enticing factors for foreign direct investment (FDI). In addition, economic growth is so far observed to be associated with the vulnerability of the country to climate change. Finally, economic growth was found to be linked to the negative impacts argued by the dependency theory. Implication on governance was discussed.

Keywords: GDP, FDI, vulnerability measure, readiness measure, resources

JEL Classification: O10, O20

1. Introduction

Growth is common or a critical measure of performance of a nation. Economic performance is one area of the growth of the country that most development administrators and economists take into account. From the past to the present, economies linked their aggregate production, consumption, investment and net export of goods and services to how well they perform. Gross domestic product (GDP) is a primary indicator to measure the health of the economy of a country.

More investments for the country bring in irrefutable opportunities. For as long as human capital favors the contribution of foreign direct investment (FDI) to employment, the belief in the economic importance of skill production for foreign affiliates remains (Jude and Silaghi, 2016). Real employment ratio increases real

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Article History:

Received 27 September 2016 | Accepted 20 October 2016 | Available Online 26 October 2016

Cite Reference:

Palma, A.P., 2016. Truth Behind Economic Performance, Natural Resources and Attracting Foreign Direct Investment. *Expert Journal of Economics*, 4(2), pp.68-77.

GDP in the short run (Ozturk and Acaravci, 2010), as far as human capital could associate itself with regional economic growth (Fleisher, Li and Zhao, 2008). From the standpoint of neoclassical economics, China through inward FDI achieved economic gains in the form of capital formation, export expansion, technology transfer, and transformation of the economic structures and institutions (Lo, Hong and Li, 2016). Looking at it through the lens of neoclassical economics, it makes sense why nations, particularly the developing ones, should attract FDI. It was found that FDI has a greater impact on the welfare of poor countries than the wealthier ones in Africa (Gohou and Soumare, 2012). In Southeast Asia, those with competitive advantages are said to continue to attract investors due to observed pluses of FDI (Diaconu, 2014).

Nevertheless, there are some noted drawbacks in attracting FDI. First, reducing employment protection rules increases FDI, which is a common theme of critique of globalization (Olney, 2013). Although such might not be the general scenario for all, for example in the European case, investment is not affected by stringent employment protection laws, but rather by the level of access to financial markets (Calcagnini, Ferrando and Giombini, 2014). Next, investment at some point may require loss of some natural resources that for instance, are of high value to the rural poor population that could only be counterweighed by gaining employment and opportunities (Baumgartner, Braun, Abebaw, and Muller, 2015). In addition, as far as the environmental issue is concerned, a study asserts that a foreign involvement in ownership in China can haggle with environmental levies associated with pollution control, which gives birth to concession just to attract FDI primarily in developing provinces (Chen, Maung, Shi and Wilson, 2014).

On the other hand, natural resources simply boast economic growth. As noted, since 2002, mineral-rich regions in Russia are richer than other regions (Alexeev and Chernyavskiy, 2015). In Norwegian economy, about 20 percent of the annual GDP per capita increase is associated with endowment of petroleum resources such as oil, natural gas, natural gas liquids, and condensate (Mideksa, 2013). In addition, investing resource revenues in public capital may promote economic growth (Melina, Yang and Zanna, 2016).

However, economic development has substantial drawback when economies forget to produce back-up industries as other industries flourish due to the discovery of natural resources that are of high economic importance. Such is found in the case of the Dutch disease, coined by the *The Economist* in 1977 (Ebrahimzadeh, 2003; *The Economist*, 1977). Therefore, managing income from the expected natural resource revenue eliminates the possibility of Dutch disease explained in literature. The productivity and supply responses of spending could be the roots to ensure the realization of the benefits linked to mineral revenue (Go, Robinson and Thierfelder, 2016). Furthermore, countries with greater economic freedom may not be that vulnerable to the negative growth effects of resource rents (Farhadi, Islam and Moslehi, 2015).

The UN Millennium Project (2006) asserts that investing in development is key to a nation's success which makes millennium development (MDG) goals matter. The project simply sees MDGs as the fulcrum of international development policy, that help advance the means to a productive life, and they are critical for global security. The bottom line of this is development. The UN Millennium Project reported that there are four reasons for shortfalls in achieving the goals and could be summarized as governance failures, poverty traps, pockets of poverty and areas of specific policy neglect.

While measuring the growth of the economy is still substantial through the lens of neo-classical growth theory, there are other important things that can be considered in understanding the country's economic growth as implied in the report of the UN Millennium Project. The efficiency of labor, for instance, allows the economy to ignite economic growth for as long as a faster labor-force growth exists. In context, if the government does what it needs to do, investment will pour in, giving everyone a good opportunity to employment, and eventually economic growth, as implied into the GDP. By citing the point of the UN Millennium Project, it is clear that governance issue plays a significant role in making natural resources and attracting foreign direct investment productive, at some point. A good governance allows the achievement of MDGs to their full level, especially in the midst of acquiring sustainability and innovation to national development in the new era, by which the environment, the source of raw materials for development, is at stake. This requires that the economy of the country should be linked to other economies, creating a significant justification of the dependency theory (Ahiakpor, 1985; Ferraro, 2008).

For this paper, to address the combined theoretical foundation of dependency theory and the one stated by the UN Millennium Project about governance failure, it is of importance to measure how these natural resources and the country's ability to attract foreign investment (GOI) affect the GDP performance. Much to understanding this relationship is the interest of conducting an initial exploration of the mediation effect of vulnerability score and readiness score. These are specific measures of level of governance potential of a country, but not specifically addressed in the literature yet as far as their linkage to economic performance is concerned. On the other hand, GOI itself could mark as potential measure of governance level, but it will be

brought to a higher stage if mediated by other factors in line with governance, is a particular point of view that this paper investigates. Furthermore, even if the number of natural resources could truly improve a country's investment potential, thus its GDP's performance, government intervention through its level of governance is still a remarkable issue, so as to eliminate the preliminary economic symptom of Dutch disease.

2. Research Methodology

2.1 Data and Sample Size

The study is an initial exploration of testing the associated relationship of variables in the preliminary discussion. Thus, the latest available data for GOI, number of natural resources of economic value per country, readiness score, vulnerability score and GDP in 2016 were gathered for data analysis and exploration purposes.

There were data sets coming from 131 countries, of which at least 80 percent of these nations are developing countries. In the following sections, information of the data sets and variables of the study is presented.

ND-Gain Index Organization (2016) measures every country's vulnerability score and readiness score, which are all specific measures of government's level of performance in governing the negative impact of climate change and ability to leverage investments and convert them to adaptation actions.

Milken Institute (2016), on the other hand, reveals the Global Opportunity Index (GOI) for each country, which measures economic fundamental factors, ease of doing business, quality of regulations and rule of law. Singapore was on top in 2015. The GOI simply measures the ability of a country to attract foreign investments, which clearly is a primary task of the government, prior to economic growth.

Central Intelligence Agency (2016) has a list of every nation's primary natural resources with substantial value to the economy. Furthermore, the organization published the latest data for GDP (PPP, OER, Per Capita) of each country.

