ISSN 2069 - 5756

Faculty of Business and Administration
University of Bucharest

International Journal of economic behavior

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2015 vol. 005

International Journal of economic behavior

Editor
Fabio Musso

EDITURA T3

Tipărit la **Editura LVS Crepuscul**
Prahova, Ploieşti, str. Gh. Gr. Cantacuzino nr. 23.
Tel: 0244-511244, fax: 0244-519466
www.crepuscul.ro

THE IMPORTANCE OF INTERDISCIPLINARITY

Editorial of the 2015 issue of the International Journal of Economic Behavior

Since 1970s several authors (Benton, 1976[1]; Dymsza, 1984[2]) stressed the need for adopting an interdisciplinary approach. According to Brewer (1999)[3] "*interdisciplinarity generally refers to the appropriate combination of knowledge from many different specialities - especially as a means to shed new light on an actual problem*".

Nissani (1997)[4] identified ten advantages of adopting interdisciplinary knowledge and research, and one of the most important is that several intellectual, social, and practical problems need interdisciplinary approaches.

Finally, during the last decade, the vast majority of call for papers, textbooks and research initiatives required or offered and interdisciplinary approach (Knights and Willmott, 1997)[5].

The International Journal of Economic Behavior is multidisciplinary in nature and the papers collected in this issue contribute in enhancing the adoption of interdisciplinarity, especially providing stimuli for future research of economic behavior and management perspectives.

The first paper by Amron Mahmud explores the role of corporate performance in a developing economy (i.e. Indonesia), and particularly if SMEs' learning orientation, marketing orientation and innovation have an impact on corporate performance. Using a sample of 110 SMEs and adopting a structure equation model, the author demonstrate that there is a positive relationship between learning orientation, market orientation and corporate performance.

The second paper authored by Simplice A. Asongu presents theoretical justifications and empirical validity as to why, the conception and definition of the financial system by the informal financial sector from a macroeconomic perspective is anachronistic and antagonistic. In order to achieve this objective, the author presents recent findings on the weight of the sector. Results reveal that the informal financial sector can only be marginalized at the cost of misunderstanding current burgeoning trends in mobile phone penetration, knowledge economy and poverty.

The main objective of the third paper by Widuri Kurniasari and Yusni Warastuti is to investigate whether there is a relationship between Corporate Social Responsibility, Profitability and Firm Value. By using regression analysis, the authors find a positive relationship between profitability and firm value. Results also reveal that Corporate Social Responsibility has no effect on firm value.

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The fourth paper written by Lukman Raimi, Adeniyi Olubunmi Fadipe and Morufu Oladimeji Shokunbi examines the possibility to make a case for responsible investment as an alternative funding mechanism for roads-bridges management in Nigeria, through the adoption of a Public-Private Partnership framework. Adopting discursive approach, the paper provides an important implication for responsible investors in Nigeria and emphasizes that the success of any tolls collection systems mainly depend on effectiveness of governance, probity and accountability.

The fifth paper, written by Wei-Bin Zhang, is focused on consumers' wealth accumulation and consumption behavior. In detail, the author build a dynamic economic model of heterogeneous households in order to explain some economic mechanisms of how the richest one per cent of the population own 50% of national wealth. Main results highlight that the main determinants of growth and inequality are endogenous wealth and human capital accumulation under perfectly competitive conditions.

Another quantitative research is undertaken by Sulaimon Olanrewaju Adebiyi, Emmanuel Olateju Oyatoye and Bilqis Bolanle Amole. This sixth paper is focused on the application of a particular process, the Analytic Hierarchy Process, for creating seven criteria for customers` churning of network and investigating the relative priorities of the criteria. Using a sample of 408 mobile phone subscribers in Lagos state, results reveal the utility of the model for marketing decisions.

The eighth paper by John R. Wingender, Vasant Raval and Samantha J. Schuett is based on an event study exploring the implementation of the Balanced Scorecard. The authors indicate and suggest how to implement balanced scorecard for aligning the business strategy with the short-term operations.

The final paper by Arthur Tarasov is an experiment for testing whether people may consider equal outcomes unfair and willing to penalize the others for distributing money equally with them. Results highlight that people's fairness conceptions diverge and decisions to distribute money equally are considered fair about as often as decisions to maximize outcome.

The managing editor wants to thank the editor-in-chief of International Journal of Economic Behavior, Fabio Musso, all the reviewers and all the authors who submitted papers to this issue. I wish to give my thanks to the members of our Editorial Board, who contribute immensely to bringing this 2015 issue to this stage.

Barbara Francioni

Managing Editor

DETERMINANTS OF CORPORATE PERFORMANCE: A STUDY ON FURNITURE COMPANIES IN JEPARA INDONESIA

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Received: *June 29, 2014* Accepted: *October 8, 2014* Online Published: *March 12, 2015*

Abstract

The aims of this research were to analyze corporate performance through learning orientation, leader's characteristics, market orientation, and innovation in furniture industries in Jepara, Indonesia. The samples in this research were 110 small and medium enterprises. Based on SEM analysis results, the seven research hypothesis used were; (1) learning orientation has significant effect on corporate performance; (2) learning orientation has significant effect on innovation; (3) leader's characteristics do not have significant effect on corporate performance; (4) leader's characteristics have significant effect on innovation; (5) market orientation has significant effect on innovation; (6) market orientation has significant effect on corporate performance; (7) Innovation does not have significant effect on corporate performance. After the test and analysis, it was found that five out of the seven hypotheses were accepted and two out of them were rejected.

Keywords : corporate performance, innovation, market orientation, leader's characteristics

1. Introduction

Market orientation approach assists organization to adjust with its environment, and it is used as an effort to develop competitive advantages. Therefore, a more organizational-oriented market will be more capable of accessing its goal. Consequently, a company requires market orientation more than other strategic approaches to be successful. In addition, learning orientation is also required to be able to support the market and behavioral-oriented vision strength in organization.

Actually, learning orientation known as the acceptance of learning process in organization enables a company to continue the creation of the knowledge needed for marketing its products, technology, and relevant processes, and it is highly associated with introduction and action against market opportunity in an unstable environment (Slater and Narver, 1995). The condition of highly competitive and dynamic competition demands

aggressive and innovative attitudes. Besides, the tight competition also affects companies to be more flexible, adaptive, and responsive.

The emergence of innovation or innovation product is essentially to meet market demands so that innovation product is one of competitive advantages for companies. Innovation products are believed to be able to increase sales, profit, and competitiveness of a business organization, but the development of innovation products also means expensive products and risks for a company. Therefore, an appropriate and accurate coordination is required among the departments in a company to produce appropriate products for market. Hadjimanolis (2002) linked the owner's and corporate characteristics to innovation, and found the positive effect on corporate performance measured by profitability, size, market share, and sales growth. Thus, based on the research, the final result of innovation was corporate performance. Han and Rajendra (1998) stated that innovation product has positive effects on corporate performance.

The researches in relation with leader's characteristic to market orientation were conducted by Jaworski and Kohli (1993), and the results were; leader factor affected market orientation. Furthermore, the roles of senior manager are the important factor in supporting market orientation development.

By adapting the insights and researches above, this research was conducted to the furniture industries in Jepara Regency, Central Java Province. The reasons and considerations were; first, according to Sadler (2004), the research on small medium enterprises has no functional separation in small businesses and organizational work. They are easier to explore, and the entrepreneurship and managerial competencies can be found in each manager individually. In addition, small businesses are considered to contribute significantly in innovation. Then, Sadler (2004) also suggested that the research in small companies is full of individuals running their operational, managerial, and entrepreneurial functions.

The second reasons and considerations were that furniture industry is one of major trade commodities and export activities in Central Java mostly located in Jepara Regency, and until recently they are still actively involved in export and trading activities. Central Java Province, since 2001, has launched the program to develop export and trade with the purpose to encourage the development of trade and non oil and gas export of regional superior products that will affect economic development and employment. As the center for wooden furniture industry in Indonesia, Jepara Regency has a very important role in national economy. According to Roda et al., (2007), there were 15,271 furniture industries in Jepara and employed 176,470 workers. Based on the data of the Center Bureau of Statistic (BPS) of Jepara Regency in 2007, total furniture trade from Jepara in 2007 reached 37,894,523.92 kg of furniture with the production value of US$ 94,640,782.15.

Loebis and Schmits (2005) stated that wooden furniture industry is one of industries that can survive in economic crisis in 1997. It was found from the furniture industry growth in Jepara and the increase of employment rate. The number of wooden furniture industries in 1997 was 2,439 and the number of the industry in 2007 increased to 3,710 (the Cooperative, Trade, and Industry Agency of Jepara Regency, 2008). Similarly, the number of employment in 1997 was 38,264 workers and increased to 49,192 workers in 2007.

Considering the contribution provided by the furniture industry, furniture industry must get attention, not only in the market aspect of teak wood furniture in Jepara but also in the aspects of corporate performance and marketing.

As the description, the fluctuation of export activities in Jepara Regency, based on the empirical data on the potency of furniture industry in 2009-2011, can be seen in Table 1 below:

Table 1 – Report of export value in Jepara Regency, 2009 - 2011

No	Year	Value (in US$ millions)	Number of Destination Countries	Number of Exporters
1	2009	101.04	106	265
2	2010	131.39	105	290
3	2011	138.04	105	276

Source: http://disperindag.jeparakab.go.id/index.php/web/data/9

Table 1 shows that the number of the destination countries for furniture export decreased from 2009 to 2011. Similarly, the number of exporters increased from 2009 to 2010, and then dropped from 2010 to 2011. However, the value increased from 2009 to 2011.

Based on the source of the Regional Government, the decrease of export volume was caused by the quantity of rejected furniture since they did not meet the quality required by consumers. The rejected products were priced cheaply. This statement was in line with the managements' in Jepara Regency who stated that every product which was not suitable with consumers' orders was not paid fully (100%), but it was priced based on its incompatibility, e.g. only 80%. Therefore, it is necessary to improve the products concerning the requirements required by consumers.

The furniture industries in Central Java are only considered as the tailors because they do not have clear basic design, just imitate, minimum innovation, and tend to be controlled by buyers. In addition, the decrease of export volume was caused by the crisis which struck the European countries as the export destination countries.

2. Corporate Performance

There have been many studies recognizing the importance of innovation on corporate performance. This study was discussed in a variety of academic research perspectives in the form of conceptual and empirical research; (Prajogo, 2006), (Salomo et al., 2008), (Akgun, Keskin, & Byrne, 2009), (Rosenbusch, Brickmann, & Bausch, 2010) and (Gunday et al., 2011). They introduced changes in organization structures and processes with a view of trying or improving performance levels. An empirical study of organizational innovation and performance shows that high-performing organizations have a stronger relationship between the level of innovation in their social and technical systems. The empirical study studied the relationship between the types of innovation and corporate performance. In this study, corporate performance was divided into innovative, production, market and financial performances, and innovation was classified into four types; product, process, marketing and organizational innovations.

The findings have revealed positive effects of innovation on corporate performance in the furniture industries. They also show innovative performance as a mediator role between the types of innovation and performance aspects. The findings support the strategy of innovation as a key driver of corporate performance and should be executed as an integral part of a business strategy to improve operational performance (Gunday et al., 2011).

Significant corporate performance can be achieved if a company prioritizes innovation and manages innovation from a strategic perspective. It was demonstrated in a study by Salomo et. al., (2008) showing that the orientation of innovation has an indirect effect on performance mediated by the innovation of a new product portfolio of the company. Exploratory and exploitative innovation have positive effects on firm performance. Companies need to introduce innovations in the exploration of dynamic environment so that they will find the premium market segment to develop and survive. Meanwhile, in a less

competitive environment, companies can keep their current business systems with an exploitative innovation of low cost risk which is more beneficial to improve performance companies (Li et al., 2010). Corporate performance is the achievement of a company's business objectives as established by the maximum benefit to be able to sustain growth and development. The corporate performance indicators consist of four indicators, i.e. sales, profit, new product growth, and employee productivity.

2.1. The Role of Learning Orientation, Innovation on Corporate Performance

Several studies on the relationship of learning orientation, innovation and performance can be seen from the research results of the researchers (Calantone et al., 2002 and Aragon et al., 2007). In global competition, innovation acts as a key driver to address the issues of quality, quantity and speed. Companies strive to optimize their design search and new values in the form of new products, processes or ways of doing business.

The effectiveness of management in the innovation process requires a set of innovation balance related to all drivers of innovation such as leadership, culture and community participation and results associated with financial innovation and when to enter the market. Innovation uses all inputs, such as leadership, employee participation process, innovation strategy, innovation resources, customer feedback process, portfolio of innovation projects, and supplier participation to produce the products of innovation process. The results consist of customer, employee, organizational and overall performance impacts (Dervitsiotis, 2010).

Innovation is a multidimensional concept used as a framework for analyzing business performance, firm innovation and related contextual factors. Thus, innovation is defined as product, process, and organizational innovations, and management systems (Neely et al., 2001). In the context of innovation, it is deemed to affect company's capacity to innovate and the actual level of innovation. Innovation does not only refer to a result or a new idea but also the process of emerging ideas (Gupta, Tesluk, & Taylor, 2007). This definition also has some similarities in terms of innovation as a process and as a result (Crossan and Apaydin, 2010).

Innovation positively affects business performance (Carmen et al., 2009), and the innovations of products and processes have a strong and positive relationship with Vendor performance (Murat Ar, Ilker and Baki, Birdogan, 2011).

Previous researchers had extensively discussed the effect of innovation on corporate performance (Hernandez Delgado-Ballester Espallardo, 2009 and Salomo et al., 2008). For example, the empirical research show that innovation has a positive effect on company performance, such as innovation, production, marketing and financial performances (Gunday et al., 2011).

Based on the literature review on the kinds of innovation, understanding innovation in an organization must distinguish between how innovation is implemented and what the results of innovation that will ultimately affect corporate performance. In determining corporate, an innovation process must precede the results of innovation. Therefore, to adjust the proposed framework, the definition of innovation is "an interactive process that involves multidimensional organizational factors held or carried through the stages of the innovation process in producing innovation outcomes, such as products, services, processes and business models which are relatively new to the organization" (Suriati et al., 2011).

3. Research Method

3.1. Samples

The data used in this research was primary data, and the sampling technique was purposive sampling. The samples in this research were 110 companies in order that the data obtained was representative enough to use the analysis technique of Structure Equation Model (SEM).