2.2 Internal Validity

To ensure that the study measures what it actually wants to measure, everything placed in the model has a corresponding connection to the established theory or proposed theory. For this paper, the fundamental point of view relies on the dependency theory and the UN Millennium Project, with particular reference as to how or why economies fail to achieve their goals. One fundamental concern is failure governance. Each variable in the model, at some point, measures or has link to matters concerning governance.

Furthermore, multivariate assumptions and analysis for the data were preliminary considered and addressed prior to data analysis, to ensure that the model measures the existing reality concerning growth and development of the nation. One particular area of concern is the fitness of the model. The other is on how the entire process of analysis adheres to the assumption stated within the context of the modelling technique of multivariate analysis using Structural Equation Modelling (SEM).

2.3 External Validity (Generalizability)

As part of the limitation of the study, secondary data together with their availability was a primary concern. In fact, around 40 percent of the countries with missing data and were eliminated from the analysis, as a result. However, the data sets include economic and governance information of the remaining 131 countries, which is enough number to suffice the scope or coverage of this study to ensure generalizability.

2.4 Reliability

The study is based on descriptive correlation, aiming to achieve a mathematical model with a high level of credibility. Using SEM technique, as an objective tool, similar results would be obtained if the same data sets and sample size will be generated by other parties aiming to redo the model.

2.5 Objectivity

The sources of data for this study are the ND-Gain Index Organization, Milken Institute and Central Intelligence Agency. These are organizations linked independently to prime academic institutions, and publish their data online for transparency purposes. Thus, they have no other choice but to measure objectively. That alone allows a slim chance for objectivity to be influenced so much by human skill and perception, which in reality might be a common drawback for using survey questionnaires, at some point.

3. Results and Discussion

3.1 Model Fit (Model 1 versus Model 2)

After the preliminary multivariate analysis or testing multivariate assumptions and data screening, there were two models obtained. First, the proposed model and the second one, the modified model for which an excellent model fit was observed.

Under the first model, probability of getting the Chi Square statistics value of 45.04 is .00, but in the second model, probability is .63 for the Chi Square .229. This alone speaks that there is something interesting and conclusive to look forward to in the second model. When the minimum value of discrepancy (CMIN) is divided by the degrees of freedom, with its restriction principle to ensure unbiased probability, a ratio less than 2 signifies good model fit. Again, with $CMIN/df = 22.52$, the first model is far behind the second model and with $CMIN/df = .229$ at a probability value of .63. The goodness of fit index (GFI) reveals that the first model might be good with $GFI = .895$, but the second model is far better with $GFI = .999$. A value of 1 for GFI indicates perfect fit. The comparative fit index (CFI) shows that the first model might also be a good model with $CFI = .916$. However, the second model is quite more than good because of $CFI = 1$, revealing a perfect model fit. The normed fit index (NFI) is another measure of the model's fitness. A value of 1 or closer to it marks a very good fit. Although $NFI = .914$ for the first model, the NFI for the second model is 1, which remarkably holds the latter model better than the former. The Tucker-Lewis coefficient suggests that a value closer to 1 is a very good fit. Based on this coefficient, the second model is a good fit because $TLI = 1.015$, compared to the first model with $TLI = .582$.

The root mean square error (RMSEA) is a measure for the close fit of the model. A RMSEA of .05 or less indicates a close fit of the model in relation to the degrees of freedom. For the first model, the probability of getting a sample as large as $RMSEA = .407$ is .00. On the other hand, for the second model, the probability of getting a sample as low as $RMSEA = .00$ is .68.

Overall, with all the statistical tests to measure the goodness-of-fit of the model reveal that the second model is the best model to use for the estimate.

Table 1. Model Fit

| Model | χ^2 (df) | CMIN/df | GFI | CFI | NFI | TLI | RMSEA |
|-------|----------------------------|-------------------|-------|-------|-------|-------|-------------------|
| 1 | 45.04 (Sig = .00) (df = 2) | 22.52 (Sig = .00) | 0.895 | 0.916 | 0.914 | 0.582 | 0.407 (Sig = .00) |
| 2 | 0.229 (Sig = .63) (df = 1) | 0.229 (Sig = .63) | 0.999 | 1.000 | 1.000 | 1.015 | 0.000 (Sig = .68) |

By covariating the error estimate for readiness score and vulnerability score, the second model became a better model. Illustration of this covariation is shown in Figure 2.

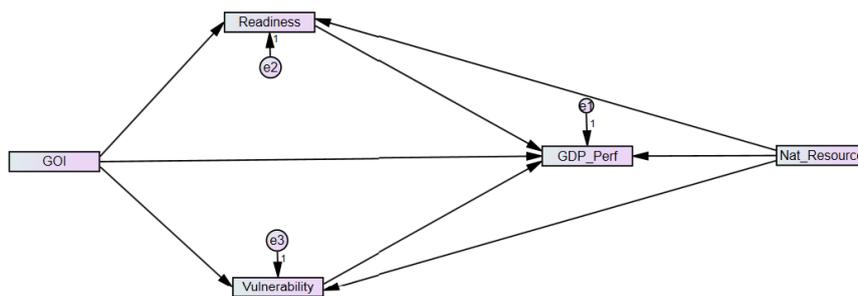


Figure 1. The proposed model (Model 1) based on the theoretical framework

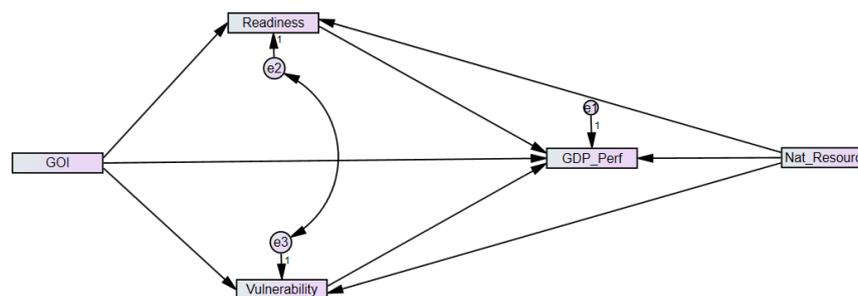


Figure 2. Modified model (Model 2) based on modification indices result

Based on Figure 3, when GOI goes up by 1 standard deviation, the readiness score goes up by .91, standard deviation and vulnerability score goes down by .76. This means that when the ability of the nation to attract foreign investment increases, its ability to leverage investments and convert them to adaption increases as well. On the other hand, there is a downfall for this high dexterity to attracting foreign investment because this can lower the country's exposure, sensitivity and ability to adapt to the negative impact of climate change. This must be the case, knowing that according to UN Millennium Project (2006) only the advanced countries have the ability to initiate good governance as far as sustainability issue is concerned. Considering that most of the countries included in the model are developing countries, they have the tendency to attract foreign investment as priority, but along the way, they might not be quite able at establishing the sustainability issue yet, just as the Philippines for instance, as a sample case. This sounds like an interesting viewpoint, as far as the dependency theory is concerned, knowing that economies of developed countries are enriched at the expense of those developing ones.