3.2. Operational Definition and Measurement

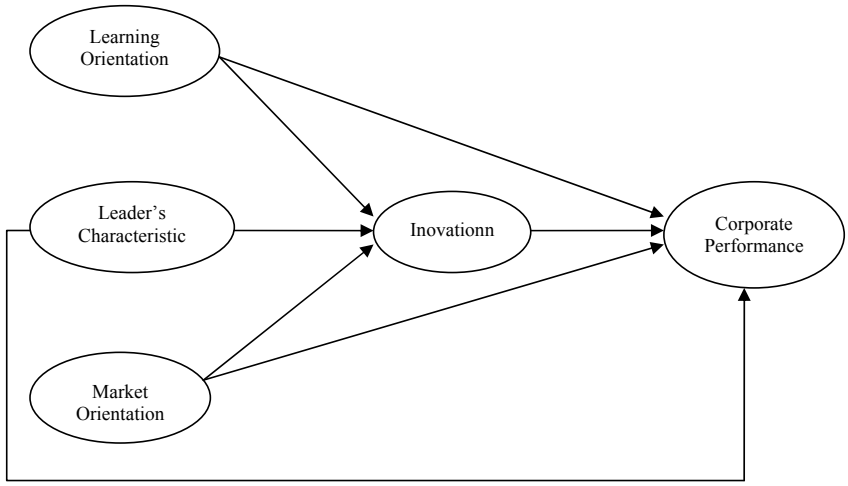
The operational definition and measurement of this research could be explained in the following table:

Table 2 – Operational Definition and Measurement

Variables	Operational Definition	Measurement
Learning Orientation	A process in which the members of an organization develop mutual values and knowledge based on their own and other's past experiences. The learning orientation measured refers to Sinkula et al., (1997) ; Moorman and Miner (1998) and Nikoomaram (2011), with the operational measures, i.e.: commitment to study, mutual vision, mind openness, and sharing knowledge among organizations.	1 to 10 (Totally Disagree – Totally Agree)
Leader's Characteristics	It is the attitudes of leaders in communicating, the attitudes to risk, educational level, mobility level, the attitudes toward changes and the actions taken that will affect their subordinates. The indicators of leader's characteristics refer to Hadjimanolis (2002) and Salomo et al.,(2008), with the operational measures, i.e.: commitment, knowledge on innovation, manager's experience, and risk taking.	1 to 10 (Totally Disagree – Totally Agree)
Market Orientation	An orientation concept focuses on the creation of high value for consumers. The indicators of market orientation measured refer to Narver and Slater (1990) and Oudan (2012), with the operational measures, i.e.: customer's orientation, competitor's orientation, and inter-functional coordination.	1 to 10 (Totally Disagree – Totally Agree)
Innovation	An introduction to tools, legal system, products or services, and new production process technology, administration system, structure, or planning program to be adopted by an organization. The indicators of innovation measured refer to Hurley and Thomas (1998) and Carmen et al., (2009), with the operational measures, i.e.: innovation culture, administration innovation, and technical innovation.	1 to 10 (Totally Disagree – Totally Agree)
Corporate Performance	It is a measurement of success or achievement achieved by a company measured every certain period of time. The indicators of performance measured refer to Harris and Ogbonna (2001) ; Bae and Lawler (2000); Gunday et al., (2011), with the operational measures, i.e.: corporate growth, profit growth, and new product growth, and employee's productivity.	1 to 10 (Totally Disagree – Totally Agree)

Concerning the above explanation, the correlation can be described in the form of the following relationship of the theoretical frameworks variables (Figure 1):

Figure 1 – Theoretical Framework



3.3. Analysis Technique

The research analysis used Structure Equation Model (SEM) of the computerization package AMOS 16. The selection of the causal modeling of AMOS described the associations hypothesized between the constructs explaining causalities that included staged causality.

By considering the complexity of data measurement, the technique proposed was multivariate technique of SEM. Concerning the presence of ability in developing the model, it is still efficient statistically to have more than one dependent and independent variables when the other multivariate techniques, such as multiple regression, factor analysis, multivariate analysis of variance and discrimination analysis, can only explain one single association in a particular time.

Therefore, SEM computerization program was chosen in analyzing the relevant research data by answering the research questions, like the tools used in previous research. A complete SEM modeling basically consists of measurement model and structure model. Structure model is a model on relational structure that forms and explains inter-factor causality (Ghozali, 2008).

To make a complete modeling, several measures to do are:

1. Theoretical-based model development
2. Composing Path Diagram
3. Path Diagram conversion into equation
4. Selecting matrix input and analysis technique
5. Assessing problem identification
6. Evaluating the criteria of Goodness-of-fit
7. Model interpretation and modification.

4. Results and Discussion

4.1. Structural Equation Model (SEM)

Model feasibility test was entirely conducted by using the analysis of Structure Equation Model (SEM) which was also used to analysis the hypothesis proposed. The summary of the model feasibility test of confirmatory factor analysis is as follows (Table 3).

Table 3 – The Results of Model Feasibility Test Using Confirmatory Factor Analysis

Goodness of Fit Index	Cut-off Value	Analysis Results	Model Evaluation
Chi-square	<152.09 (5%, 125)	122.684	GOOD
Probability	≥0.05	0.542	GOOD
RMSEA	≤0.08	0.000	GOOD
GFI	≥0.90	0.887	MARGINAL
AGFI	≥0.90	0.845	MARGINAL
TLI	≥0.90	1.002	GOOD
CFI	≥0.95	1.000	GOOD
CMIN/DF	≤2.00	0.981	GOOD

Source: Processed primary data

The results of the data processing analysis show that all constructs used to make a research model in the analysis process of SEM full model meet the determined criteria of goodness of fit. The size of goodness of fit showing the fit condition is caused by the chi-square score of 122.684 which is smaller than the determined cut-off value (152.09) with the probability value of 0.542 or more than 0.05. This value does not show the difference between the sample's and population's covariance matrix estimated. The other size of goodness of fit also shows good condition, i.e.; TLI (1.002), CFI (1.000), CMIN/DF (0.981), RMSEA (0.000), and they meet the criteria of goodness of fit. In other hand, the values of GFI (0.887) and AGFI (0.845) are still in tolerance limit so that they can be accepted.

The calculation results to the criteria of goodness of fit in the program of AMOS 16 show that the confirmatory analysis and Structural Equation Modeling in this research can be accepted in accordance with the fit model with the Chi-Square score of 122.684 which is smaller than the determined cut-off value (152.09) with the probability value of 0.542 or more than 0.05. This value does not show the difference between the sample's and population's covariance matrix estimated. The other size of goodness of fit also shows good condition, i.e.; TLI (1.002), CFI (1.000), CMIN/DF (0.981), RMSEA (0.000), and meets the criteria of goodness of fit. In other hand, the values of GFI (0.887) and AGFI (0.845) are still in tolerance limit so that they can be accepted. Based on the fit model, the test can be conducted to the five hypothesis proposed in this research.

4.2. Hypothesis Test 1

H_1: *Learning Orientation has positive effect on Corporate Performance*

The results of this research indicate that H1 in the research is acceptable because the estimation parameter of the two variable relations was 0.459 and the test shows significant results with CR value = 3.083 that meets the requirement of >1.96, with the probability = 0.002 that meets the requirement of test probability of below 0.05.

The Relation between Learning Orientation and Corporate Performance

Data respondents indicated that the mean of learning orientation index is high with the indicators of mind openness and placed the highest position index in the variable of learning orientation. It was then followed by the commitment to study and share knowledge between organizations, and the last is mutual vision.

These data indicate that the respondents' learning orientation was good enough so that it supported the improvement of corporate performance. It is in accordance with the research of Calantone et al (2002) and Aragon et al (2007).

4.3. Hypothesis Test 2

H_2: *Learning Orientation has positive effect on Innovation*

The estimation parameter of the two variable relations was 0.367. The test shows significant results with CR value = 4.981 that meets the requirement of >1.96, with the probability = 0.000 that meets the requirement of test probability of below 0.05. Thus, H_2 in this research can be accepted.

The Relation between Learning Orientation and Innovation

From the research conducted, it can be concluded that the second hypothesis can be accepted. The mean of learning orientation index is high with the indicator of mind openness and places the highest position index in the variable of learning orientation. It is then followed by the commitment to study and sharing knowledge among organizations, and the last is mutual vision.

The respondents' opinions with high mean of index and the results of data processing show that the respondents' learning orientation is very good so that it supports the improvement of corporate innovation. It is in accordance with the research of Hurley and Thomas (1998) stating that learning orientation is an antecedent of innovation, and learning orientation is positively associated with innovation. However, it is different from the research results of Sinkula (1999) suggesting that learning orientation has direct effect on performance, but it also has indirect effect on product innovation.

4.4. Hypothesis Test 3

H_3: *Leader's Characteristic does not have significant effect on Corporate Performance*

Hypothesis H_3 in this research is rejected, The test shows significant results with CR value = 0.260 that does not meet the requirement of >1.96, and with the probability = 0.795 that does not meet the requirement of test probability of below 0.05. Meanwhile, the calculation result of the estimation parameter of the two variable relations was 0.037.

The Relation between Leader's Characteristics and Corporate Performance

Hypothesis H_3 is not accepted in this research, It means leader's characteristic does not have the significant role so that it does not affect corporate performance. The mean of leader's characteristic index is medium with the indicator of innovation knowledge and places the highest position index in the variable of leader's characteristic. It is then followed by risk taking and manager's experience, and the last is commitment.

The respondents' opinions with the medium mean of index and the results of data processing show that the respondents' leader's characteristic are quite good so that it supports the improvement of corporate performance. The facts this research shows are in line with the research of Jaworski and Kohli (1993) and Gunday et al., (2011) stating that continuous support or attention of top management to employees make the employees be more sensitive and responsive to market which finally influences corporate performance.

4.5. Hypothesis Test 4

H_4: *Leader's Characteristic has positive effect on Innovation*

According the facts of this research, they show that the estimation parameter of the two variable relations was 0.280. The tests show significant results with CR value = 3.293 that meets the requirement of >1.96 with significant probability. The facts of this study show that H_4 in this research can be accepted.

The Relation between Leader's Characteristics and Innovation

The facts of this research show that the forth hypothesis can be accepted. In this research, leader's characteristic has significant role so that it can affect innovation. The mean of leader's characteristic index is high when it is viewed from the indicator of innovation knowledge and places the highest position index in the variable of leader's characteristic. The results of this research are in line with the research of Daellenbach et al., (1999) and Carmen et al., (2009) stating that the Leader's Characteristic of a team management and CEO characteristics have positive effect on commitment to innovation.

4.6. Hypothesis Test 5

H_5: *Market Orientation has positive effect on Innovation*

Hypothesis H_5 in this research can be accepted because the estimation parameter of the two variable relations is 0.344, and the tests show significant results with CR value = 3.083 that meets the requirement >1.96 with the probability of 0.003 (below 0.05).

The Relation between Market Orientation and Innovation

The implications of the research data are the mean of market orientation index is high in this research, and the market orientation has significant role so that it can affect innovation. In addition, when it is viewed from the indicators, the competitor's orientation places the highest position index in the variable of market orientation which is then followed by inter-functional coordination and customer's orientation. The variable of market orientation indicates that the market orientation is highly important to do by the furniture companies in Jepara to perform innovation (Oudan, 2012).

4.7. Hypothesis Test 6

H_6: *Market Orientation has positive effect on Corporate Performance*

The effect of market orientation on corporate performance can be seen in the results of the estimation parameter to the two variable relations of 0.459. H_6 in this research can be accepted because the tests show significant results with CR value = 2.304 that meets the

requirement of >1.96, with the probability = 0.021 that meets the test probability requirement of below 0.05. It shows that market orientation affects corporate performance.

This research result is in line with the research of Baker and Sinkula (1999) that market orientation has positive effect on organization's performance and will result in competitive advantage for a long period of time (Slater and Naver, 1995; Noble et al., 2002 and Salomo et al., 2008).

4.8. Hypothesis Test 7

H_7: *Innovation does not have significant effect on Corporate Performance*

The results of this research indicate that H_7 in this research is rejected because of the following facts; the estimation parameter of the two variable relations is -0.278 and the tests does not show significant results with CR value = -1.003. It does not meet the requirement of >1.96, and the probability = 0.316 does not meet the test probability requirement of below 0.05. It shows that innovation does not affect corporate performance directly.

This research results are in line with the research of Olson and Bokor (1995) and Hadjimanolis and Dickson (2000) stating that the level of corporate innovation does not have significant effect on corporate performance measured by sales growth.

5. Conclusion

The research results can conclude that there was a significant relationship between learning orientation and market orientation on corporate performance. On the other hand, leader's characteristics and innovation did not significantly influence corporate performance. It is possible because the research found that most of Jepara furniture companies only served the design orders with specified motive of the buyers (importers). Therefore, Jepara furniture companies have no chance to develop their innovative designs and motives in serving their buyers (importers).

The results also show that learning orientation, leader's characteristics and market orientation have significant relationship to innovation. It indicates that, to increase innovation, Jepara furniture companies need to make the right policy at the variable of learning orientation, leader's characteristics and market orientation.

Meanwhile, in an effort to improve the corporate performance, it is suggested that Jepara furniture companies should create the policies that take into account the variables of learning and market orientation so that Jepara furniture companies' performance can be increased.

This research is also expected to be a reference for other researchers interested in studying in the field of marketing, especially related to corporate's marketing performance.

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MAY THE SOUL OF THE IFS FINANCIAL SYSTEM DEFINITION RIP IN DEVELOPING COUNTRIES

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Received: *October 9, 2013* Accepted: *November 3, 2014* Online Published: *March 14, 2015*

Abstract

In this paper, we dissect with great acuteness contemporary insufficiencies of the IFS (2008) definition of the financial system and conclude from sound theoretical underpinnings and empirical justifications that the foundation, on which it is based, while solid for developed countries, holds less ground in developing countries. Perhaps one of the deepest empirical hollows in the financial development literature has been the equation of financial depth in the perspective of money supply to liquid liabilities. This equation has put on the margin (and skewed) burgeoning phenomena of mobile banking, knowledge economy (KE), inequality…etc. We conclude that the informal financial sector, a previously missing component in the IFS conception and definition of the financial system can only be marginalized at the cost of misunderstanding recent burgeoning trends in mobile phone penetration, KE and poverty. Hence, the IFS definition has incontrovertibly fought its final dead battle and lost in the face of soaring trends highlighted above. Despite the plethora of econometric and policy-making sins the definition has committed in developing countries through bias estimates and misleading inferences, may its soul RIP.

Keywords : Banking; Mobile Phones; Shadow Economy; Financial Development; Poverty

JEL Classification: E00; G20; I30; O17; O33

1. Introduction

The title of this paper will strike some as fanciful and earthshaking, heartbreaking and eye-catching for others. The International Financial Statistics (IFS, 2008) definition by the International Monetary Fund (IMF)? To rest in peace (RIP)? Surely not. Or at least surely not for developed countries. However, this lamentation is a subject to controversy in developing countries and motivates no tears or elements of consolation. Not least, because one of the deepest empirical hollows in the financial development literature has been the equation of financial depth in the perspective of money supply to liquid liabilities. This equation has put on the margin, some burgeoning phenomena in the informal financial sectors of developing countries. Among others, mobile banking and microfinance (or in one conception 'informal

finance') are elements of consolation for developing countries as the soul of the IFS conception and definition of the financial system RIP.

In this paper we dissect with great acuteness and contextualize the IFS definition of the financial system in developing countries in order to provide an updated account of the circumstances surrounding the definition in these countries. Hence, we present theoretical justifications and empirical validity as to why, the conception and definition of the financial system by the IFS from a macroeconomic perspective is anachronistic and antagonistic. To this effect, we present recent findings on the weight of the informal financial sector (that is neglected in the definition); notably its nexuses with mobile banking, knowledge economy (KE) and inequality.

Recent findings on the dynamics of the KE-finance nexuses have shown: (1) the informal financial sector (a previously missing component in the definition by the IFS) significantly affects dimensions of KE; (2) disentangling the existing measurement (of the financial system) into its constituent components of formal (banking) and semi-formal (or other financial institutions) sector indicators improves dynamics of the KE nexus; (3) introducing measures of sector importance (competition) is relevant in understanding the dynamics of financial sector competition on KE (Asongu, 2012). In fact, recent findings have prompted a complete rethinking of the definition of financial depth in developing countries after the burgeoning phenomenon of mobile banking could not be effectively appreciated with traditional financial development indicators.

Accordingly, with a relaxation of the IFS assumption on the marginality of the informal sector adopted, the informal financial sector has been found to be endogenous to how mobile phone penetration has positively affected financial development in developing countries (Asongu, 2013). Sound empirical evidence has also shown that, the informal financial sector significantly mitigates poverty through its positive income redistributive effect on household income (Asongu, 2013, 2014a).

In light of the weight of sound theoretical underpinnings (to be detailed below) and the empirical justifications highlighted above, the IFS (2008) definition for the financial system in developing countries has fought its final dead battle and lost. Accordingly, even before the strong advent of information & communication technologies (ICT) and KE in developing countries, it was factual that: "a great chunk of the monetary base (M0) in developing countries does not transit through the formal banking sector, hence, the equation of money supply (M2) to liquid liabilities fails to take account of the informal financial sector which substantially contributes to the circulation of currency". The rest of the paper is organized as follows. Section 2 discusses recent trends on linkages between informal finance and burgeoning phenomena. Section 3 states the problem, rethinks financial development indicators and presents first generation solutions. Second generation solutions are discussed in Section 4. We conclude with Section 5.