When GOI goes up by 1 standard deviation, GDP performance goes up by .37. GDP performance goes up by .13 standard deviation when the number of natural resources of economic values goes up by 1 standard deviation. When the number of natural resources of economic importance goes up by 1 standard deviation, readiness score moves up by .04 standard deviation, and vulnerability score goes down by -.13 deviation. Based on the previous discussion as anchored on the fundamental and implication of dependency theory, the number of natural resources of economic importance, especially among developing countries, reduces the government's level of performance in governing the negative impact of climate change. On the other side, it improves the country's ability to leverage investments and convert them to adaptation actions. However, the small value of readiness score from the path of GDP performance to readiness score implies that the number of natural resources of economic importance creates a low capacity of the country to leverage investments and convert them to adaptation actions. For this reason, it may sound that the Dutch disease generally exists in the world, especially among economies that are largely dependent on natural resources for their economic growth. This also implies that since there was only a relatively small value in the path from natural resources to the readiness score, its statistical significance is of primary importance. It is of interest to find if there is something going on to this this path.

Meanwhile, GOI and natural resources explain 83 percent of the variance of readiness score and 59 percent of the vulnerability score. The combined predictors of GDP performance explain 62 percent of its variance. This means that the predictors are quite good requirements to predict the readiness score, vulnerability score and GDP performance of the country.

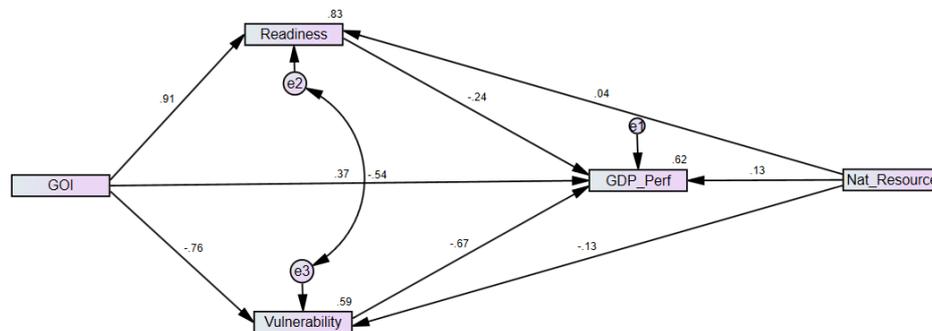


Figure 3. Standardized estimate of relationship between variables based on standard deviations.

3.2 Regression Weight

Considering that there was a promising association between the variables, it is of primarily concern to consider their statistical significance with the probability values of their coefficients.

Revealed in Table 2 are the estimates of coefficients for each variable in their respective paths, and the p-values. Only the path for natural resources to readiness score and from readiness score to GDP performance have not-so-remarkable paths in the model. This means that the country's ability to leverage investments and convert them to adaptation does not affect GDP performance. After all, in reality, investors will only invest upon consideration of other important factors such as economic fundamentals, ease of doing business, quality of regulations, and rule of law. This observation was empirically supported by the model as GOI has statistically significant contribution to GDP performance. In fact, when GOI increases by 1 percent, GDP performance rises to around 5.6 percent.

On the other hand, the idea that the number of natural resources affects the ability of the country to leverage investments and convert them to adaptation actions cannot be statistically established. The probability

value for this path is more than $\alpha = .05$, which is .307. This cannot be established, as there are many countries good at governance level in managing their resources so as not to be affected by Dutch disease, and there are also others, especially developing countries or relatively developed ones, which are affected by policies of developed or investing countries, as in line with the evidence of some studies (Calcagnini, Ferrando and Giombini, 2014; Baumgartner, Braun, Abebaw and Muller, 2015; Chen, Maung, Shi and Wilson, 2014).

When GOI increases by 1 percent, an increase of 10.9 percent in the readiness score is statistically significant. This should be the case, knowing that attracting foreign direct investment is associated with ensuring leveraging investments and converting them to adaptation actions. However, as countries attract investment, their vulnerability to some environmental concerns decreases by 5.9 percent when their capacity to attract FDI increases by 1 percent. Much of the implication of this was explained earlier.

Another important evidence to prove the peril of dependency is marked by the decrease of 5.8 percent in the vulnerability score when the natural resources increase by 1 percent. This suggests that economies may overlook governing the negative impact of climate change, while exhausting their natural resources for economic advantage. In reality, and based on dependency theory, advanced economies take advantage of the resources of poor countries to their advantage.

When the number of natural resources of economic importance increases by 1 percent, readiness score increases by 2.6 percent, which is another indication of attracting FDI, which could suggest that Dutch disease may be hampered at some point, even if it exists generally in the economy of the world.

A 1 percent increase in GOI, natural resources and vulnerability leads to 5.6 percent increase, 11.9 percent increase, and 133 percent decrease in GDP performance, respectively. This only proves that the three predictors are significant components of the model that could predict the economic performance of the country. It sounds that attracting foreign direct investment and the number of natural resources are the factors that provide positive contribution to the economic performance. The percentage of natural resources guarantee GDP performance, which is another remarkable proof that the danger for Dutch disease generally is eminent in the world economy, as far as the literature is concerned (Melina, Yang and Zanna, 2016). Furthermore, it sounds that when countries are quite focused or serious about addressing climate change or sensitive to its issues, the GDP performance will be largely and badly affected. Thus, this proves the finding according to which there is a need to somehow sacrifice policies associated with environmental concerns just to ensure economic growth as an exchange (Chen, Maung, Shi and Wilson, 2014).

Table 2. Regression weights of the independent variables

| | Path | | Estimate | S.E. | C.R. | P |
|---------------|------|---------------|----------|------|---------|------|
| Readiness | <--- | GOI | .109 | .004 | 25.480 | *** |
| Vulnerability | <--- | GOI | -.059 | .004 | -13.601 | *** |
| Vulnerability | <--- | Nat_Resource | -.058 | .026 | -2.256 | .024 |
| Readiness | <--- | Nat_Resource | .026 | .026 | 1.022 | .307 |
| GDP_Perf | <--- | GOI | .056 | .020 | 2.806 | .005 |
| GDP_Perf | <--- | Nat_Resource | .119 | .050 | 2.387 | .017 |
| GDP_Perf | <--- | Readiness | -.308 | .198 | -1.554 | .120 |
| GDP_Perf | <--- | Vulnerability | -1.327 | .198 | -6.710 | *** |

Note: ***The regression weight for predictors in the prediction of dependent variable is significantly different from zero at the 0.001 level (two-tailed).

3.3 Mediation Influence

For the other important part of the study, testing the mediation effect is the main concern of the study.

It shows on Table 3 that readiness score and vulnerability score have only partial mediation effect to the GDP performance. This means that GOI and percentage of natural resources of economic importance have direct effect to GDP performance.

For this reason, the symptom for Dutch disease is evident because of the vulnerability of GDP performance to increase when the percentage of natural resources of economic importance increases. In fact, as stated in Table 2, a 1 percent increase in natural resources adds up around 11.90 percent to the country's GDP performance.

However, GOI, as governance indicator, is another fundamental component to increase GDP performance. Thus, the results of the study add up something to the idea of Ebrahim-zadeh (2003) and *The Economist* (1977). Governance is necessary, and diversification of industries is part of it, due to the consideration of economic fundamentals, ease of doing business, quality of regulations and rule of law.

Table 3. The mediation influence of vulnerability score and readiness score to GDP performance

| Relationship | Direct without mediator | Direct with mediator | Remarks |
|--------------|-------------------------|----------------------|-------------------|
| GOI>Read>GDP | 0.659 (0.001) | 0.408 (0.001) | Partial mediation |
| GOI>Vul>GDP | 0.659 (0.001) | 0.415 (0.001) | Partial mediation |
| Nat>Vul>GDP | 0.207 (0.001) | 0.131 (0.017) | Partial mediation |
| Nat>Read>GDP | 0.207 (0.001) | 0.132 (0.015) | Partial mediation |

4. Conclusion and Recommendation

The number of natural resources of economic importance plays an important role in the GDP performance. Thus, the preliminary symptom of Dutch disease continuous to manifest for as long as each country aims for development, with their resources as ultimate enticing factors for foreign investment. In addition, economic growth is so far observed to be associated with the vulnerability of the country to climate change. Finally, economic growth was found to be linked to the negative impacts argued by the dependency theory.

The findings imply that in order to ensure growth and not to hamper potential development, good governance is a fundamental factor to directly and partially affect and mediate future economic growth. Good governance is a great contributing factor to the country's GDP performance.

However, future researches are necessary to expand and support the above stated claim to stand conclusive considering that the data in this study consisted of information from developing and developed economies combined in this comprehensive analysis. An insight about focused investigations to be initiated separately for developing and developed countries is a remarkable area of interest for future inquiries.

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Appendices

Annex 1. Curve estimate between the GDP performance and percentage of nation's resources of economic value

| R Square | F | P-value | Curve estimate |
|-----------------|---------------|----------------|-----------------------|
| .098 | 24.114 | .000 | Linear |
| - | - | - | Logarithmic |
| - | - | - | Inverse |
| .103 | 12.693 | .000 | Quadratic |
| .104 | 8.553 | .000 | Cubic |
| .090 | 21.944 | .000 | Compound |
| - | - | - | Power |
| - | - | - | S |
| .090 | 21.944 | .000 | Growth |
| .090 | 21.944 | .000 | Exponential |
| .090 | 21.944 | .000 | Logistic |

Annex 2. Curve estimate between the GDP performance and country's global opportunity index (GOI)

| R Square | F | P-value | Curve estimate |
|-----------------|----------------|----------------|-----------------------|
| .447 | 106.765 | .000 | Linear |
| .440 | 103.710 | .000 | Logarithmic |

| | | | |
|------|--------|------|-------------|
| .414 | 93.193 | .000 | Inverse |
| .447 | 53.037 | .000 | Quadratic |
| .449 | 35.314 | .000 | Cubic |
| .406 | 90.235 | .000 | Compound |
| .413 | 92.950 | .000 | Power |
| .403 | 88.962 | .000 | S |
| .406 | 90.235 | .000 | Growth |
| .406 | 90.235 | .000 | Exponential |
| .406 | 90.235 | .000 | Logistic |

Annex 3. Curve estimate between the GDP performance and country's vulnerability score

| R Square | F | P-value | Curve estimate |
|-------------|----------------|-------------|----------------|
| .593 | 259.142 | .000 | Linear |
| .598 | 264.805 | .000 | Logarithmic |
| .575 | 240.504 | .000 | Inverse |
| .600 | 132.760 | .000 | Quadratic |
| .601 | 88.293 | .000 | Cubic |
| .539 | 208.494 | .000 | Compound |
| .519 | 191.924 | .000 | Power |
| .474 | 160.506 | .000 | S |
| .539 | 208.494 | .000 | Growth |
| .539 | 208.494 | .000 | Exponential |
| .539 | 208.494 | .000 | Logistic |

Annex 4. Curve estimate between the GDP performance and country's readiness score

| R Square | F | P-value | Curve estimate |
|-------------|----------------|-------------|----------------|
| .390 | 114.861 | .000 | Linear |
| .363 | 102.624 | .000 | Logarithmic |
| .307 | 79.854 | .000 | Inverse |
| .392 | 57.595 | .000 | Quadratic |
| .395 | 38.658 | .000 | Cubic |
| .280 | 70.171 | .000 | Compound |
| .270 | 66.651 | .000 | Power |
| .239 | 56.528 | .000 | S |
| .280 | 70.171 | .000 | Growth |
| .280 | 70.171 | .000 | Exponential |
| .280 | 70.171 | .000 | Logistic |

Annex 5. Relationship between the independent variables

| Test | Pearson r coefficient | P-value | Decision on Ho |
|----------------------------|-----------------------|---------|----------------|
| Vulnerability vs Readiness | -.824** | .000 | Reject |
| Vulnerability vs GOI | -.762** | .000 | Reject |
| Readiness vs GOI | .908** | .000 | Reject |

Note: **Correlation is significant at the 0.01 level (2-tailed)

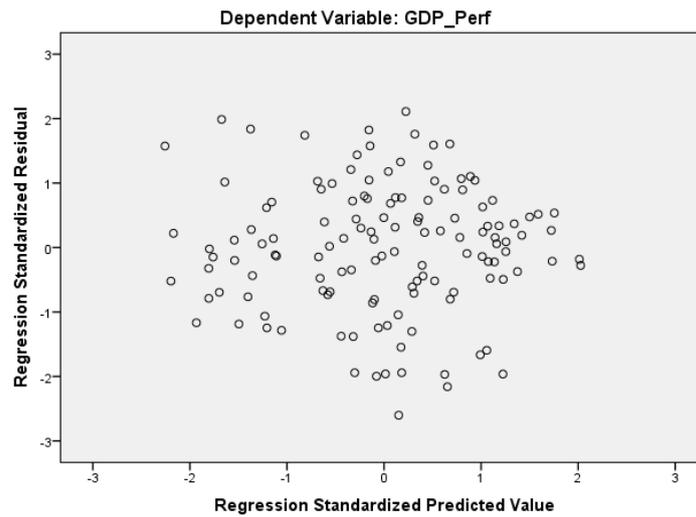
Annex 6. Collinearity statistics among the independent variables

| Variables | Tolerance | VIF |
|--------------------------|-----------|-------|
| Vulnerability score | .296 | 3.383 |
| Readiness | .124 | 8.057 |
| Global Opportunity Index | .176 | 5.679 |

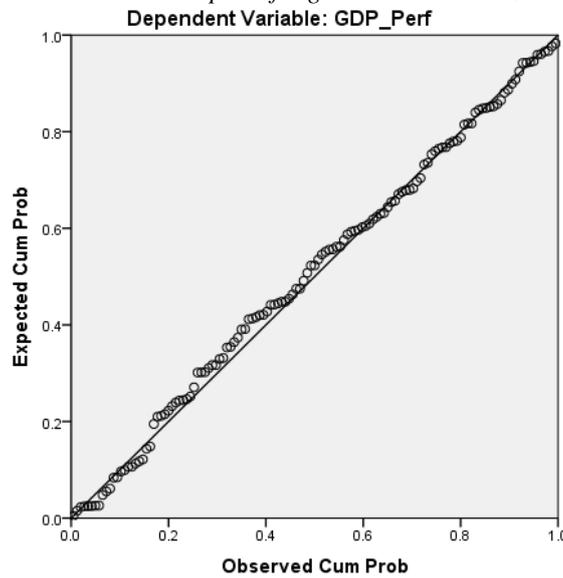
Annex 7. Collinearity statistics after dropping "readiness" from the independent variables

| Variables | Tolerance | VIF |
|--------------------------|-----------|-------|
| Vulnerability score | .419 | 2.385 |
| Global Opportunity Index | .419 | 2.385 |