2. The burgeoning phenomena of informal finance, KE, mobile banking and, poverty

2.1. Informal finance and Knowledge Economy (KE

Consistent with the World Bank (2007, p.73), a KE cannot be built without finance. For small entrepreneurial projects in developing countries, funding needs may be relatively small (informal) and microfinance mechanisms are sufficient. Hence, the need for sector-importance (and informal financial) measurements which appreciate microfinance mechanisms. Spreading rapidly throughout the world following the pioneering initiative of the Bangladesh Grameen Bank, microfinance hinges on the social responsibility of borrowers belonging to a narrow group to ensure repayment (Asongu, 2012). Other entrepreneurial

projects require a great amount of development capital. Indeed a broad range of financial services (formal, semi-formal and informal) are necessary to support growth and entrepreneurship in knowledge-based economies in the developing world, as elsewhere (World Bank, 2007). But why is KE relevant in developing countries?

It has become crystal clear that for any country, region or continent to be actively involved in the global economy it has to be competitive in KE. Europe and North America have mastered the dynamics of KE and inexorably driving development in the global and international arena. Other regions like Asia and South America are reacting in calculated steps that underscore the role of KE in the current pursuit of national, regional and international initiatives (Tchamyou, 2014). The governments of The Newly Industrialized Economies (Hong Kong, Korea, Taiwan & Singapore, Malaysia and China) led by Japan are playing a substantial role in their moving towards KE from the 'product economy' in the post-industrialization period (Chandra & Yokoyama, 2011). The main idea is that the process of creation and diffusion of knowledge is contingent on financial sectors that are the outcome of financial policies. Hence, it is important to identify how financial sectors promote the diffusion of knowledge.

2.2. Informal finance and mobile banking

The mobile revolution has transformed the lives of many people in developing countries, providing not just communications but also basic financial access in the forms of phone-based money transfer and storage (Jonathan & Camilo, 2008; Demombynes & Thegeya, 2012). The high growth and penetration rates of mobile telephony that are transforming cell phones into pocket-banks in developing countries is providing opportunities to increase affordable and cost-effective means of bringing on board a large chunk of the population that hitherto has been excluded from formal financial services for decades. Such a transformation is the focus of interest not only to banks and Micro Financial Institutions (MFIs) but also to governments, financial regulators as well as development partners who are providing support to improve the livelihoods of the poor through poverty reduction and sustained economic growth.

There are four principal avenues along which the incidence of mobile phone penetration on mobile banking could be discussed. The first strand captures the usefulness of mobile financial informal transactions (store of value, conversion of cash and, transfer of stored value). In the second strand, the concepts of savings (basic or partially integrated) in mobile banking are elucidated. The third strand relates mobile banking to GSM phones whereas the fourth presents some statistics on the proliferation of mobile banking in some developing countries (Asongu, 2015a; 2015b).

In the first strand, Jonathan & Camilo (2008) have emphasized, most mobile transactions[1] in the developing world enable users to do three things. (a) Store and preserve value (currency) in an account accessible through a handset. When the user already has a bank account, this is generally an issue of linking to a bank account. If the user does not have an

[1] "In order to have a mobile money account and make a deposit, a customer must own a cell phone SIM card with the mobile operator and register for a mobile money account. The customer then makes cash deposits at the physical offices of one of the operator's mobile money agents. These cash deposits create electronic money credit in the account. Customers can make person-to-person transfers of mobile money credit to the accounts of other mobile money users in the same network. They can also use their mobile money credit to pay bills and to buy phone airtime. Withdrawals (conversion to cash) could be made at the offices of the network's mobile money agents. There is also a possibility for a mobile money customer to make a transfer to someone who is not registered with the same network. In this case, when notice of the transfer is received through an SMS text message, the recipient can receive the cash at a mobile money agent" (Demombynes, & Thegeya, 2012).

account, then the process creates a bank account for him/her or creates a pseudo bank account, held by a third party or the user's mobile operator (Asongu, 2013). (b) Convert cash into and out of the account that stores value. When the account is linked to a bank account, then users can visit banks to cash-out and cash-in. In many cases, users can also visit the GSM providers' retail stores. In most flexible services, a user can visit a corner kiosk or grocery store (maybe the same one where he/she purchases airtime) and perform a transaction with an independent retailer working as an agent for the transaction system. (c) Transfer of stored value between accounts. Users can generally transfer funds between accounts linked to two mobile phones, by using a set of SMS (or menu commands) and PIN codes. The new services offer a way to move money from place to place and present a genuine alternative to the payments system offered by banks, pawn shops, remittance firms…etc.

The growth of m-banking (payments) systems has been particularly significant in the Philippines (where three million customers use systems offered by mobile operators Smart & Globe; Neville, 2006); Kenya (where nearly two million users registered with Safaricom M-PESA system within a year of its nationwide rollout, Vaughan, 2007; Ivatury & Mas, 2008) and South Africa where 450, 000 people use Wizzit ('the bank in your pocket'; Ivatury & Pickens, 2006) or one of two other national systems (Porteous, 2007).

The second strand elucidates the concept of savings. Demombynes & Thegeya (2012) have tackled the mobile-finance nexus through this concept. They distinguish two types of mobile savings.

(a) *Basic mobile* savings; that is purely and simply the use of a standard mobile money system such as M-PESA to store funds. These basic mobile savings are not subject to interest. Bank-integrated mobile savings approaches have received a great deal of attention as a way to provide banking services to the poor. They have the edge of offering access to basic banking services without requiring substantial proximity to a physical bank branch. Therefore, with a bank-integrated mobile savings account, basic banking services can be accessed via network of mobile phone agents, which in Kenya outnumber the weight of bank branches significantly (Mas & Radcliffe, 2011).

(b) The term '*partially integrated'* mobile savings system is also used to describe situations where bank account access through mobile phones depends on the establishment of a traditional account at a physical bank. Additionally, banks are beginning to build their own agent networks in order to assume a more competitive bargaining standpoint in accessing mobile service platforms. Fully and partially integrated savings present different types of contracts between the partnering bank and mobile service provider.

Consistent with Demombynes & Thegeya (2012), on the one hand, a partially integrated product clearly delineates the role of the bank (which provides and owns banking services) from that of the mobile service provider (which provides mobile telephony infrastructure and controls the agent network). Hence, the bank compensates the mobile service provider for access to the network and enjoys the remaining profits. This type of contract more closely looks like a debt contract between parties (Asongu, 2013).

On the other hand, a fully integrated solution may not account for the same distinction between bank and mobile service providers. In this case, the distribution of surplus depends on the relative bargaining power of the bank and mobile service provider. This type of contract more closely looks like an equity contract between two parties. Equity-oriented contracts are more likely to be complex and therefore more difficult to negotiate than debt-like contracts, there-by presenting a potential hurdle towards the goal of increasing access (Asongu, 2015a; 2015b).

In the third strand, we analyze how mobile banking is linked to GSM phones. Ondiege (2010), Chief Economist of the African Development Bank has looked at the mobile-finance

nexus from four perspectives. Firstly, the mobile phone can serve as a virtual bank card where customer and institution information can be securely stored, thereby mitigating the cost of distributing cards to customers. In fact he suggests, the subscriber identity module (SIM) card inside most (if not all) GSM phones is in itself a smartcard (similar to the virtual bank card). Hence, the banks customer's PIN and account number can be stored on this SIM card to perform the same functions as the virtual card of the bank. Secondly, the mobile phone could also serve as a point of sale (POS) terminal. Accordingly, a mobile phone could be used to transact and communicate with the appropriate financial institution to solicit transaction authorization. These are similar functions of a POS terminal at mails, retail or other stores.

A mobile phone can duplicate these functionalities quite easily. Thirdly, the mobile phone can also be genuinely used as an ATM. A POS is therefore used to pay for goods and services at the store. If cash and access to savings were to be acknowledged as 'goods and services', that customers buy and store, then the POS will also serve as a cash collection and distribution point that basically is the function of an automatic teller machine (ATM). Fourthly, the mobile phone could be used as an Internet banking terminal. This implies, it offers two fundamental customer services: a) ability to make payments and transfers remotely and; b) instant access to any account. Ultimately, the mobile phone device and wireless connectivity bring the internet terminal into the hands of otherwise unbanked customers (Asongu, 2015a; 2015b).

For a clearer perspective, it is worthwhile blending the above facts (on the proliferation of mobile banking) with figures and statistics in the fourth strand. Consistent with Mbiti & Weil (2011), the story of the growth of mobile phones in Africa is one of a tectonic and unexpected change in communications technology. From virtually unconnected in the 1990s, over 60% of Africa now has mobile phone coverage and there are now more than 10 times as many mobiles as landline phones in use (Aker & Mbiti, 2010). In accordance with Aker & Mbiti (2010), mobile phone coverage in Africa has soared at staggering rates over the past decade. In 1999, only 11% of the African population had mobile phone coverage, in Northern Africa for the most part (Egypt, Algeria, Libya, Morocco and Tunisia), with also significant coverage in Sothern Africa (Kenya and South Africa).

By 2008, 60% of the population (477 million) could get a telephone signal and an area of 11.2 million square kilometers had mobile phone coverage: equivalent to the United Sates and Argentina combined. By the end of 2012, it is estimated that most villages in Africa will have coverage with only a handful of countries relatively unconnected. In line with Demombynes & Thegeya (2012), Kenya has undergone a remarkable ICT revolution. Towards the end of the 1990s, less than 3% of Kenyan households owned a telephone and less than 1 in 1000 Kenyan adults had mobile phone service. However, by the end of 2011, 93% of Kenyan households owned a mobile phone. This substantial soar is largely credited to the M-PESA mobile-banking network (Demombynes & Thegeya, 2012, pp. 23-25; Asongu, 2015a; 2015b).

2.3. Informal finance and poverty

The role of informal finance in poverty alleviation is too obvious to be discussed owing to space constraint (Asongu, 2014a). It would be interesting however to devote space in discussing how mobile penetration mitigates poverty through a form of informal finance. Many lives have been transformed by the mobile revolution, which is providing not just communication but also basic financial access in the forms of phone-based money transfer and storage (Jonathan & Camilo, 2008; Demombynes & Thegeya, 2012; Asongu, 2015a; 2015b). At the 2007 'Connect Africa' summit, Paul Kagame, president of Rwanda eloquently emphasized: "*in ten short years, what was once an object of luxury and privilege, the mobile phone has become a basic necessity in Africa*" (Aker & Mbiti, 2010, p. 208).

An article in *The Economist* (2008) had earlier made this claim: "*a device that was a yuppie toy not so long ago has now become a potent for economic development in the world's poorest countries*". As far as we have reviewed, one of the most exhaustive accounts on the 'mobile penetration' development literature concludes: "*Existing empirical evidence on the effect of mobile phone coverage and services suggest that the mobile phone can potentially serve as a tool for economic development in Africa. But this evidence while certainly encouraging remains limited. First, while economic studies have focused on the effects of mobile phones for particular countries or markets, there is little evidence showing that this has translated into macroeconomic gains*…" (Aker & Mbiti, 2010, p. 224). Empirical validity for these slogans is presented in the second part of Section 4.2.3.

Consistent with Asongu (2015a; 2015b), the equalizing and 'poverty mitigating' incidences of mobile phone penetration could be explained from several angles. Firstly, many lives have been transformed by the mobile revolution thanks to basic financial access in the form of phone-based money transfer and storage (Jonathan & Camilo, 2008; Demombynes & Thegeya, 2012; Asongu, 2015a). Therefore, the significant growth and penetration rates of mobile telephony that is transforming cell phones into pocket-banks in Africa is providing countries in the continent with increase affordable and cost-effective means of bringing on board a large part of the population that have until now been excluded from formal financial services for decades.

Secondly, mobile phones can assist households' budget when confronted with unpredictable shocks which drive poverty. The probability of a poor family incurring drastic loss due to an unpredictable shock is certainly mitigated and lowered when families are able to respond to the shock in a more timely fashion. Therefore, the mobile phone could have the greatest effects on poverty reduction during vulnerable shock experiences via driving down costs associated to the shock. Better financial management and coping with shock include: incurring lower travel costs, less trauma, more efficient action and, improved access to information. Immediate positive feedbacks of income saving and cost mitigation are found particularly during vulnerable situations like death or illness within the family. It is also worthwhile to cite security increases for poor families through reduced loss of poverty. For instance, a family's ability to scale-down the number of overnight hospital days or capacity to avoid transport cost during desperate situations are some major cost saving strategies implemented with the quick dial of the mobile phone (Asongu, 2015a). In a nutshell, the communication device provides a means of timely response, reduced surprises, multi-task and plans during shocks, as well as less time required to physically search individuals during difficult ordeals.

Thirdly, mobile phones could empower women to engage in small businesses (and/or run existing businesses more efficiently), thus enabling them to bridge the gap between gender income inequality. It is also worthwhile to point-out that mobile phones represent long-term economic growth investments for the disadvantaged in income-distribution. Therefore, many households maybe willing to cope with unpleasant sacrifices (such as reduction in food consumption or sanitation in the perceived short-term) in the hope that, the mobile phone would improve their opportunities with income and jobs in the long-run (Asongu, 2015b).

3. Problem statement and solutions

A bias in the definition of the financial system by the IMF is core to this problem statement because it is biased toward the developed world. According to the IFS, the financial system is made-up of the formal and semi-formal sectors; that is, deposit money banks and other financial institutions (see lines 24, 25 and 45 of the IFS, 2008). Whereas this definition could be quasi-true for developed countries, it fails to take account of the informal financial sector

in undeveloped countries. This begs the concern of knowing if the roles of the informal sector (in economic development) discussed in Section 2 above is not just thin air. In this section, we first provide the IFS conception of the financial system in the context of developing countries, before rethinking the premises on which the definition is based and, finally discussing first generation solutions.

3.1. The International Financial Statistics' (2008) conception of the financial system

As detailed in Table 1 below (by Asongu (2012) inspired by Steel (2006)), formal finance refers to services that are regulated by the central bank and other supervisory authorities. Semi-formal finance provides a distinction between formal and informal finance. This is the segment of finance that occurs in a formal financial environment but not formally recognized.

A good example is microfinance. Informal finance is one that is not arranged through formal agreements and not enforced through the legal system. From the fourth column, the last two types of 'saving and lending' are very common in developing countries, particularly among the financially excluded or those on low incomes. Unfortunately, the IFS definition completely marginalizes the last types. We postulate that based on the weight of available evidence, informal finance should no longer be undermined in the definition of the financial system.

Table 1 – Segments of the financial system by degree of formality in Paper's context

Paper's context			Tiers	Definitions	Institutions	Principal Clients
Formal financial system	IMF Definition of Financial System from International Financial Statistics (IFS)	Formal Financial sector (Deposit Banks)	Formal banks	Licensed by central bank	Commercial and development banks	Large businesses, Government
Semi-formal and informal financial systems		Semi-formal financial sector (Other Financial Institutions)	Specialized non-bank financial institutions		Rural banks, Post banks, Saving and Loan Companies, Deposit taking Micro Finance banks	Large rural enterprises, Salaried Workers, Small and medium enterprises
			Other non-bank financial institutions	Legally registered but not licensed as financial institution by central bank and government	Credit Unions, Micro Finance NGOs	Microenterprises, Entrepreneurial poor
	Missing component in IFS definition	Informal financial sector	Informal banks	Not legally registered at national level (though may be linked to a registered association)	Savings collectors, Savings and credit associations, Money lenders	Self-employed poor

Source (Asongu, 2012)

3.2. Rethinking financial development indicators

Consistent with Asongu (2012, 2013), financial development indicators have been universally employed without due regard to regional/country specific financial development realities (contexts). The employment of some indicators simply hinge on the presumption that they are generally valid (Gries et al., 2009)[2]. As far as we have reviewed, but for Beck et al. (1999) and Asongu (2012, 2013, 2014abc), the absence of studies that underline the quality of financial development indicators with regard to contextual development is a significant missing component in the financial development literature.

Some studies have identified the issue, but fallen short of addressing it. Hence, it has been well documented that the financial depth indicator as applied to developing countries is very misleading as it does not integrate the realities and challenges of financial intermediary development (Demetriades & Hussein, 1996; Khumbhakar & Mavrotas, 2005; Ang & McKibbin, 2007; Abu-Bader & Abu-Qarn; 2008). Therefore, a motivation of this work hinges on an existing debate over the contextual quality of financial development indicators. Indeed, as we shall cover in the section on second generation solutions, recent findings have shown that traditional financial indicators based on the IFS definition of the financial system do not capture certain dimensions of KE (e.g mobile banking).