Annex 8. Scatterplot between the standardized residual and the standardized predicted value



Annex 9. Normal P-P plot of regression standardize residual



Annex 10. Normality statistics of unstandardized and standardized residuals

| Descriptive | Unstandardized Residuals | Standardized Residuals |
|---------------------------|---------------------------------|-------------------------------|
| Skewness | -.230 | -.230 |
| Standard error (Skewness) | .210 | .210 |
| z value Skewness | -1.09 | -1.09 |
| Kurtosis | -.220 | -.220 |
| Standard error (Kurtosis) | .417 | .417 |
| z value Kurtosis | -.53 | -.53 |

Annex 11. The Skewness and Kurtosis of distribution for each variable

| Variables | Skewness | Standard Error | Skw z-value | Kurtosis | Standard Error | Kurt z-value |
|------------------|-----------------|-----------------------|--------------------|-----------------|-----------------------|---------------------|
| GDP_Perf | -0.233 | 0.210 | 1.11 | -0.985 | 0.420 | -2.34 |
| Resources | 0.683 | 0.212 | 3.22 | -0.077 | 0.420 | -0.18 |
| GOI | 0.141 | 0.210 | 0.67 | -0.828 | 0.420 | -1.97 |
| Vulnerability | 0.402 | 0.212 | 1.89 | -0.608 | 0.420 | -1.45 |
| Readiness | 0.504 | 0.210 | 2.40 | -0.693 | 0.420 | -1.65 |



On the Location Attractiveness of Emerging Countries for Foreign Direct Investments

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Our paper investigates the FDI attracting potential of emerging markets by in terms of their location attributes. We use Statistical cluster analysis to study the dynamic evolution of emerging markets' clusters, based on country attributes that are relevant for the MNEs location decision. We find that countries tend to be grouped at a geographical level or depending on the various resources they possess, except for China that clusters independently. Also, there are numerous countries' transitions from one cluster to another over the years, which indicate a natural process of changing location attributes and market development for many emerging economies.

Keywords: *foreign direct investments, location decision, emerging markets, cluster analysis*

JEL Classification: *F21, F23*

1. Introduction

The total volume of foreign direct investments (FDI) has increased tremendously over the past two decades and it became one of the strongest contributors to the economic growth in emerging markets. FDI flows to emerging countries rose continuously since 2002, despite a drop in inward FDI in 2009, reaching a record of \$684 billion in 2011 and thus accounting for nearly half of global FDI – 45% more precisely. According to data from the latest Global Investment Trends Monitor published by UNCTAD, developing economies saw their FDI reaching a new high of US\$741 billion in 2015, 5% higher than in 2014. Among these countries, developing Asia remained the largest FDI recipient region in the world, accounting for one third of global FDI flows.

Emerging markets attract FDI as they are perceived to be a driver of long-term economic growth, through their estimated indirect effects - especially technological spillovers, access to foreign markets or human capital development stimulus. Therefore, it is vital to understand the factors taken into account by multinational enterprises (MNEs) in their location decision in emerging countries. At their turn, MNEs seek the best market environments where they can locate and develop, as „location decisions are some of the most costly strategic decisions an organization makes”, according to Zelbst et al. (2010). They decide to serve foreign markets by reallocating production facilities, instead of exports, only if they possess some special

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Article History:

Received 14 September 2016 | Accepted 18 October 2016 | Available Online 28 October 2016

Cite Reference:

Belascu, L. and Shivarov, A., 2016. On the Location Attractiveness of Emerging Countries for Foreign Direct Investments. *Expert Journal of Economics*, 4(2), pp. 78-85.

advantages that local firms do not have access to. These benefits must exceed all costs associated with a presence on foreign markets, such as transport and communication costs, overseas staff allocation costs, tariff and non-tariff barriers, cultural or linguistic differences.

With respect to MNEs location decision, Dunning (1980) proposes an eclectic theory of international production, known as the “Eclectic Paradigm”, starting with the assumption that MNE’s decisions of engaging in international production through FDI are based on three determinants: (1) they possess an asset that other competitors do not have access to (Ownership Advantage), such as legally protected rights, trade monopolies, exclusive market control over certain marketplaces, firm size and technical characteristics, which can provide access to economies of scale; etc.; (2) they discover that exploiting their ownership advantage using the resources and characteristics of the host market is more profitable (Location Advantage); (3) they consider that choosing to internalize the assets they own is more profitable than selling or leasing them to other companies (Internalization Advantage).

Chen and Moore (2009) study the location decision of MNEs from a different perspective, concluding that choosing a foreign host country also varies according to total factor productivity: more productive companies will invest more in relatively "harsh" host economies - that have smaller market potential, high fixed costs, low tariffs on imports, but offer higher factor use productivity - as compared to their less productive competitors. Therefore, changes in corporate, investment and trade policies may affect both FDI volumes and the productivity distribution of MNEs that decide to invest in the host country.

Under these circumstances, there is a constant competition between emerging and developed markets, both seeking to attract large FID inflows, that are perceived by academic and politic environments to be a driver of long economic growth for the host markets. This competition has led to the development of many types of incentives offered to the foreign investors by national governments. Besides the industry specific or country specific incentives, there are some general market characteristics offered by emerging markets that attract foreign investors, raising their attractiveness.

They can be found in the academic literature usually divided in two categories: traditional and new influencing factors. The “traditional” FDI attractiveness factors on emerging markets may be considered the following:

(a) market size and growth potential, which reflects a country or region’s potential of absorbing new production outputs or the potential to create economies of scale (Lankes and Venables, 1997, Bevan and Estrin, 2000);

(b) low costs, particularly in the form of labour costs or more specifically wage-adjusted productivity of labour, cost of capital, cost and availability of raw materials, etc. (Barrel and Holand, 2000);

(c) the absence or limited number of competitors, which bring a "first-mover" advantage to the investing company (Boeri and Brucker, 2000); or

(d) infrastructure. The literature also advances “new” FDI attractiveness factors that have the ability to facilitate more broad-based FDIs and are highly significant when MNEs evaluate major expansions.

Among these factors one can identify (i) geographic distance, which has had an increasingly important role since the development of closer links among industrial locations and the geographic characteristics of the marketplaces, directly influencing transport or communication costs (Brainard, 1997); (ii) information asymmetry and the cost of obtaining that information; (iii) macroeconomic stability, characterized by transparent institutions (Campos and Kinoshita, 2003, Belascu and Horobet, 2015), private property development degree and method (Carstensen and Toubal, 2004), specific conditions for repatriating profits, legislation or tax regime, time spent in dealing with local authorities, corruption level (Wei, 2000; Al-Sadig, 2009), etc; (iv) country risk, measured by specific indicators – economic growth, inflation, debt to GDP ratio, microeconomic indicators that are computed by various international institutions, etc. (Holand and Pain, 2004).

In the present paper, we investigate the location potential of several emerging markets in terms of some of the previous factors, grouping them into clusters of resemblance and analysing their evolution over time. One important contribution that our paper makes to the existing literature is the uncovering of clustering patterns for emerging countries in terms of location attributes offered to MNEs – more specifically, whether location advantages are regionally-specific or market feature-specific.

The paper is organised as follows: Section 2 presents the data and the research methodology employed in our analysis, Section 3 outlines the main results of our research, and Section 4 concludes and presents a few directions for further investigation.

2. Data and Research Methodology

Our research uses data on 41 countries, classified as key emergent markets by BBVA Research. They can be sub-classified in three categories: (1) Emerging and Growth leading Economies – with an expected incremental GDP in the next ten years that will surpass the average G7 economies' GDP except USA: China, India, Indonesia, South Korea, Brazil, Mexico, Russia, Turkey; (2) NEST – with an expected incremental GDP in the next ten years lower than the average G7 economies' GDP except USA, but higher than Italy's: Argentina, Bangladesh, Chile, Colombia, Egypt, Malaysia, Nigeria, Pakistan, Peru, Poland, Thailand, South Africa, Ukraine and Vietnam; (3) Other Emerging Markets: Bahrain, Bulgaria, Czech Republic, Estonia, Hungary, Jordan, Kuwait, Latvia, Lithuania, Mauritius, Morocco, Oman, Romania, Slovakia, Sri Lanka, Sudan, Tunisia, UAE and Venezuela.

In order to form annual clusters and to relevantly position these emerging markets in the clusters, we use a set of ten macroeconomic variables that we hypothesize to illustrate the relevant economic attributes for MNE's decisions.

(1) For market size and potential, we use three variables: (i) GDP per capita in \$US (GDPC); (ii) domestic credit to private sector as percentage of GDP (DC) – it measures financial resources offered to the private sector through loans, trade credits, purchase of non-equity securities and other account receivables; and (iii) the percentage of urban population in total population (UP) – it illustrates the countries' development potential, especially since in the last years a great part of FDI inflows was oriented to the tertiary sector.

(2) To account for country risk, we work with (i) inflation rate calculated as the annual percentage change of the Consumer Price Index (INF); and (ii) international reserves including gold, in \$US (IR).

(3) For infrastructure and ease of obtaining information, we use one important variable in the context of the digital development occurring in the last decades: mobile cellular subscriptions as number of subscriptions per 100 people (MS).

(4) To illustrate labour markets – we use both (i) the labour force, as the number of people aged 15 and older who represent economically active population, according to the International Labour Organization, including both the employed and the unemployed, armed forces and first-time job-seekers (LBF) and (ii) labour force participation rate, as percentage of total economically active population aged above 15 years, who supply labour for the production of goods and services during a specified period (LBP).

(5) As a measure of integration in the world economic environment, we use trade Balance in \$US (TB) and a measure of goods and services trade openness, computed as sum of imports and exports, as percentage of GDP (TO).

In order to analyze emerging markets' current investment situation, and to understand their level of attractiveness for international investors, we use inward FDI flows per capita (in \$US). All the data we employ has an annual frequency and is collected for the period 1994 to 2011 from World Bank and UNCTAD international databases, in order to be able to include it in cross-country comparisons.

We use Statistical cluster analysis (SCA) to investigate the dynamic evolution of emerging markets' natural clusters based on countries' attributes that are relevant for the MNEs location decision. SCA's goal resides in discovering natural clusters according to a specific internal criterion, without knowing beforehand the affiliation of entities to the identified clusters.

The entities' assignment to a cluster is made by taking into account the similarity between the studied entities, according to the considered set of variables and the differentiation of entities that belong to a cluster from the ones that belong to other clusters. Our analysis is developed using Euclidian distances, and clusters are first formed using a hierarchical amalgamation algorithm and second using an integrative method – k-means algorithm.

The hierarchical amalgamation is based on the Ward's method, which minimizes the sum of squares (SS) of any two clusters that can be formed at each step. We have chosen this method because it is considered to be very efficient in terms of final clustering result, although it tends to generate clusters of smaller size compared to the other amalgamation methods. The k-means algorithm we use calculates Euclidian distances from normalized quantities (i.e. values with a range between 0 and 1).

The difference between hierarchical clustering and k-means stems from the manner clusters are formed: in the hierarchical clustering algorithm clusters are formed step by step, starting with the entities that have the smallest distance and afterwards linking more and more entities together and aggregating larger and larger clusters of increasingly dissimilar entities until, in the last step, all entities are joined together; the k-means clustering algorithm, on the other hand, is based on a priori hypotheses concerning the number of clusters that may be formed based on the variables taken into account.

We undertake SCA for each year, as well as for the entire time frame of our analysis. This approach will provide us with an overall view on emerging countries similarities and differences in terms of hosts for MNEs, as well as with a dynamic perspective on the changing country attributes that influence the MNEs' location decisions.

3. Results

The hierarchical amalgamation algorithm was applied first on an annual basis, and then for the entire time frame of our analysis (1994-2011). Figure 1 shows the Euclidian distances between all groups of countries for each of the years under analysis. We observe that average Euclidian distances do not vary much during the sample period – the lowest is recorded in 1997 (3.798) and the highest in 2000 (4.097). The same is true for the minimum distances – the lowest value is 0.309 between Latvia-Lithuania, in 1998, while the highest is 0.967 between Pakistan-Sudan in 2010.