3.3. First generation solutions

Consistent with Asongu (2014a), reforms of the first generation embody a stream of the literature that has raised the concern in the IFS definition but failed to substantially address it because the informal financial sector is not incorporated into the measurement of the financial system. The fundamental concern raised in this strand is that the principal measurement of financial development in the literature has been money supply (M2): an indicator that has been substantially used over the decades to proxy for liquid liabilities (World Bank, 1989; King & Levine, 1993). While M2 can proxy for liquid liabilities in advanced countries, there are a number of shortcomings in the equation of the former to the latter in developing countries. The basis for the criticism is that in nations with less developed financial systems, growth in M2 may not necessarily represent an improvement in bank deposits or liquid liabilities. We discuss proposed solutions in three main strands.

First, Demetriades & Hussein (1996) have addressed the issue by deducting currency that flows outside of the banking system from M2. This new measurement of liquid liabilities reflects the situation of developing countries. While this form of adjustment has been used substantially in the literature (e.g Abu-Bader & Abu-Qarn, 2008), in the correction of the problem, the authors have failed to incorporated the missing informal financial sector that has been traditionally neglected by the IFS financial system definition.

Second, the concern has been tackled by another stream of authors using principal components analysis. In this process, financial depth is combined with other financial development indicators to derive a composite index (Ang & McKibbin, 2007; Gries et al., 2009; Khumbhakar & Mavrotas, 2005; Asongu, 2014a). The fundamental draw-back in this approach is that M2 is mixed with a plethora of financial development variables which in conception and definition may not be directly related to financial depth. For instance, some variables that are combined with M2 include, inter alia financial dynamics of activity (private domestic credit), efficiency (bank credit/bank deposits), size (deposit bank assess/total assets).

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[2]Gries et al. (2009) state: "In the related literature several proxies for financial deepening have been suggested, for example, monetary aggregates such as Money Supply (M2) on GDP. To date there is no consensus on the on the superiority of any indicator" (p. 1851).

Third, Asongu (2012, 2013, 2014abc) has proposed a solution to the problem in which neither financial concepts are mixed nor is the informal financial sector neglected. The author has documented a pragmatic method of articulating the effects of various financial sectors incorporated in M2. Given the substantial weight of the informal financial sector discussed in Section 2, we present the third strand in detail as a second generation solution.

4. Second generation solutions

There are three main justifications for qualifying these solutions as 'second generation' (Asongu, 2014a). First, the missing element of the informal financial sector in the financial system is clearly articulated. Second, the existing indicator of financial system is decomposed into formal and semi-formal financial sectors. Third, this solution clearly incorporates contemporary financial development tendencies like KE dynamics, mobile banking and the burgeoning phenomenon of mobile phone penetration that is substantially positively (negatively) correlated with the informal (formal) sector.

4.1. Propositions

Financial development can either by direct or indirect. Whereas, the former is through financial markets and the latter is via the banking sector or financial intermediary development. In this study, we are limited to the latter dimension, which according to Beck et al. (1999) can be further classified into financial development components of depth (M2), allocation efficiency[3], activity[4] and size[5]. We have already seen that among the indicators, M2 is the most widely employed in the financial development literature.

After decomposing M2 into financial sector components and extending the IFS financial system definition, propositions in Table 2 from Asongu (2012) are obtained. These proportions are founded on insufficiencies of the financial system definition presented in Table 1 and discussed in Section 3.2. Therefore, the previously missing informal financial sector has been incorporated in Asongu (2012, 2013, 2014a). The author has disentangled the existing indicator into formal and semi-formal financial sectors. Moreover, the new measurements proposed could also be used as indicators of financial sector competition. The following sections discuss recent empirical evidence based on the new financial system definition and corresponding indicators.

4.2. Recent empirical evidence

4.2.1. Knowledge economy and informal finance

Based on the propositions above, Asongu (2012) has assessed how financial sector competition plays-out in the development of knowledge economy (KE). He has contributed at the same time to the macroeconomic literature on measuring financial development and responded to the growing field of KE by means of informal sector promotion, micro finance and mobile banking. The study has indeed tested the feasibility of disentangling the effects of various financial sectors on different components of KE. The variables identified under the World Bank's four knowledge economy index (KEI) have been employed in testing three main hypotheses based on seven propositions in Table 2.

[3] Bank credit on bank deposits.
[4] Private domestic credit.
[5] Deposit bank assets / Central bank assets plus deposit bank assets.

Table 2 – Summary of propositions

Propositions	Name(s)	Formula	Elucidation
Panel A: GDP-based financial development indicators			
Proposition 1	Formal financial development	Bank deposits/GDP	Bank deposits[6] here refer to demand, time and saving deposits in deposit money banks.
Proposition 2	Semi-formal financial development	(Financial deposits – Bank deposits)/ GDP	Financial deposits[7] are demand, time and saving deposits in deposit money banks and other financial institutions.
Proposition 3	Informal financial development	(Money Supply – Financial deposits)/GDP	
Proposition 4	Informal and semi-formal financial development	(Money Supply – Bank deposits)/GDP	
Panel B: Measures of financial sector importance			
Proposition 5	Financial intermediary formalization	Bank deposits/ Money Supply (M2)	From 'informal and semi-formal' to *formal* financial development (formalization)[8].
Proposition 6	Financial intermediary 'semi-formalization'	(Financial deposits - Bank deposits)/ Money Supply	From 'informal and formal' to *semi-formal* financial development (Semi-formalization)[9].
Proposition 7	Financial intermediary 'informalization'	(Money Supply – Financial deposits)/ Money Supply	From 'formal and semi-formal' to *informal* financial development (Informalisation)[10].
Proposition 8	Financial intermediary 'semi-formalization and informalization'	(Money Supply – Bank Deposits)/Money Supply	Formal to '*informal and semi-formal'* financial development: (Semi-formalization and informalization)[11]

N.B: Propositions 5, 6, 7 add up to unity (one); arithmetically spelling-out the underlying assumption of sector importance. Hence, when their time series properties are considered in empirical analysis, the evolution of one sector is to the detriment of other sectors and vice-versa.

[6] Lines 24 and 25 of the IFS (October 2008).
[7] Lines 24, 25 and 45 of the IFS (2008).
[8] In undeveloped countries M2 is not equal to liquid liabilities (liquid liabilities equal bank deposits: bd). Whereas, in undeveloped countries bd/M2<1, in developed countries bd/M2 is almost equal to 1. This indicator measures the rate at which money in circulation is absorbed by the banking system. Financial formalization here is defined as the propensity of the formal banking system to absorb money in circulation.
[9] This indicator measures the level at which the semi-formal financial sector evolves to the detriment of formal and informal sectors.
[10] This proposition shows the rate at which the informal financial sector is developing at the cost of formal and semi-formal sectors.
[11] The proposition appreciates the deterioration of the formal banking sector to the benefit of other sectors (informal and semi-formal). From common sense, propositions 5 and 8 should be perfectly antagonistic, meaning the former (formal financial development at the expense of other sectors) and the later (formal sector deterioration) should display a perfectly negative coefficient of correlation (See Appendix 2). Proposition 7 has a high positive correlation with Proposition 8 and therefore, only the former will be used in the empirical section.

Hypothesis 1: The informal financial sector (a previously missing component in the definition of the financial system) significantly affects KE. Propositions 3 & 4 have tackled this hypothesis.

Hypothesis 2: Disentangling different components of the existing measurement (financial system) into formal (banking) and semi-formal (other financial institutions) sector indicators could improve understanding of the KE-finance nexus. Propositions 1 & 2 have addressed this hypothesis.

Hypothesis 3: Introducing measures of sector importance is relevant to understand financial sector competition in KE [12]. Propositions 5, 6 & 7 have examined this hypothesis.

Results summarized in Table 3 below have shown that: (1) the informal financial sector, a previously missing component in the definition of the financial system by the IMF significantly affects KE dimensions; (2) disentangling different components of the existing measurement of the financial system improves dynamics in the KE-finance nexus and; (3) introduction of measures of sector importance provides relevant new insights into how financial sector competition affects KE. These finding are broadly consistent with theoretical underpinnings covered in Section 2.1

Table 3 – Summary of results on the KE-finance nexuses

		Education		ICT		Economic Incentive				Innovation			
		Educatex		ICTex		Creditex		Tradex		Journals		FDI Inflows	
		E	UH	E	UH	E	UH	E	UH	E	UH	E	UH
Hyp. 1	Prop.3	n.a	+	n.a	n.a	n.a	+	+	n.a	n.a	n.a	n.a	n.a
	Prop.4	n.a	+	n.a	n.a	n.a	+	+	n.a	n.a	n.a	n.a	n.a
Hyp. 2	Prop.1	n.a	+	n.a	+	-	-	-	-	n.a	+	+	+
	Prop.2	n.a	-	-°	-	+	+	-	n.a	-	n.a	+	n.a
Hyp. 3	Prop.5	n.a	+	n.a	+	n.a	-	-	-	n.a	+	n.a	+
	Prop.6	+	-	-	-	+	+	+	n.a	-	-	+	-
	Prop.7	n.a	-	n.a	-	n.a	+	+	+	n.a	-	n.a	-

E: Controlling for Endogeneity. UH: Controlling for the Unobserved Heterogeneity. Prop: Proposition. n.a: not applicable due to insignificance of estimated coefficient. °: invalid instruments. Educatex: first principal component of primary, secondary and tertiary school enrolments. ICTex: first principal component of mobile, telephone and internet subscriptions. Creditex: first principal component of Private credit and Interest rate spreads. Tradex: first principal component of Trade and Tariffs. Results are based on robust panel 2SLS to control for endogeneity and panel fixed effects to control for the unobserved heterogeneity.

4.2.2. Mobile phone penetration and informal finance

In the first macroeconomic empirical assessment of the relationship between mobile phones and finance, Asongu (2013) has examined the correlations between mobile phone penetration and financial development using two conflicting definitions of the financial system in the financial development literature.

[12] To put this in other terms, the need to evaluate how one financial sector develops at the expense of another (and vice-versa) and the incidence of these changes on various components of KE could be crucial in grasping the KE-finance nexus.

As presented in Table 4 below, with the traditional IFS (2008) definition, mobile phone penetration has a negative correlation with traditional financial intermediary dynamics of depth, activity and size (Panel A). Conversely, when a previously missing informal-financial sector component is integrated into the definition, mobile phone penetration has a positive correlation with informal financial development (Panel B). Three implications have resulted from the findings: there is a growing role of informal finance; mobile phone penetration may not be positively assessed at a macroeconomic level by traditional financial development indicators and; it is a wake-up call for scholarly research on informal financial development indicators which will guide monetary policy. These finding are broadly in accordance with theoretical underpinnings covered in Section 2.2.

Table 4 – Impact of mobile phone penetration on financial development

	Panel A Dependent variables: Traditional financial intermediary dynamics						
	Financial Depth		Financial Efficiency		Financial Activity		Financial Size
	Economic Financial Depth	Financial System Depth	Banking System Efficiency	Financial System Efficiency	Banking System Activity	Financial System Activity	Financial System Size
Mobile Phone Penetration	-	-	na	na	-	-	-
	Panel B Dependent variables: Measures financial sector importance						
	Proposition 1		Proposition 3		Proposition 7		Proposition 8
Mobile Phone Penetration	-		na		+		+

Results are based on cross-sectional OLS with robust HAC standard errors and specified with RAMSEY RESET. n.a: not applicable due to insignificance of estimated coefficient.

4.2.3 Inequality and informal finance

a) From the propositions

In assessing the effects of the propositions on inequality, Asongu (2014a) has tested the following hypotheses.

Hypothesis 1: The informal financial sector (a previously missing component in the definition of money supply) is good for the poor.

Hypothesis 2: Disentangling different components of the existing measurement (financial system) into formal (banking sector) and semi-formal (other financial institutions) financial sector indicators contribute significantly to the finance-inequality nexus debate.

Hypothesis 3: Introducing measures of sector importance provides interesting dynamics of financial sector competition in the finance-inequality nexus.

The main finding as summarized in Table 5 shows that, from an absolute standpoint (GDP base measures), all financial sectors are pro-poor. From specific standpoints, three interesting findings are drawn from measures of sector importance: (1) the expansion of the formal financial sector to the detriment of other financial sectors has a disequalizing income-effect; (2) growth of informal and semi-formal financial sectors at the expense of the formal financial sector has an income equalizing effect; (3) the positive income redistributive effect of semi-

formal finance in financial sector competition is higher than the corresponding impact of informal finance. These findings broadly corroborate the postulations in Section 2.3.

Table 5: Impact of propositions on income-inequality (GINI Index)

	Panel A: First Specification							
	Full data		2 Year NOI		3 Year NOI		5 Year NOI	
Proposition 1	-	-	na	na	na	na	na	na
Proposition 2	na	na	na	na	-	-	na	na
Proposition 3	na		na		na		-	
Proposition 4		na		na		na		-
Proposition 5	na		na		na		+	
Proposition 6	-	-	na	na	-	-	na	na
Proposition 7		na		na		na		-

	Panel B: Second Specification							
	Full data		2 Year NOI		3 Year NOI		5 Year NOI	
Proposition 1	na	na	na	na	na	na	na	na
Proposition 2	na	na	na	na	na	na	na	na
Proposition 3	na		-		-		-	
Proposition 4		na		-		-		-
Proposition 5	na		+		+		+	
Proposition 6	-	-	-	-	-	-	na	na
Proposition 7		na		-		-		-

NOI: Non Overlapping Intervals. na: not applicable because of insignificant estimates. Results are based on dynamic system panel GMM. The blank spaces indicate propositions that were not taken into account in the specifications owing to issues of multicollinearity. Different control variables are used in the two specifications.

b) From mobile phone penetration

To provide additional insights into the effect of Propositions 3 & 4 on income-inequality, Asongu (2015a) has examined how the sentiments and slogans discussed in Section 2.3 are reflected in the incidence of 'mobile phone penetration' on income-redistribution in 52 African countries. The findings shown in Table 6 overwhelmingly suggest that mobile penetration is pro-poor, as it has an equalizing income effect. 'Mobile phone'-oriented poverty reduction channels have already been covered in Section 2.3. The study is significant because it deviates from mainstream country-specific and microeconomic survey-based approaches in the literature and provides a macroeconomic assessment of the 'mobile phone'-inequality nexus.

Table 6 – Impact of mobile penetration on income-inequality (GINI Index)

	Dependent Variable: GINI Index					
	Panel A: OLS with RAMSEY RESET					
	Regressions without HAC standard errors			Regressions with HAC standard errors		
	Model 1	Model 2	Model 3	Model 1*	Model 2*	Model 3*
Mob. penetration	-	-	-	-	-	-
	Panel B: Two-Stage Least Squares					
	Regressions without HAC standard errors			Regressions with HAC standard errors		
	Model 4	Model 5	Model 6	Model 4*	Model 5*	Model 6*
Mob. penetration	-	-	na	na	-	-

na: not applicable because of insignificant estimates.

5. Conclusion and policy recommendations

In this paper, we have dissected with great acuteness contemporary insufficiencies of the IFS (2008) definition of the financial system and concluded from sound theoretical underpinnings and empirical justifications that, the foundation on which it is based, while solid for developed countries, holds no ground in developing countries. Perhaps one of the deepest empirical hollows in the financial development literature has been the equation of financial depth in the perspective of money supply to liquid liabilities. This equation has put on the margin (and skewed) burgeoning phenomena of mobile banking, knowledge economy (KE), inequality…etc. We conclude that the informal financial sector, a previously missing component in the IFS conception and definition of the financial system can only be marginalized at the cost of misunderstanding recent burgeoning trends in mobile phone penetration, KE and poverty. Hence, the IFS definition has incontrovertibly fought its final dead battle and lost in the face of soaring trends highlighted above because, it is inherently antagonistic and anachronistic. Despite the plethora of econometric and policy-making sins the definition has committed in developing countries through bias estimates and misleading inferences, may its soul RIP.