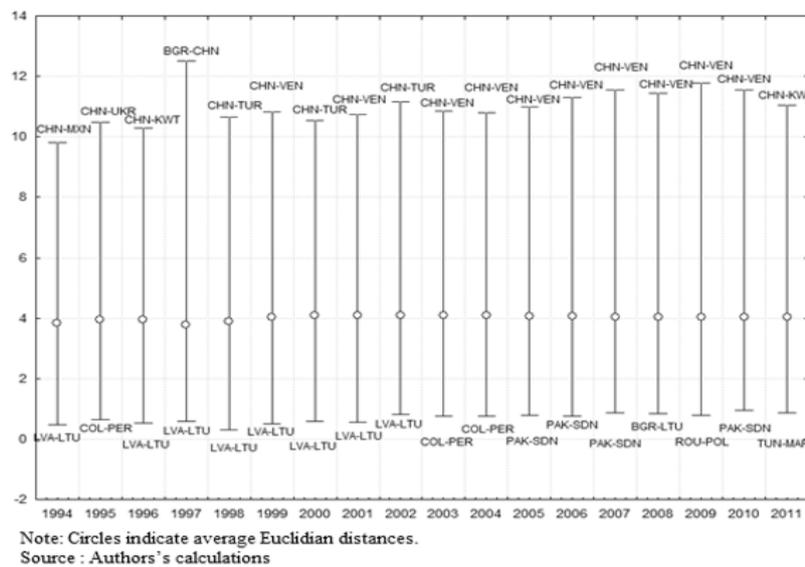


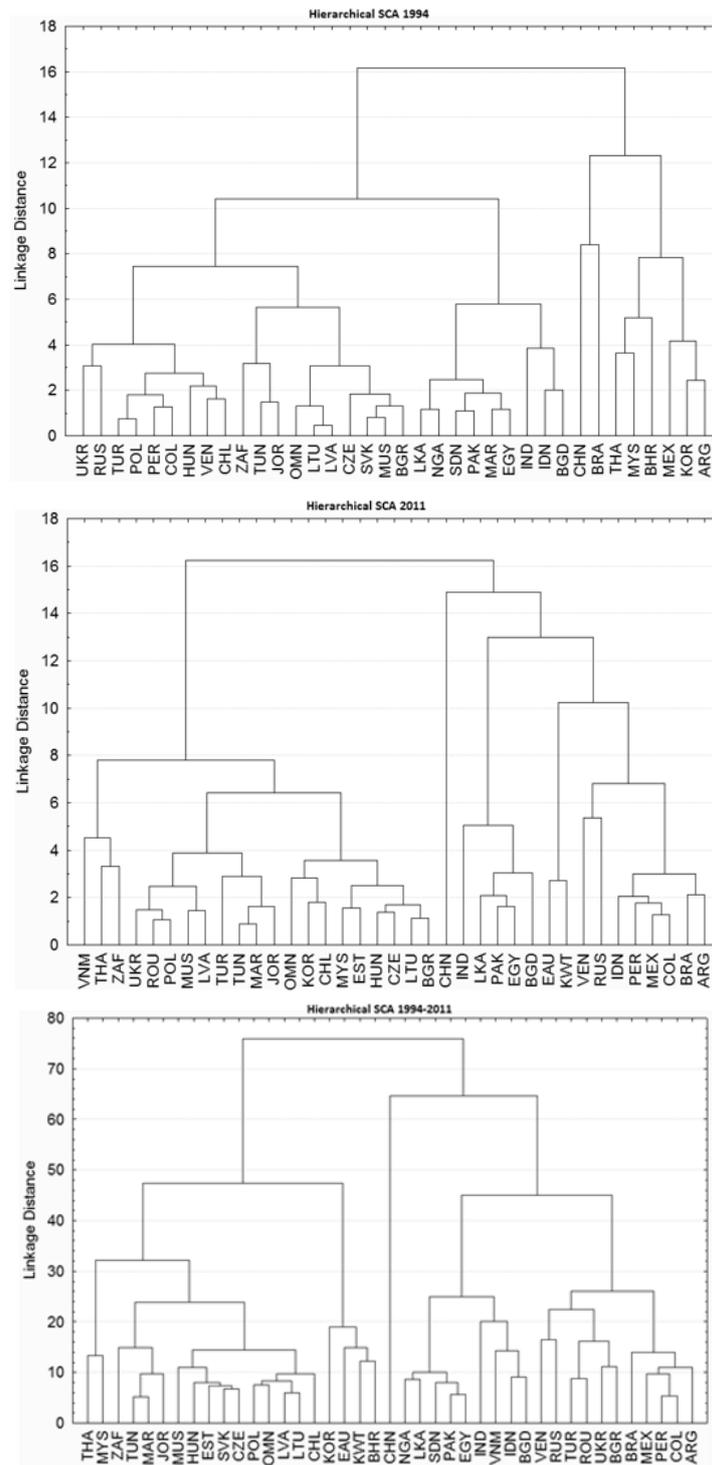
Figure 1. Plot of minimum, maximum and average Euclidian distances, 1994-2011

We notice that emerging markets from similar geographic regions and with similar economic background and/or cultural environment are generally clustered at lower distances (Latvia-Lithuania, Romania-Poland, Columbia-Peru, Egypt-Morocco, Tunisia-Morocco, Chile-Venezuela), with few exceptions of country pairs with warm diplomatic or economic relations or similar general characteristics (Poland-Mexico or Turkey; Mauritius or Oman with several CEE countries; Pakistan-Sudan).

The highest maximum Euclidian distances appear between China and several different countries (UAE, Venezuela, Turkey, etc) and record higher variability, from 9.815 China-Morocco in 1994, to 12.551 between China-Bulgaria in 1997. In each of the 18 years, the highest distances belong to pairs formed of China and almost all the other countries, probably because China has experienced accelerated economic growth in this period.

When we study countries' placements in clusters over time (see Figure 2), we generally observe countries grouped in two or three clusters, depending to a high extent on their geographical location and economic development or access to natural resources (oil, natural gas, access to the international waters). European countries are usually grouped in 2 sub-clusters, one with Ukraine, Romania, Russia, Poland, Bulgaria and one with Slovakia, Hungary, Czech Republic, Lithuania, Latvia and Estonia.

Turkey and Oman are usually in the same clusters with the European countries. South American countries also appear clustered together, except for Chile. In many years, CEE and South American countries appear in the same cluster. African markets are generally grouped in two clusters, along with Pakistan. Many Asian countries also appear clustered: India, Indonesia, Vietnam, Bangladesh, or Thailand and Malaysia. Bahrain, UAE and Kuwait, are usually grouped in one cluster, mainly due to their access to oil reserves. The analysis over the entire period confirms these results (see also Figure 2).



Source: Authors' calculations

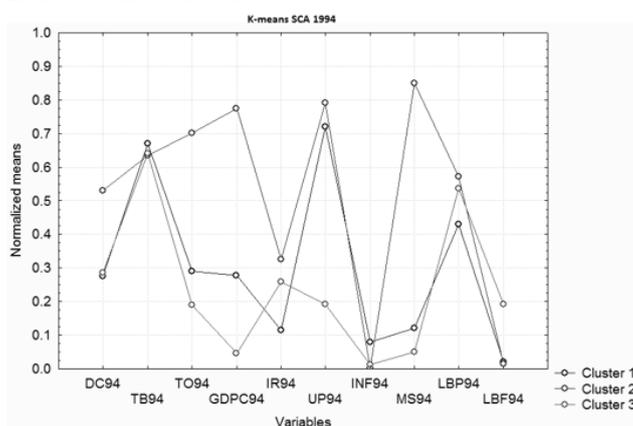
Figure 2. Results of hierarchical clustering algorithm

When we apply the k-Means algorithm we observe the tendency of countries to group in up to four clusters over the years, indicating that over time, they transit from one cluster to another. Table 1 shows clusters' members for each year and for the overall period. All clusters contain countries from all continents. In 1994, one big cluster contains countries from Latin America and Europe and the other big cluster countries from Africa and Asia. In 2011, there are four clusters, one with Latin American countries and Turkey, one with Asian and African countries, one with big Asian countries (China, Russia) and one with the European countries and a few others. When looking at the entire 1994-2011 period, China is in a cluster by itself.