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THE RELATIONSHIP BETWEEN CSR AND PROFITABILITY TO FIRM VALUE IN SRI-KEHATI INDEX

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Received: *February 13, 2014* Accepted: *September 23, 2014* Online Published: *March 28, 2015*

Abstract

This study aims to investigate the relationship between Corporate Social Responsibility (CSR), Profitability to Firm Value. The samples are all manufacturer companies that listed in SRI-KEHATI Index by using control samples (manufacturers company not listed in SRI-KEHATI Index). This study is empirically examined between CSR disclosure (environment, energy, health and safety, product, and community services), profitability (ROA) and firm value. For company that listed in Sri Kehati Index, this study found no significant relationship between CSR to firm value but there were positive significant relationship between profitability to firm value.

Keywords : Corporate Social Responsibility (CSR), Corporate Social Responsibility Index (CSRI), Firm Value, Profitability, Firm Size

1. Introduction

Corporate Social Responsibility (CSR) is getting an increasingly important issue for all over the world, due to a new attention to all the aspects of firms activities and their relationships with stakeholders. Carroll (1999) found that public interest on the role of businesses in society is driven by greater sensitivity and awareness of environmental and ethical matters. The public expectation of civic duty means going beyond adding value to the bottom line. Currently, CSR reporting practice development is globally imbalance. In Asia, evidence shows that many developing countries are moving in a positive direction with reference to corporate social reporting. Nurlela and Islahuddin (2008) analyzed the effect of CSR on firm value by using the percentage of management ownership as a moderating variable showed a significant effect on firm value but partially only percentage of management ownership has an effect on firm value.

In Indonesia, many companies implement the corporate social responsibility programs and concern to the social and environmental problem. Companies have to report any expenses occurred related to CSR program in financial report. This study will analysis the relationship

between CSR and profitability to firm value. Firms, used as samples, are listed firms in Indonesian Stock Exchange (IDX) selected from SRI-KEHATI Index. SRI-KEHATI Index is stock market index that consists of 25 Indonesian firms that have excellent performance in promoting sustainable businesses, as well as having awareness of environmental, social and good corporate governance.

2. Literature review

2.1. Corporate Social Responsibility

In Indonesia, the discourse on CSR began to surface since 2001, but prior to this discourse has surfaced many companies CSR and very few are expressed in a report. This was probably because we do not have any means of support such as: reporting standards, skilled personnel (both accountant that prepare the report and the auditors). So that CSR is not considered important to report in detail because no one requires reporting on CSR.

CSR as an idea, the company no longer faced with the responsibility that rests on a single bottom line, the value of the company (corporate value) are reflected in the financial condition (financial) only. But corporate responsibility should be based on the triple bottom lines. Here, other than the financial bottom lines also social and environmental. Because financial conditions are not enough to guarantee the value of the company to grow in a sustainable. Sustainability will only be guaranteed if the company shows interest to the social and environmental dimensions. It is a fact how the resistance communities, in different places and times come to the surface of the companies that are considered not pay attention to aspects of social, economic and environmental (Nurlela and Islahuddin, 2008). The information disclosed in the annual report can be grouped into two, namely the mandatory disclosure, which is the minimum disclosures that must be disclosed (required regulations), and voluntary disclosure, where companies are free to choose the type of information disclosed that if only to support decision-making and increase the company's value to stakeholders and shareholders.

Voluntary disclosure rise because of the awareness of the surrounding environment, successful companies not only on profit but also concern for the environment surrounding communities (Yuliani, 2003). Research conducted by (Maksum and Kholis, 2003) states that have Corporate Social Responsibility (CSR) is an important thing to do for a company. Masnila (2007) stated that CSR disclosure in annual reports can be grouped based on the theme that was revealed, the type of disclosure, the level of disclosure, as well as locations where social responsibility is expressed.

According to Hackston and Milne (1996) in Nisya (2008), CSR is the process of communicating the social and environmental impact of economic activities on the organization of special interest groups and the community as a whole. In its operations, the company often causes problems for the environment and society as a social problem, pollution, natural resource, and waste.

According to the Prince of Wales Foundation, there are five important things that can affect the implementation of CSR, first, concerning the empowerment of human capital or human. Second, the environments are talking about the environment. Third is Good Corporate Governance. Fourth is social cohesion. That is, in implementing CSR not to cause social jealousy. Fifth is the economic strength or bamboozle environment towards economic independence.

In Company Law also mentioned the regulations regarding concerns about the environment, which is set in the Company Law Article 74 paragraph (1) which states: Limited Liability Company Act states that the company runs its business activities in the field and or

relating to any source natural resources required to carry out social and environmental responsibility. This is what is meant by corporate social responsibility.

2.2. Signaling Theory

Signaling theory offers an intriguing opportunity for reconciling the strategic-actor and materialist approaches in the social sciences with approaches centered on meaning, social value, and ritual. Signaling theory is one theory that underlies the voluntary disclosure of where the company was driven to provide information to outside parties.

Signaling theory is useful for describing behavior when two parties (individuals or organizations) have access to different information. Typically, one party, the sender, must choose whether and how to communicate (or signal) that information, and the other party, the receiver, must choose how to interpret the signal. Accordingly, signaling theory holds a prominent position in a variety of management literatures, including strategic management, entrepreneurship, and human resource management.

Signaling theory in science communication in the disciplines of accounting is used to explain and predict the behavior patterns of communication to the public managers. Signaling theory in accounting for one of its functions is to assess any private information that will be issued by the management to shareholders. The manager seeks to communicate private information which tends to contain good news is to increase shareholder wealth (Jaswadi, 2004).

According to signal theory, companies with high earnings quality will result in persistent earnings, and are entitled to a high valuation from investors. Instead, the company will produce low-quality earnings are not persistent, and deserves a low valuation of investors indicated a low stock market prices (Bandi, 2009).

The theory of signals related to the capital market response in response to good news and bad news coming from a company that has been listed in the investment portfolio of the investor. With the information released by management to be addressed as good news or bad news can help investors to make upward revisions to earnings and performance of the company in the coming and decided to buy the company's stock. Conversely, if the prediction is higher than actual, which means bad news, investors will revise down and immediately sell the shares of the company because the company's performance does not match the expected (Ambarwati, 2008).

2.3. Firm Value

The company's main objective is to increase shareholder value. Value of the company is the investor's perception of the level of success of a company that is often associated with stock prices (Sujoko and Ugy, 2007).

The value of the company will be reflected in its stock price. The market price of the company's shares that is formed between the buyer and the seller in the transaction is called the market value of the company, because the market price of the stock is considered as a reflection of the true value of the company's assets. The value of a company formed through the indicator value is strongly influenced by the stock market investment opportunities.

The existence of investment opportunities can provide a positive signal about the company's growth in the future, so as to enhance shareholder value. Literally, the value of the company can be observed through shareholder wealth that can be measured by its share price in the stock market (Hasnawati, 2005).

2.4. Corporate Social Responsibility and Profitability

The main objective of the company is gaining profits, yet in the development of today's companies can not just focus on maximum profit regardless of the surrounding environment. Concept 3 P: profit, people, and planet must always strived to be run simultaneously and continuously. There is a significant relationship between CSR activities and profitability of the industrial companies. Adopting such activities will improve the company's reputation and positioning in the community and increase customer satisfaction. This however will lead to increase the market share and maximize profits.

There is a significant relationship between provide donations and establish non-profit projects and the profitability of industrial companies and there is a significant relationship between support projects and charities associations and the profitability of industrial companies (Dabbas and Al-Rawashdeh, 2012). The results of other studies of Olagunju and Omeyele (2012) by using a questionnaire to staff from 10 companies located in Logos obtain the result that the CSR effect on profitability. The consequence of this is CSR activities should not only be driven by profit motive but must also be ethical and transparent in the conduct of their business operation while remaining sensitive to the problems and aspirations of their host environment.

2.5. Corporate Social Responsibility and Firm Value

Corporate social responsibility is expressed in a report called Sustainability Reporting (sustainability reporting). CSR can be sustained if the program created by a company is really a shared commitment of all the elements that exist within the company itself. The company's main purpose is to increase the firm value. The value of the company is ensured sustainable growth (sustainable) when the company noticed the economic, social and environmental sustainability as a balance between economy, environment and society. CSR will increase the value of the company's stock price and the views of corporate profits (earnings) as a result of investors who invest in company stock. Nurlela and Islahuddin (2008) stated that the presence of good CSR practices, the expected value of the company will be judged well by investors.

Jensen (1986) stated that in the long run no company can maximize the value of the company, if it ignores the interests of stakeholders. In accordance with the views of stakeholder theory, Khanifar (2012) found the value of the company in the long run will be determined by the company's relationships with internal and external stakeholder.

3. Previous research and hypotheses

A number of different methods have been applied to examine the relationship between CSR performance and Firm value. McWilliams and Siegel (2000) point to a number of problems with CSR performance research; inconsistencies in defining CSR, selecting samples, as well as research design and misspecification of the models. As a result, a lot of research on CSR performance is not comparable.

Several papers have investigated the relationship between corporate social responsibility and firm value. Barnett (2007) insight that the impact of CSR on firm value depends on the ability of CSR to influence stakeholders in the firm. McWilliams and Siegel (2001) examined the relationship between the corporate governance ratings of firms and their equity prices. Their findings were the high governance ratings had higher firm value, higher profits, and higher sales growth. According to Orlitzky, et al (2003) insight that the impact of CSR on firm value has measured value as either market prices such as stock returns or accounting measures such as return on equity or return on assets.

On the basis of previous research there is positive relationship between CSR and firm value (Sen and Bhatachrya, 2001). According to McGuire, et al (1988) a firm has an

investment in reputation, including its reputation for being socially responsible. Dowell, et.al (2000) measure firm value and find that multinational enterprises' adoption of strict global environmental norms is positively related to higher firm value. Nurlela and Islahuddin (2008) argued that the disclosure of CSR significant effect on firm value. This is because more and more disclosure of CSR then it shows the company's value, the better. Something similar is supported by research conducted by Wijayanti (2009) which concluded that there is a positive and significant relationship between CSR on firm value manufacturing.

Handayani (2010) states that the ratio of profitability have a significant effect on firm value. The samples are 18 companies on the Stock Exchange in the period 2003-2005. The tool is regression analysis. His study states that the ratio is found to significantly affect the value of corporate profitability. Yuniasih and Gede (2008) using a sample of 27 companies on the Stock Exchange during 2005-2006 with the result that profitability ratios affect the value of the company. The higher profitability ratios show the company in a good performance that will increase the value of his company. The results of a similar study revealed also by Frick and Andreas (2009) and Kiel (2003) which states that the ratio of profitability effect on firm value. The higher profitability ratios (ROE) is the ratio between the net income by total equity in a corporation showing its financial performance has increased due to greater profits, so it will have an impact on increasing the company's value as more and more investors to their shares to the company in question.

Maksum and Kholis (2003) states that social responsibility (CSR) is an important thing to do for a company and Maslina (2007) stated that CSR disclosure in annual reports can be grouped based on a theme that was revealed, the type of disclosure, the level of disclosure, as well as locations where social responsibility is expressed. Nurlela and Islahuddin (2008) argued that the disclosure of CSR significant effect on firm value. This is because more and more disclosure of CSR then it shows the company's value, the better. Something similar is supported by research conducted by Wijayanti (2009) which concluded that there is a positive and significant relationship between CSR on firm value manufacturing.

On the basis of the previous researches about the relation between CSR and firm value, then the hypotheses develop in this study are:

H1: *CSR gives positive impact on firm value of Indonesia firms*

H2: *Profitability gives positive impact on firm value of Indonesia firms*

4. Research method

4.1. Data and Sample

Firms used as samples are 25 listed firms (suspect) in Indonesia Stock Exchange (IDX) selected from SRI-K.EHATI Index. SRI-KEHATI Index is stock market index that consists of 25 Indonesia firms that have excellent performance in promoting sustainable businesses, as well as having awareness on environmental, social and good corporate governance. Sample firms were monitored from 2009 to 2010.

4.2. Variable Measurement and Model

Firm value. Firm Value is an economic measure reflecting the market value of a whole business. This study will use market to book value (MTB) as a measurement of firm value. MTM is the proxy for growth opportunity Gaver and Gaver (1993) and Black et al (2006).

*Corporate Social Responsibility***.** Corporate Social Responsibility is measured by the CSRI checklist that consists of 78 statements. The data of CSR activities are collected from firm

annual reports and the content analysis used to check the information about CSR Activities done by the firms with the list of statements on CSR Disclosure checklist. If the CSR Activity of the firm is appropriate to the CSR checklist then get score of 1 otherwise get score of 0. The CSRI score is calculated by score of firm CSR Activities is divided by total score of CSR Disclosure Checklist.

$$CSRI_j = \frac{\sum X_{ij}}{n_j}$$

Where:
CSRIj = Index of Corporate social responsibility for company
$\sum X_{ij}$ = Number of items that been disclosed by the companies j
nj = Number of item for the company j

*Profitability***.** Profitability measures the ability of the company to produce the earnings. Profitability is one of the financial performance measurements. This study will use the Return on Assets (ROA) as a measurement of profitability. ROA is calculated from Earnings after Taxes (EAT) divided by Total Assets.

*Firm Size***.** Firm Size is used as control variables. Previous studies used firm size as control variables because the CSR activities, in some cases, affected by firm size. The firm size is calculated by the ln of total asset.

4.3. Research Models

The first regression model is used to examine the effect of CSR index and profitability to the firm value with firm size as control variable. The multiple regression modelsare represented as follows:

$$FirmValue_{suspect} = ß_0 + ß_1CSRI_{suspect} + ß_2ROA_{suspect} + ß_3Firm\_Size_{suspect} + e \quad (1)$$

$$FirmValue_{nonsuspect} = ß_4 + ß_5CSRI_{nonsuspect} + ß_6ROA_{nonsuspect} + ß_7Firm\_Size_{nonsuspect} + e \quad (2)$$

Where:
$ß_0$, $ß_4$ = intercept coefficient
$ß_1$, $ß_2$, $ß_3$, $ß_5$, $ß_6$, and $ß_7$ = coefficient of each independent variable

5. Results and discussion

Preliminary data used is 40, but due to problems of data normality, outlier removal is carried out as much as 4 data and data processes further as many as 36 data. Table 1 presents the descriptive statistics for firm suspect.

Table 1 – Descriptive Statistics ($Firm_{suspect}$)

	Firm_Values	CSRIs	ROAs	Ln Firm Sizes
Mean	3.025978	0.294878	0.104042	31.49389
Median	2.780850	0.282100	0.105950	31.48000
Maximum	5.415200	0.512800	0.268400	33.94000
Minimum	0.159800	0.230800	0.012300	29.40000
Std. Dev.	1.397022	0.068312	0.076955	1.454519
Observed	36	36	36	36

Firm value measured by market value divided book value of equity. The result shows average 3.025978. Table 1 shows that the average market value is 3.025978 times compared to the book value of its equity. The standard deviation of this variable is 1.397022 means that the deviation from the average of data for the variable value of the company amounted to 1.397022. CSRI average of suspect 0.294878 that means disclosure 29.4878%. The average number of social responsibility disclosure equal to 23 disclosure of 78 required disclosure. Profitability measured by net income divided by total assets (ROA). ROA suspect group have an average 0.104042. The average mean suspect group was able to generate a net profit of 10.4042% utilization of all assets owned.

Table 1 also appears that there is a small variation in CSRIs and ROAs. It means that the CSR Activities among firms are quite similar. The variation of ROA is also quite small among firms. The variation of firm size is quite big that means the different of the firm size among firms are quite big.

Table 2 presents the data used as a non suspect is a company within the same industry and has total assets of nearly the same, so the number of suspect and non-suspect firms are alike. The data used is a financial statement data of 2009 and 2010. Preliminary data used is 40, but due to problems of multicollinearity. Outlier removal is carried out as much as 6 data and data processed further as many as 34 data.

Table 2 – Descriptive Statistics ($Firm_{nonsuspect}$)

	Firm_Values	CSRIs	ROAs	LnFirmSizes
Mean	3.485366	0.209653	0.063061	30.41162
Median	2.301091	0.224359	0.054366	30.34814
Maximum	18.92810	0.269231	0.235380	32.74782
Minimum	0.004436	0.141026	-0.075353	25.57283
Std. Dev.	3.677762	0.038381	0.070277	1.627622
Observed	34	34	34	34

Firm value non suspect is 3.485366, means the market capitalization 3.485366 times to book value of its equity. Value of non-suspects group companies is higher than the group of companies suspected. CSRI has an average 0.209653 means non suspect disclosure CSR information is 20.9653%, or in other words, nonsuspect companies disclose 16-17 item of 78 required disclosure. Total disclosure of this group is less than the suspected group. ROA of nonsuspect group is 0.063061, meaning that the company is able to produce net profit 6.3061% of the total utilization of assets. Profitability of suspect group higher than the non-suspect groups.

Table 2 also provided that the variability of the data is very wide distance range minimum value maximum value is very large when compared to the average value. The average value of the enterprise value 3.485366 means that the value of the average market price for 3:48 times compared to the book value of equity per share. Variability to social responsibility disclosure index is small, with an average of 0.209653. Average shows that on average companies do as much disclosure of 14 items of 68 disclosure items that can be done. For variable ROA as a measure of profitability has little variability with an average value of 0.063061, which means that the average non-suspect firm has a profit of 6.3061% of its total assets. Firm size has a low variability.

The results of this study using multiple regression models are given in Table 3. The first part of the Table 3 is regression model with FIRM VALUE suspect as dependent variable and CSRI suspect, ROA suspect and Firm Size suspect as independent variables. The first model

is used to examine the first hypothesis that stated CSRI suspect gives positive impact on FIRM VALUE.

Table 3 – Summary of Regression Model Suspect Firms

	Coefficient	Std. Error	t-Statistic	Prob.
C	-12.64501	5.637928	-2.242847	0.0320
CSRIS	-3.606223	2.931031	-1.230360	0.2275
ROAS	18.81931	3.098906	6.072889	0.0000
LNFIRMSIZES	0.469183	0.164355	2.854684	0.0075

R-squared	0.544995	Mean dependent var.	3.025978
Adjusted R-squared	0.502338	S.D. dependent var.	1.397022
S.E. of regression	0.985531	Akaike info criterion	2.913167
Sum squared resid.	31.08070	Schwarz criterion	3.089114
Log likelihood	-48.43701	Hannan-Quinn criter.	2.974578
F-statistic	12.77631	Durbin-Watson stat.	2.092459
Prob. (F-statistic)	0.000012		

Dependent Variable: FVS
Method: Least Squares
Sample: 1 36
Included observations: 36

The results showed that $ROA_{suspect}$ had positive effect on firm value $_{suspect}$. In otherwise, $CSRI_{suspect}$ had no effect on firm value $_{suspect}$. These results indicate that the more or less of the practices of CSR of the company do not have affect on the increase in the value of the company. This is because many companies have a few disclosure on their CSR compared with the total items that should be disclosed for industry.

Based on signaling theory which states that the company gives signals to the public with the intention of increasing the value of the company was not able to be explained by companies. Leastwise those items disclosed to the readers of company annual reports make investors pay less attention to or consider the disclosure of corporate CSR as one of the information that affects them in an investment. Therefore, CSR disclosures are not an element that affects the investor to assess overall company performance. Investors are likely to consider other matters such the company's financial performance in investing.

For non-suspect group of companies, explanatory power and CSRI ROA variables are controlled by the size of the company amounted to 22:38%, so it can be said that as many as 77.62% of the variance explained by the variable value of the company to another. The results showed that the model fit to predict the variance of the value of the company at the level of 5%. Variables ROA and CSRI are not statistically affect the value of the company, but the size of the company is able to control the influence of profitability and broad social responsibility disclosure.

The result of this research shows that there are differences in the influence of profitability on firm value. This indicates that companies listed in the Sri Kehati Index have better financial performance han companies that are not in the category of Sri-Kehati index. In addition, companies that enter into the index must have Sri-Kehati positive ROA and asset specific number. On the other hand, it shows that investors in Indonesia are keener in investing.

Table 4 – Summary of Regression Model Non Suspect Firms

	Coefficient	Std. Error	t-Statistic	Prob.
C	42.14231	12.21648	3.449628	0.0017
CSRI	-2.595284	14.70827	-0.176451	0.8611
ROA	-1.445449	8.745687	-0.165276	0.8698
FIRMSIZE	-1.250235	0.377762	-3.309583	0.0024
R-squared	0.294372	Mean dependent var		3.48536
Adj R-squared	0.223809	S.D. dependent var		3.67776
S.E. of regression	3.240171	Akaike info criterion		5.29926
Sum squared resid	314.9612	Schwarz criterion		5.47883
Log likelihood	-86.08742	Hannan-Quinn criter.		5.36049
F-statistic	4.171772	Durbin-Watson stat		1.61401
Prob(F-statistic)	0.013924			

Dependent Variable: FIRMVALUE
Method: Least Squares
Date: 08/15/12 Time: 10:12
Sample: 1 34
Included observations: 34

The results of this study indicate that the size of CSR practices do not affect the increase in the value of the company. This is because the company is an entity that operates only for its own sake and for its stakeholders. The results of this study are consistent with research Nurlela and Islahuddin (2008) which states that CSR variable has no effect on firm value. In addition to the Corporate Social Responsibility (CSR) as part of its business strategy. Basamalah and Jermias (2005) suggests that one reason is the social management reporting for strategic reasons. Although not mandatory, but it can be said that almost all the companies listed on the Indonesia Stock Exchange already disclose information about CSR in its annual report. From an economic perspective, the company will disclose the information because of necessity. The Company will acquire social legitimacy and maximize long-term financial strength through the implementation of CSR (Kiroyan, 2006)

6. Conclusion

This study aimed to investigate the influence of CSR disclosure on firm value. Object of this study were the firms listed in the SRI KEHATI index of the Indonesian Stock Exchange Market 2009 – 2010. The results of this paper give the evidences that profitability has positive effect on firm value, in otherwise, CSR has no effect on firm value. In addition, the processing of the data showed that there was no difference in the effect on firm value CSR between suspect and non-suspect firms. It also shows that CSR disclosures for sample firm involvement so that the amount disclosed in the CSRI is not too large. It also shows that the company's CSR program is not an important factor to be considered by investors in Indonesia.

These results indicate that the more or less of the practices of CSR of the company do not have affect on the increase in the value of the company. There are other factors that can be used by investor in investing such as firm characteristics.

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RESPONSIBLE INVESTMENT (RI): AN ALTERNATIVE FUNDING OPTION FOR ROADS-BRIDGES MANAGEMENT IN NIGERIA UNDER THE PUBLIC-PRIVATE PARTNERSHIP FRAMEWORK

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Received: *May 26, 2014* Accepted: *August 27, 2014* Online Published: *April 10, 2015*

Abstract

Tolling is an age long revenue collection system institutionalised by public authorities for accumulating funds required for roads and bridges construction, maintenance and management. In spite of the merits of tolling as a major source of revenue in Nigeria, it was abruptly abrogated by the government few years ago because of reasons linked to ineffective governance, endemic corruption and lack of probity. The purpose of this paper is to make a case for responsible investment as an alternative funding mechanism for roads-bridges management (RBM) in Nigeria under a Public-Private Partnership (PPP) framework. The paper adopts a discursive approach, relying on government policy documents, journal articles, online resources, working papers and reports on tolling best practices. The numerical and non-numerical data were critically analysed using content analysis enriched by tables and figures. The first finding indicates there are enormous potentials in tolls collection from privately funded roads and bridges for responsible investors in Nigeria under the PPP framework. The second finding identifies eight (8) PPP typologies that could be explored by investors under government's new tolling policy. The paper concludes that the success of any tolls collection systems depend largely on effectiveness of governance, probity and accountability, which are core elements of responsible investment in the contemporary times.

Keywords: Responsible Investment; Public-Private Partnership; Roads-Bridges Management; Nigeria.

1. Introduction

Roads and bridges are key infrastructural facilities required for an efficient transport system, and they are good measurements of regional economic development (Chi and Waugaman, 2010; Federal Ministry of Works, 2013). Also, it has been observed that communities and geographical areas surrounded by roads and bridges experienced fast regional, industrial, environmental and residential development than areas lacking these infrastructural facilities (Parasibu, 2005). In view of the importance of roads and bridges to nation-building and urbanisation, immediately after independence, the Federal Government of Nigeria gave high priority to the construction of roads and bridges in the nation's economic development plans and blueprints.

The commitment to road development in Nigeria is manifest in the first and second national development plans, which made provision for construction of feeder roads and bridge key priorities to enhance effective transportation of people and goods (Salawu et al., 2006). Furthermore, the third and fourth national development plans earmarked substantial budget for the construction of more roads in the rural and urban communities as well as jetties for riverine communities for smooth movement of people and agricultural produce across the country (Akhuemonkhan et al., 2012; Olowookere, 2012; Raimi et al., 2014). The construction of roads and highways was also a major project of the Babangida's administration, which established the Directorate of Food, Roads and Rural Infrastructure (DFRRI) as a scheme that brought relief to farmers through infrastructural development which boosted agricultural production in Nigeria (Iwuchukwu and Igbokwe, 2012; Raimi et al., 2014). In the same vein, the 7-point Agenda of the Yar'adua administration underscored transport sector development with emphasis on road as a major priority (Dung-Gwom, 2010; Dode, 2010).

The present administration of Goodluck Ebele Jonathan has equally made roads development and rehabilitation an important segment of its transformation agenda; the regime is credited with rehabilitation of a number of roads and bridges across the country (Transformation Watch, 2013). The total road network in Nigeria is estimated at about 200,000km, which are owned and managed by the three levels of governments disproportionately. The Federal Government controls 17% of the road networks (Over 34,000Km), the thirty-six (36) states owns and controls 16%; while the local governments own and control 67% of the entire road networks (Yuguda, 2013).

The need for a sustainable management of Nigerian roads and highways led to the erection of traditional barrier-type tollgates for tolls collection; the proceeds therefrom are reinvested for further construction of new roads/bridges and maintenance of existing ones (Leba, 2010; Madunagu, 2012 and Ugeh, 2013). Operation of traditional barrier-type tollgates for maintenance of roads in Nigeria worked effectively at inception, but the tolling system in Nigeria was rendered ineffective by public servants as a result of corruption, revenue leakages and unmet maintenance of the tolled roads and bridges. Consequently, it was cancelled in 2004 by the regime of President Olusegun Obasanjo under the guise of proving a palliative measure for cushioning the burden of 5% increment in the pump price of petroleum products introduced by the government (Leba, 2010).

In the recent times however, dwindling fortunes of the federal government and the deteriorating conditions of roads and bridges nationwide, necessitated the proposed reintroduction of tolls by the policymakers as a realistic funding option for fixing roads and highways sustainably. As at 2010 fiscal year, the sum of N1 trillion was estimated as costs required to fix roads nationwide (Leba, 2010). In the same vein, the cost of construction of federal roads and bridges from 2010 to 2013 fiscal years was estimated at N32 trillion

(US$2214.4 billion); and by design, the federal government, state & local governments and private-sector investors were to contribute N10 trillion, N9 trillion and N13 trillion respectively (Ugeh, 2013). This funding option was viewed by policymakers as unsustainable in the face of several projects competing for government's attention.

Another reason for rethinking tolling in Nigeria is not unconnected with the monumental success recorded by the Lagos State Government on its private-sector managed tolls collection and management of roads along Ajah axis and the growing acceptance of public private partnership (PPP) model as a viable strategy for infrastructural management in the contemporary times (Madunagu, 2012). Unlike the traditional tolling system managed by the government, the proposed new tolling system under Public-Private Partnership (PPP) is designed to provide the country with a sustainable strategy for managing its network of roads and bridges for the benefit of all stakeholders - government, businesses and communities (Njoku and Adegboye, 2013).

In a bid to convince Nigerians further on the desirability of tolling and leveraging on the PPP experiment, the Federal Ministry of Works (FMW) developed a policy document entitled: 'Green Paper: Federal Roads and Bridges Tolling Policy for Nigeria'. (Federal Ministry of Works, 2013). The Green Paper provides justification for reintroduction of tolls as a viable private sector intervention designed to fund sustainably the nation's roads and bridges. The private sector investors judging by their antecedents are believed possess the exposure, technology and professional competence to generate sufficient revenue from tolls to recover cost of construction, rehabilitation, financing, maintenance and operation of tolled roads and highways (Ugeh, 2013; Njoku and Adegboye, 2013).

From the above overview, the purpose of this paper is to explore prospect of responsible investment (RI) as an alternative funding option for roads-bridges management in Nigeria under the Public-Private Partnership Framework. In specific terms, the paper unveils the socio-economic merits of tolling for roads-bridges management in Nigeria with a view to putting in proper perspective the various PPP options opened to the responsible investors under the newly proposed tolling policy. The two main research questions that this paper seeks to ask are:

RQ1: Are there socio-economic merits behind the reintroduction of tolling for roads-bridges management in Nigeria?

RQ2: What are the tolling options available to responsible investors under the PPP frameworks?

The entire paper has a total of four (4) parts. Part I provides a highlight on tolling and its rationale across the ages. Part II focuses on conceptual issues and review of literature from scholarly works responsible investment, PPP framework and tolling. Part III states the research method and analyses the numeric and non-numeric data from which findings on the socio-economic merits of tolling under the PPP framework and the models of tolling available to responsible investors under PPP framework. Part IV concludes with s summary of implication for further research, conclusion and recommendations.

2. Conceptual Issues and Review of Literature

2.1. Responsible Investment

Responsible Investment (RI) or Social Responsible Investment (SRI) has emerged in the global business environment as another investment strategy. RI attracts a number of definitions in the management literature, but could simply be defined as "an investment

process that seeks to achieve social and environmental objectives alongside financial objectives" (Mercer Investment Consulting, 2007:10). In other words, RI is a deliberate and conscious decisions by the investing public or ethical investors to put their investments (usually pension or other life earnings) into corporations that demonstrate commitment to responsible business practices, or those whose products and services are socially, humanly and environmentally friendly such as investing in renewable energy sector, public utilities, shunning problematic corporations such ammunition manufacturing firms, alcoholics and tobacco as well as rogue multinational corporations..

From another lenses, RI represents an investment focus of "integrating environmental, social and governance (ESG) factors into … investment processes [which is believed would] help to improve risk-adjusted financial return" (Lake, 2007:3). However, Karch (2007) notes that RI transcends ethical issue with regards to investment; it includes efficiency in managing investment. Efficiency when linked to RI entails sustainability, security and improvement of investment strategies deployed for fund management.

RI gain global acceptance with international institutions like ILO, UN, OECD et cetera. In particular, the United Nations Principles for Responsible Investment (2007:81) state that member countries and corporations "believe that environmental, social, and corporate governance (ESG) issues can affect the performance of investment portfolios" as well as the choice of investment decisions. Put differently, the scope of RI covers ethics, environment, governance, social aspects, economics, labour rights, international and national norms (Goy, 2013). The thrust of RI is the avoidance of investments that the members of the public are averse to, or deemed ethically unacceptable and socially irresponsible (Boersch, 2010; Goy, 2013). It could therefore be concluded that RI matches investments with ethical values and long-term impact in the business environment. Empirical survey reveals that RI is driven more by social wellness and welfare which are expectations greatly influenced by public pressure than expectation of higher returns or lower risk (Boersch, 2010). On the strength of this definition, the deteriorating conditions of Nigerian roads and bridges qualify for responsible investment.