Table 1. Clusters' members, 1994-2011

| Country | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 1994-2011 |
|---------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| ARG | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| BRA | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| COL | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| EAU | n/a | n/a | n/a | n/a | n/a | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 1 |
| KWT | n/a | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 1 |
| MEX | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| PER | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| RUS | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 1 |
| TUR | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| VEN | n/a | 1 | 1 | 1 | 1 | 1 | 1 | 4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| BGD | 3 | 1 | 1 | 1 | 3 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 3 | 1 | 2 | 2 |
| EGY | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 3 | 1 | 2 | 2 |
| IDN | 3 | 1 | 1 | 1 | 3 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 3 | 1 | 2 | 2 |
| IND | 3 | 1 | 1 | 1 | 3 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 3 | 1 | 2 | 2 |
| LKA | 3 | 1 | 1 | 1 | 3 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 3 | 1 | 2 | 2 |
| NGA | 3 | 1 | 1 | 1 | 3 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 3 | 1 | n/a | 2 |
| PAK | 3 | 1 | 1 | 1 | 3 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 3 | 1 | 2 | 2 |
| SDN | 3 | 1 | 1 | 1 | 3 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 3 | 1 | n/a | 2 |
| THA | 3 | 1 | 1 | 2 | 3 | 2 | 1 | 3 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 4 | 2 |
| VNM | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 3 | 2 | 2 | 2 | 2 | 4 | 2 |
| BGR | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 3 |
| BHR | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | n/a | 3 |
| CHL | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 4 | 3 |
| CZE | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 3 |
| EST | n/a | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 3 |
| HUN | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 3 |
| JOR | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 4 | 3 |
| KOR | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 3 |
| LTU | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 3 |
| LVA | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 3 |
| MAR | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 4 | 3 |
| MUS | 1 | 1 | 1 | 2 | 3 | 2 | 1 | 1 | 2 | 2 | 1 | 1 | 3 | 2 | 2 | 2 | 2 | 4 | 3 |
| MYS | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 3 |
| OMN | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 4 | 3 |
| POL | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 2 | 4 | 3 |
| ROU | n/a | n/a | 1 | 1 | 3 | 1 | 1 | 4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 4 | 3 |
| SVK | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | n/a | n/a | n/a | 3 |
| TUN | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 2 | 4 | 3 |
| UKR | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 4 | 3 |
| ZAF | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 4 | 3 |
| CHN | 3 | 1 | 1 | 1 | 3 | 1 | 1 | 4 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 3 | 2 | 3 | 4 |
| Number of clusters | 3 | 2 | 2 | 2 | 3 | 2 | 2 | 4 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 3 | 2 | 4 | 4 |

When we observe the means of the variables for each cluster (see Figure 3), they seem to be better differentiated in 2011, as compared to 1994. There are several variables that lead to this differentiation: trade openness, GDP per capita and mobile subscriptions in each year of the analysis; urban population and labour force are significant differentiators only in some years. Domestic credit to private sectors becomes relevant after 2006, indicating that in recent years, the existence of consumption credits could be a significant differentiating factor in MNEs location decision.



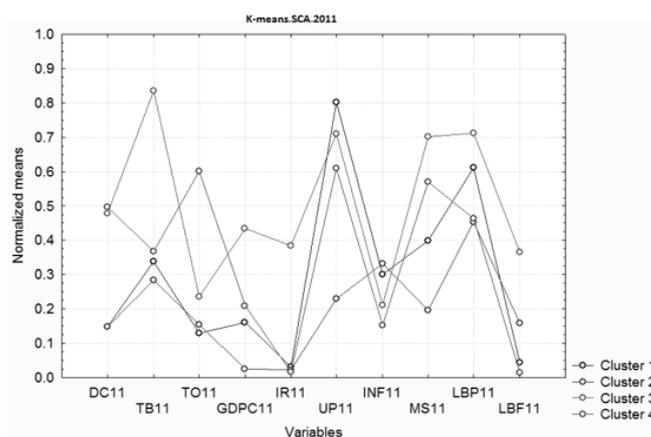


Figure 3. Results of k-means clustering algorithm – graph of means

Analysing the distances between clusters' centroids (see Table 2) we observe no trend in terms of the average distance evolution over time – before 1997 and in 2011, a high level of dissimilarity among clusters exists, while in the period 1997-2010 the level was lower, indicating that clusters tended to be closer to each other in this period and, subsequently, that countries' groups were more similar, at least based on the variables included in our analysis.

Table 2. Distances between clusters' centroids, 2000-2011

| Clusters | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 1994-2011 |
|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------|
| 1 and 2 | 1.04 | 0.97 | 0.93 | 0.67 | 0.65 | 0.56 | 0.70 | 0.63 | 0.66 | 0.68 | 0.70 | 0.70 | 0.59 | 0.66 | 0.69 | 0.58 | 0.70 | 0.66 | 3.12 |
| 1 and 3 | 0.64 | | | | 0.57 | | | 0.57 | | | | | 0.62 | | | 0.65 | | 0.89 | 2.23 |
| 1 and 4 | | | | | | | | 0.54 | | | | | | | | | | 0.68 | 7.38 |
| 2 and 3 | 1.37 | | | | 0.92 | | | 1.02 | | | | | 0.82 | | | 0.96 | | 1.15 | 2.91 |
| 2 and 4 | | | | | | | | 0.84 | | | | | | | | | | 0.84 | 6.95 |
| 3 and 4 | | | | | | | | 0.59 | | | | | | | | | | 0.87 | 7.53 |
| Average distance | 1.02 | 0.97 | 0.93 | 0.67 | 0.71 | 0.56 | 0.70 | 0.70 | 0.66 | 0.68 | 0.70 | 0.70 | 0.68 | 0.66 | 0.69 | 0.73 | 0.70 | 0.85 | 5.02 |

4. Conclusions and Further Research

Our paper examined the attraction potential of 41 emerging countries for MNEs, by analysing some of their attributes that may be considered such attraction factors over the 1994-2011 period. We have uncovered clustering patterns of emerging countries in terms of location attributes relevant for MNEs through the use of Statistical Cluster Analysis. The clusters are formed annually and the position of countries in clusters was considered for each year and dynamically over the years, with the purpose of comprehending emerging markets' evolution in time from the perspective of their relevant attributes for the MNEs decision.

We find that countries are typically grouped in two or three clusters, depending to a high extent on their geographical location and economic development or access to natural resources (oil, natural gas, access to the international waters). This result is observable for each of the 18 years covered in our research, as well as over the entire period. An interesting but not unexpected result is that China clusters independently from the other emerging countries. At the same time, there are numerous transitions of countries from one cluster to another over the years, which indicate a natural process of changing location attributes and market development for many emerging economies. A remarkable observation is that clusters that are formed by using the K-means methodology include countries from all continents, which indicates that the countries' similarities and differences matter less in geographic terms and more in terms of economic development.

Further research on the topic is needed and intended on a few directions, depending on data availability. First, the analysis deserves to be replicated on a higher number of emerging markets, although this involves the use of a shorter time period than the one used in the present paper. Second, the number of variables deserves to be increased, so that they offer a better view on countries' location attributes. Third, the origin and sector orientation of multinational enterprises present in each country should be studied in relation to the inward FDI, as to provide a better understanding of different location characteristics importance for these companies' investment decision abroad.

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