2.2. Public-Private Partnership

The Public-Private-Partnership (PPP) model finds theoretical groundings in the theory of privatization. The first basis of PPP is to promote greater allocative and productive efficiency. The second basis is to strengthen the role of the private sector to play greater role in the economy. The third rationale of PPP framework is to improve government revenue base or financial health leveraging on private sector funding. The fourth basis is to enable the public authority directs its scarce resources to other important areas of governance competing for attention (Sheshinski and López-Calva, 2003:2). Several scholars argued that when publicly owned enterprises (POEs) are fully or partially privatized in the forms of PPP, concessioning, joint-venture et cetera, they tend to manifest operational efficiency, greater profitability and improved access to capital for investment purposes. Such privatized enterprises have also recorded increased output at lower cost overtime; they have also been able to create more employment opportunities for people and generation of greater revenue for government's treasury (Megginson and Netter, 2001; Kareem, 2010; Raimi et al., 2013). Besides, privatisation leads to reduction in public spending when viewed against the experience of the United Kingdom where privatisation of electricity resulted in a permanent five (5) percent annual reduction in the cost of providing electricity service (Newbery and Pollitt 1997:269). In addition, it has also been confirmed that privatisation, whether full or partial leads to an increase in profitability of enterprises as well as increase in productivity of such enterprises (Sheshinski and López-Calva, 2003).

The sustainable economic benefits of PPP necessitated the call for its adoption in the roads-bridges management in Nigeria. It is instructive to note that application of PPP model in the Nigeria transport sector spanned over 14 years; it was effectively applied to revamp that nation's ports under the concessioning agreement (Kruk, 2008; Raimi et al. 2013). Nigeria's former Minister of Transport, underscored the need for collaborative relationship with the private sector because of dwindling government revenue and expertise (Chikwe, 2000). Specifically, the former Minister canvassed support for PPP because "maintenance of… transport infrastructure and services usually require huge financial outlay. Government alone cannot provide all the resources required….it is economically prudent and financially expedient to encourage private sector participation in the key areas that are hitherto commonly regarded as social services. This is also in consonance with contemporary practice all over the world, of shifting emphasis from government driven to private driven economy" (Agbakoba, 2001:6).

Official data as shown in Table 1 and 2 provide further justification for the views above. In Table 1, the share of construction expenditure among other expenditure heads under economic services from 2000-2010 has been rising overtime. Furthermore, the rising recurrent expenditure on construction in Table 2 vis-à-vis the nation's gross domestic product (GDP) from 1961-2011 shows that funding roads solely by the government is unsustainable and require private-sector cooperation (Chikwe, 2000; CBN, 2011). Another official report indicated that from 2011 to 2012, the sum of N120 billion was expended on roads development and rehabilitation in Nigeria (Ibya, 2013).

2.3. Toll/Tolling

Tolling is an age long revenue collection system (toll) adopted by many civilizations for roads construction and maintenance for over 2,700 years (Gilliet, 1990). Toll collection had long appeared in the works of Aristotle as a common practice in the classical era for boosting the revenue base in nations like India and Roman Empire (Munroe, et al., 2006). In the modern times, England introduced tolls on roads in the 14th century as a form of tax for the purpose of recouping the costs of construction and maintenance of highway (Bernstein, 2010). Apart from revenue source for government, tolling provides avenue for job creation for members of the public (Madunagu, 2012). Tolls started in Lancaster, United States in the 1790s (Munroe, et al., 2006); and has since then become acceptable user fees which guarantee stable and sustainable streams of revenue for the maintenance of road and highways (Forkenbrock, 2004).

Table 1 – Federal Government Recurrent Expenditure on Economic Services

Function/Year	2000	2005	2006	2007	2008	2009	2010
				Economic Services			
Agriculture	6,335.78	16,325.60	17,900.00	32,500.00	65,400.00	22,440.00	29,560.00
Construction	4,991.09	17,914.96	20,100.00	71,300.00	94,500.00	80,630.00	138,050.00
Transport & Communication	3,034.68	8,041.30	9,800.00	32,200.00	67,400.00	90,030.00	178,700.00
Other services	14,230.37	22,025.16	31,900.00	43,100.00	86,500.00	124,100.00	238,680.00
Total	28,591.93	64,307.02	67,801.78	83,518.19	313,800.00	317,200.00	584,990.00

Source: Federal Republic of Nigeria Official Gazettes, CBN (2010)

Table 2 – Federal Government Recurrent Expenditure on Construction

Year	Construction ₦ Million	GDP ₦ Million
1961	0.59	2,361.20
1965	25.29	3,110.00
1970	14.28	5,205.10
1975	31.97	20,957.00
1980	46.03	49,632.30
1985	151.11	70,633.20
1990	643.40	271,908.00
1995	1,699.10	1,934,831.00
2000	4,991.09	4,727,523.00
2001	7,202.04	5,374.335.00
2002	7,452.14	6,232.244.00
2003	16,951.37	6,061.700.00
2004	14,897.01	11,411,067.00
2005	17,914.96	15,610,882.00
2006	20,100.00	18,564,595.00
2007	71,300.00	20,657.317.00
2008	94,500.00	24,296,329.00
2009	80,630.00	24,794,238.00
2010	138,050.00	29,205,782.00
2011	195,900.00	33,994,612.00

Sources: Federal Republic of Nigeria Official Gazettes, CBN (1961-2011)

The roads on which tolls are collected are called toll roads, turnpikes, tollbooths, tollhouses and tollways (Gilliet, 1990; Jenkinson and Taylor, 2010). Toll is conceived as a medium for recouping the cost of building of roads and provides sustainable means for managing the roads, as well as avenue for job creation for the citizenry ((Madunagu, 2012). Besides, tolls is preferred irrespective of country because they have lower evasion rate compared to income taxes; it is relatively cost effective for government and payers; tolls ensure privacy of payers and its implementation process is easy and convenient for all stakeholders (Peters et al., 2006). Forkenbrock (2004) argued that tolls have become acceptable user fees which guarantee stable and sustainable streams of revenue for maintenance of road and highway system.

As notable as the policy of tolling is for national development, Roth (1998) noted that it suffers a lot of criticisms. One, it requires vehicle owners to slow down, thereby wasting the time of vehicle owners and building up operating costs of vehicles. Two, it is at times uneconomical because the cost of tolls collection could be as much as one-third of revenues because of the problem of probity and revenue theft. Three, where toll-free roads coexist with tolled roads, the latter becomes useless as people utilise the free toll roads. Tolled roads with the aid of electronic sensors track for monitoring the movement of cars constitute infringement on the freedom and privacy of road users. In spite of all the criticisms levelled against tolling, it still offers governments across the world a convenient template for recouping and generating further funding for roads, bridges and other transport infrastructural projects. Toll collection systems are many and diverse in the transport literature. The major typologies of tolls collection systems include: (a) manual toll collection (b) mechanical coin collection (c) traditional barrier electronic toll collection**,** (d) slow speed electronic toll

collection (e) high speed electronic toll collection (Peters and Kramer, 2003; Peters and Kramer, 2005; Peters et al., 2006). Explanations of the distinctions between the various toll typologies are discussed hereunder.

a) *Manual Toll Collection System (MTCS):* This refers to the collection of tolls manually in cash or coin by human beings at designated tollgates or booths. It is the commonest toll system across developing countries and few industrialized nations. The major disadvantages of the manual tolling system are the requirement for vehicles to be at complete halt to make payments; the slow processing time; huge wage bills of human collectors; the cost of monitoring cash to avoid revenue leakages; the generally slow speed, high compliance cost; and the impact of pollution from deceleration and reacceleration of vehicles.

b) *Mechanical Coin Collection System (MCCS):* Unlike the first type, the mechanical coin collection system refers to the collection of tolls at tollbooths using automated counting machine programmed to accepts highway authority-specific tokens or exact coin transactions. The automated machines collect tolls faster than human toll collectors and are able to process tolls at faster rate than the humans. The main setback of this system is that it requires vehicles to fully decelerate and require drivers to insert coins or tokens before speeding off.

c) *Traditional barrier electronic toll collection system (TBECS):* This refers to an electronic tolling system that allows collection of tolls at tollbooths through an electronically operated lift gate that allows passage of vehicles after the users' accounts have been charged. Meanwhile, its major disadvantage is that the cost of administration is high because it requires complete halt for processing of charges to forestall mistakes.

d) *Slow Speed Electronic Toll Collection System (SSETCS):* This is an electronic tolling system in use in several industrialized nations. This system allows collection of tolls at speed that is less than the normal road speed of vehicles. For the operation of slow speed electronic collection system, a data reader is mounted at strategic area at tollgates which process electronic collection of tolls while the vehicles slow down as low as 5 to 15 miles per hour speed after which they are allowed to leave the toll facility. It has a higher processing speed than the traditional barrier electronic toll collection system. The SSETCS attends to as much as 1200 vehicles per hour.

e) *High Speed Electronic Toll Collection System (HSETCS):* This is another variant of electronic tolling system which allows collection of tolls at full highway speed without stopping by the tollbooths. For the high speed electronic collection system, there are no tollbooths, but toll collection readers are mounted on erected gantries which facilitate processing of tolls at full highway speeds. This is the best toll collection system in several industrialized nations because of convenience for drivers, cost effectiveness of toll collection, minimal labour cost and capability to process at least 2200 vehicles per hour.

2.4. Relationships between Tolling, RI and PPP

The relationship between tolling, RI and PPP is complementary. In the face of dwindling public funding of roads and bridges, other viable funding options are RI and PPP as depicted by Figure 1. For individuals who favour ethical investment that would improve quality of life of the citizens in developing nations with infrastructural deficit, the option of RI is very attractive. However, for investors who seek joint venture businesses in infrastructural development with good return on investment, the option of PPP finds relevance.

Figure 1 – The relationship between tolling, RI and PPP

Source: Authors

3. Methods & Materials

This research adopts a qualitative research method, relying on inductive approach. The paper adopts a discursive approach, relying on government policy documents, journal articles, online resources, working papers and reports on tolling best practices. The numerical and non-numerical data were critically analysed using content analysis enriched by tables and figures on the basis of which insightful findings on the subject were established.

3.1. Results/Findings and Discussion

The summary of findings arising from the analysis of the numeric and non-numeric data are discussed below.

3.2. Socio-economic Merits of Tolling for Roads Sustainability

With regards to Nigeria, the new tolling system has greater socio-economic benefits. First and foremost, it shall be based on PPP framework, designed as a joint venture partnership between Federal Government and private sector individuals. Secondly, reintroduction of tolls on certain roads and bridges in Nigeria is believed would create massive jobs for Nigerians (Madunagu, 2012). Besides, it is believed in policy circles that tolling policy under the PPP model has the inherent potential of attracting Foreign Direct Investment (FDI) from responsible investors into the country thereby creating massive investment opportunities as well as acting as catalyst for the growth of the private sector (Ugeh, 2013). For prospective local and foreign investors, Tables 3, 4 and 5 provide highlight on roads and bridges available for responsible investment under the PPP model across Nigeria.

Analysts note that tolling is a pragmatic means of boosting government revenue required for developing, building, managing and maintaining roads and bridges (Njoku and Adegboye, 2013). Secondly, it is stated that, when road projects are financed through tolls collection it would serve as viable strategy for recouping the cost of the road projects over a period of time (Munroe et al., 2006). Considering the fact that tolls are invested on roads development, its collection facilitates better mobility of vehicles as well as provides reliable finance for transportation investment (Chi and Waugaman, 2010).

Table 3 – Ongoing PPP Highway Projects

SN	ROADS/BRIDGES	DISTANCE	REMARKS
1	Reconstruction & Expansion of Lagos – Ibadan Expressway	126Km	Newly Awarded on EPC basis. O & M Concession - to be awarded.
2	Guto – Bagana Bridge across Benue River	1.35km Bridge & 65Km Road	Concession is being reviewed & will be awarded.
PPP Projects Under Procurement			
1	Construction of 2nd Niger bridge at Asaba - Onitsha	2Km	Newly Awarded
2	Access Road to Murtala Mohammed Intern. Airport (MMIA) Road, Ikeja, Lagos	2.8Km	Award of Concession in progress
3	Construction of bridge over River Niger at Nupeko, Niger State	950m	OBC development phase in progress.

Source: Federal Ministry of Work in Yuguda (2013:22)

Table 4 – Proposed PPP highway projects with Ongoing Feasibility/Viability Studies

SN	ROADS/BRIDGES	DISTANCE	REMARKS
1	Bodo-Bonny Road to Link Bodo to the Island of Bonny in Rivers state	39 Km	Outline Business Cases (OBC) studies in progress
2	Dualizat. of Ilorin-Jebba-Mokwa-Kaduna Rd	597 km	OBC ready
3	Dualization of Keffi-Akwanga-Lafia-Makurdi Road	215 km	OBC ready
4	Dualization of Lokoja-Ajaokuta-Ogbulafo-Enugu (9th Mile) Road	238 Km	OBC is being carried out
5	Dualization of Akwanga-Jos Road	145 Km	OBC is being carried out
6	Dualization of Enugu (9th Mile) – Otukpo – Makurdi Road	261 Km	OBC is being carried out.
7	Dualization of Owerri – Aba Road	60 Km	OBC is being carried out.
8	Phase I : 2nd Lagos outer ring Road: Tin Can Island – Igando - Lagos/Otta road and Lagos/Ibadan expressway	74 Km	OBC is ready
9	Phase II : 2nd Lagos outer ring Road i) Lekki-Epe Expressway Linking Existing Lekki-Epe Expressway/Proposed Lekki Deep Sea Port ii) 5th Mainland Bridge	25 Km Road: 20 Km Bridge: 5K m	Consultancy for Feasibility Studies ongoing
10	Golden Triangle (Economic) Highways	Various (5000Km)	Consultants will be appointed to carry out Feasibility Studies for best actualization

Source: Federal Ministry of Work in Yuguda (2013;27)

Table 5 – Proposed PPP highway projects with outline business cases (OBC)

SN	ROADS/BRIDGES	DISTANCE	REMARKS
1	Enugu – Port Harcourt Dual Carriageway	210Km	Outline business cases (OBC) development in progress.
2	Lagos – Iseyin – Kishi – Kaiama Road	414Km	OBC development in progress.
3	Kiama – Bahama – Kaoje – Gwambu – Fokku – Sokoto Road	631Km	OBC development in progress
4	Construction of bridge over River Benue at Buruku, Benue State	1Km	OBC development in progress
5	Construction of bridge over River Benue at Ibi along Shendam - Wukari Road	880m	OBC development in progress

Source: Federal Ministry of Work in Yuguda (2013:23)

3.3. Tolling and PPP Models

The prevalent PPP models that responsible investors could adopt which has records of success across the globe with reasonable level of success include: Build-and-Transfer (BT), Build-Lease-Transfer (BLT), Lease-Operate-Transfer (LOT), Build-Operate-and-Transfer (BOT), Build-Own-Operate-Transfer (BOOT), Build-Own-Operate (BOO), Build-Operate-Share-Transfer (BOST) and Build-Own-Operate-Share-Transfer (BOOST) (Agbakoba, 2001; Infrastructure Development Department, 2009; Raimi et al., 2013). In-depth explanation of each of the ten models is presented below (Figure 2).

a) *Build-and-Transfer (BT):* This is a contractual arrangement where the public-private partners (as an entity) undertakes the financing and construction of roads and bridges as the case may be, and after its completion turns it over to the government, which pays the private sector investors based on mutually agreed timeline. BT allows the investors to retrieve the total investments expended on roads and bridges, plus a reasonable rate of return to compensate them for their efforts.

b) *Build-Lease-and-Transfer (BLT):* This is a PPP arrangement whereby the public authority authorizes private sector investors to finance and construct roads and bridges and upon their completion, the government grant a lease arrangement for fixed period after which ownership of the roads and bridges are automatically transferred back to the government.

c) *Lease-Operate-Transfer (LOT):* This is another PPP arrangement where existing road and bridges are handed over to qualified private sector operators for a determined period as leased facility. The investors run the roads recouping their returns on investments as tolls. The financial returns on the roads to the government later on would be in the form of rents or royalties. At the expiration of the LOT agreement, the tolled roads are returned to the government.

d) *Build Operate and Transfer (BOT):* This is a PPP arrangement where the private sector investors undertake the construction and financing of roads, operation and maintenance thereof on the basis of a contractual agreement with the government authority. The private sector investors then operate the roads over a specified period during which they

are allowed to charge appropriate tolls as stipulated in the contract to enable them recover the costs of investment with reasonable returns from the project.

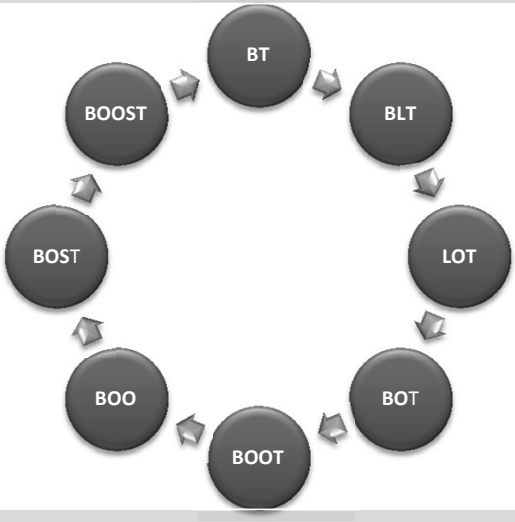
e) *Build-Own-Operate-and-Transfer (BOOT):* This is another PPP arrangement, where the private sector investors undertake as usual the tasks of roads construction, financing, operation and maintenance over a specified period of time. At the period of expiration, the facility is finally transferred, at no cost to the government. During the contractual period the private investors technically owns the roads and operate the roads charging tolls for recouping the costs of investment, operational maintenance and desirable margin of profit.

f) *Build-Own-and-Operate (BOO):* This is a contractual arrangement whereby a private sector investors are authorized by government to finance, construct, own, operate and maintain roads or bridges from which the they are allowed to charge tolls in order to costs of construction and maintenance. In this model of PPP, the private sectors own and operate the infrastructure with making transfer to government.

g) *Build-Operate-Share-Transfer (BOST):* This is a contractual arrangement where public government authorizes private investors to finance, construct, operate and maintain, share the revenue collected from roads as tolls with government and transfer the roads to government at the end of the contractual period. The BOST agreement like other model allows the private sector investors to recover their total costs of investment plus reasonable returns thereon.

h) *Build-Own-Operate-Share-Transfer (BOOST):* In this type of PPP arrangement, the private sector investors are authorized to finance, construct, own, operate and maintain, share a part of the revenue collected on tolled roads with government and then transfer the roads infrastructure at the end of the agreed period. The BOOST model allows private sector investor leeway to recover its total investment, operating and maintenance costs plus a reasonable return thereon by collecting tolls.

Figure 2 –Eight PPP Models



Source: Authors.

4. Conclusions, policy recommendations and implications for further research

The conclusions from this study are largely based on the qualitative analysis and assessment of the numerical and non-numerical data. The findings indicate that private sector tolling (especially the electronic tolls collection system) has the potential of providing the needed sustainable funding for roads construction, maintenance and management in Nigeria in the face of dwindling public funding for roads. Secondly, it has been proven that tolling is a viable measure for stimulating massive employment for the citizens. Besides, tolled roads have the potentials of accelerating urbanisation, fast regional, industrial, environmental and residential development. In order to optimize the benefits of tolling as discussed earlier, the following recommendations are suggested.

i. The private sector tolling agreement on roads/bridges built on PPP agreement should be based on Infrastructure Concession Regulatory Commission Act (2005), UNIDO Guidelines for Infrastructure Development on Build Operate Transfer (BOT) Projects (1996) and other international protocols on PPP and IR. The Global Best Practices for PPP and RI must be followed because there are scandals that followed previous privatisation and concessioning agreements in Nigeria.

ii. For tolling investment to be genuinely responsible, it is suggested that investments should be based on Core Principles and Best Practices as contained in the European Commission Guidelines for Successful Public-Private Partnerships, 2003; European Commission Green Paper on Public-Private Partnerships and Community Law on Public Contracts and Concessions, 2004.

iii. The Federal Government should create an enabling and competitive business environment for attracting responsible investors (locally and internationally). This suggestion is hinged on the presumption that political stability, security and respect for rule of law are critical factors that influences investment decision at individual, corporate and governmental levels.

iv. Both the political leadership and the implementers of Nigeria's tolling policy should avoid the mistake of the past especially ports concessioning, privatization policy and other government development policies.

v. The Federal Ministry of Works should set up an effective monitoring and evaluation process for implementing the tolling policy programme in Nigeria. In other word, due process must be followed at every stage of the implementation of the PPP framework.

vi. Government and its agencies should study the implications of tolling on the residential communities, ordinary people and the host communities to avert the crisis experience of Ajah tolls in Lagos State, which has a pending court case.

The next stage of this research is to subject the qualitative findings to empirical testing. For this to be achieved a survey especially the use of structured questionnaires is required for eliciting the opinions of end-users and policymakers on the proposed reintroduction of tolling in Nigeria under the PPP framework. The present findings and the outcomes of the proposed empirical study shall be compared on the basis of which sound conclusions on the proposed reintroduction of tolling shall be made. The paper has established that the success of any tolls collection systems depend largely on effectiveness of governance, probity and accountability, which are core elements of responsible investment in the contemporary times.

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HOW DO THE RICHEST 1% OWN 50% OF THE NATIONAL WEALTH IN AN INTEGRATED WALRASIAN EQUILIBRIUM AND NEOCLASSICAL GROWTH MODEL

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Received: *Feb 23, 2015* Accepted: *March 24, 2015* Online Published: *August 10, 2015*

Abstract

This paper proposes a dynamic economic model of heterogeneous households to explain economic mechanisms of how the richest one per cent of the population own 50% of national wealth. We explain inequality in a purely competitive economic environment with endogenous wealth and human capital accumulation. The production technologies and economic structure follow the Uzawa two-sector model. In this study a household's disposable income is the traditional disposable income (which is the income that a household earns each period of time after taxes and transfers in the Solow model and many empirical studies) plus the value of the household's wealth. By applying Zhang's concept of disposable income and utility function, we describe consumers' wealth accumulation and consumption behavior. We show how wealth accumulation, human capital accumulation, and division of labor, and time distribution interact with each other under perfect competition. We simulate the model with three groups of the people, the rich, the middle, and the poor whose shares of the population are, respectively, the 1 %, 69%, and 20%. We demonstrate the existence of an equilibrium point at which the rich 1% own more than half of the national wealth and the poor 20% less than 10% of the national wealth. The rich household works only 4 hours a day and the poor household 11 hours a day. We show how the system moves to the equilibrium from an initial state and confirm that the equilibrium point is stable. We also demonstrate how changes in the total factor productivity of the capital goods sector, the rich's human capital utilization efficiency, the rich's efficiency of learning through consuming, and the rich's propensities to save, to consume, and to enjoy leisure, affect growth and inequality.

Keywords: Inequality and growth; learning by consuming; wealth and income distribution; heterogeneous households.

1. Introduction

It has been reported that the richest 1% of the world population is owning almost half of the world's wealth. Moreover, it does seem that inequality be enlarged in the near future in tandem with rapid economic globalization. There is a need to know determinants of inequality and

dynamics of inequality. This need is emphasized by Forbes (2000) as follows: "careful reassessment of the relationship between these two variables (growth rate and income inequality) needs further theoretical and empirical work evaluating the channels through which inequality, growth, and any other variables are related." Surprisingly theoretical economics still has little to say about determinants and dynamics of economic growth and inequality. In a systematic review on the literature of economic growth and inequality of income and wealth, Zhang (2006) points out that although the importance of issues related to growth and inequality was well recognized long time ago by economists such as Marx and Kaldor, modern theoretical economics has failed in providing a proper analytical framework to analyze relations between growth and inequality.

Without a proper analytical framework, economics can hardly analyze extremely complicated dynamic issues with nonlinear interactions among many variables over time. Even mathematically it had been hopeless for any theoretical economists to deal with the issues in free market economies in an insightful and comprehensive manner even a few decades ago before computer was available for simulating high dimensional nonlinear dynamic models. The purpose of this study is to re-address issues related to growth and inequality with Zhang's concept of disposable income and utility function. We are especially interested in a phenomenon of contemporary free-market economies where the richest 1% of the population own more than almost half of wealth. By comparative dynamic analysis we also demonstrate some possibilities that inequalities will not be shrunk but will be enlarged in free market economies with rapid technological changes and connected markets. In order to analyze these issues, we introduce endogenous human capital and human capital externalities into the general equilibrium theory with heterogeneous households and endogenous wealth.

This study is based on Zhang's integrated Walrasian general equilibrium and neoclassical growth theory (Zhang, 2006, 2014). Both the Walrasian general equilibrium theory and neoclassical growth theory have played a key role in the development of formal economic theories in modern times. The Walrasian general equilibrium theory was initially developed by Walras (Walras, 1874). The theory was further developed and refined mainly in the 1950s by Arrow, Debreu and others (e.g., Arrow and Debreu, 1954; Gale, 1955; Nikaido, 1956, 1968; Debreu, 1959; McKenzie, 1959; Arrow and Hahn, 1971; Arrow, 1974; and Mas-Colell *et al.*, 1995). The theory solves equilibrium of pure economic exchanges with heterogeneous supplies and households. From the perspective of modern economies the theory has a serious shortcoming which is failures of properly including endogenous wealth (and other factors such as environment, resources, human capital and knowledge) irrespective many attempts done by many economists. Walras failed in developing a general equilibrium theory with endogenous saving and capital accumulation (e.g., Impicciatore *et al*., 2012).

Over years many economists attempted to further develop Walras' capital accumulation within Walras' framework (e.g., Morishima, 1964, 1977; Diewert, 1977; Eatwell, 1987; Dana et al. 1989; and Montesano, 2008). As it lacks proper economic mechanisms for determining wealth accumulation, the traditional Walrasian general equilibrium theory is not proper for addressing issues related to growth and inequality. On the other hand, the neoclassical growth theory deals with endogenous wealth accumulation with microeconomic foundation (e.g., Ramsey model). Nevertheless, the theory is not successful in dealing with growth with heterogeneous households. Almost all of the neoclassical growth models are built for a homogenous population. Some neoclassical growth models with endogenous wealth accumulation consider heterogeneous households. Nevertheless, the heterogeneity in these studies is by the differences in the initial endowments of wealth among different types of households rather than in preferences (see, for instance, Chatterjee, 1994; Caselli and Ventura, 2000; Maliar and Maliar, 2001; Penalosa and Turnovsky, 2006; and Turnovsky and Penalosa, 2006). Different households are essentially homogeneous in the sense that all the households

have the same preference utility function in the traditional Ramsey approach. In our approach we consider different ethnic groups have different utility functions. It implies its limited power in analyzing growth and inequality. Zhang (2006, 2014) integrates the neoclassical growth theory with the Walrasian general equilibrium theory with his concept of disposable income and utility function.

This study is based on Zhang's approach to discuss growth and inequality. It should be noted that economists made efforts in integrating the neoclassical growth theory with the general equilibrium analysis (e.g., Jensen and Larsen, 2005). As far as the Walrasian general equilibrium theory and the traditional capital theory are concerned, the issues examined by Polterovich's approach with heterogeneous capital and heterogeneous households (Polterovich, 1977, 1983; Bewley, 1982; Amir and Evstigneev, 1999) are quite similar to the model in this study. The main difference between Polterovich's model and our approach is human capital dynamics the modeling of household behavior. Polterovich's approach to household is mainly based on the Ramsey model, while this study is based on Zhang's approach. Polterovich's approach does not take account of endogenous human capital.

Both physical wealth and human capital are the determinants of economic growth and inequality. Wealth differs between households partly because people have different propensities to save and human capital differs between people partly because they have different abilities and preferences in accumulating human capital. This study follows Uzawa's two sector growth model in describing economic structure (Uzawa, 1961). Uzawa's two-sector model has been generalized and extended in different ways over years (see, Diamond, 1965; Stiglitz, 1967; Mino, 1996; and Drugeon and Venditti, 2001). We will integrate the neoclassical growth theory with the Walrasian general equilibrium theory for studying dynamic interactions among growth, wealth and income distribution, and economic structures. A unique feature of our approach is to treat human capital accumulation as an endogenous process of economic growth. In economic theory there are only a few theoretical models which study inequality and growth with both endogenous wealth and human capital accumulation. Our approach to human capital accumulation is influenced by Arrow's learning by doing, Uzawa's learning formal education, and Zhang's learning through consuming (leisure creativity). This paper also extends a recent paper on economic growth with heterogeneous households by Zhang (2012, 2014). The main difference between this study and Zhang (2012) is that this study treats human capital as endogenous process while the previous study by Zhang considers human capital fixed. The main difference between this study and Zhang (2014) is that this study treats time distribution as endogenous and the previous study by Zhang neglects time distribution issues. The two studies have different human capital accumulation equations.

The rest of this paper is organized as follows. Section 2 defines the heterogeneous households neoclassical growth model with capital accumulation and human capital accumulation. Section 3 shows that the dynamics of the economy with J types of households can be described by $2J$-dimensional differential equations. As mathematical analysis of the system is too complicated, we demonstrate some of the dynamic properties by simulation when the economy consists of three types of households. Section 4 carries out comparative dynamic analysis with regard to the total factor productivity of the capital goods sector, the rich's human capital utilization efficiency, the rich's efficiency of learning through consuming, and the rich's propensities to save, to consume, and to enjoy leisure. Section 5 concludes the study.

2. The Basic Model

The economy consists of one capital goods and one consumer goods sectors. Most aspects of the production sectors are similar to the standard two-sector growth model by Uzawa (Uzawa, 1965; Burmeister and Dobell 1970; Azariadis, 1993; Barro and Sala-i-Martin, 1995). Households own

assets of the economy and distribute their incomes to consume and to save. Firms use labor and physical capital inputs to supply goods and services.

Exchanges take place in perfectly competitive markets. Factor markets work well and the available factors are fully utilized at every moment. Saving is undertaken only by households. All earnings of firms are distributed in the form of payments to factors of production, labor, managerial skill and capital ownership. The population is classified into J groups. Each group has a fixed population, $\overline{N}_j$, ($j = 1, ..., J$). Let prices be measured in terms of the commodity and the price of the commodity be unit. Let $p(t)$ denote the price of consumer goods at time t. We denote wage and interest rates by $w_j(t)$ and $r(t)$, respectively. We use $H_j(t)$ to stand for group j's level of human capital. It should be noted that although we call it human capital, the variable $H_j(t)$ may consist of not only human capital such as skills and knowledge but also intangible assets such as social status, reputation, and social relations.

We use subscript index i and s to respectively stand for capital goods and consumer goods. We use $N_m(t)$ and $K_m(t)$ to stand for the labor force and capital stocks employed by sector m. Let $T_j(t)$ stand for the work time of a typical worker in group j. The variable $N(t)$ represents the total qualified labor force. A worker's labor force is $T_j(t)H_j^{m_j}(t)$, where m_j is a parameter measuring utilization efficiency of human capital by group j. The labor input is the work time by the effective human capital. A group's labor input is the group's population by each member the labor force, that is, $T_j(t)H_j^{m_j}(t)\overline{N}_j$. As the total qualified labor force is the sum of all the groups' labor forces, we have $N(t)$ as follows

$$N(t) = \sum_{j=1}^{J} T_j(t)H_j^{m_j}(t)\overline{N}_j, \qquad j = 1, ..., J. \tag{1}$$

Full employment of labor and capital

The total labor force is employed by the two sectors. The condition of full employment of labor force implies

$$N_i(t) + N_s(t) = N(t). \tag{2}$$

The total capital stock $K(t)$ is allocated between the two sectors. As full employment of capital is assumed, we have

$$K_i(t) + K_s(t) = K(t). \tag{3}$$

Let $\bar{k}_j(t)$ denote per capita wealth of group j at t. Group j's wealth is $\bar{k}_j(t)\overline{N}_j$. As wealth is held by the households, we have

$$K(t) = \sum_{j=1}^{J} \bar{k}_j(t)\overline{N}_j. \tag{4}$$

The capital goods sector

Let $F_m(t)$ stand for the production function of sector m, $m = i, s$. The production function of the capital goods sector is specified as follows

$$F_i(t) = A_i K_i^{\alpha_i}(t) N_i^{\beta_i}(t), \ \alpha_i, \beta_i > 0, \ \alpha_i + \beta_i = 1, \tag{5}$$

where A_i, α_i, and β_i are positive parameters. The capital goods sector employs two input factors, capital and labor force. We assume that all the markets are perfectly competitive. The marginal conditions for the capital goods sector are

$$r(t) + \delta_k = \frac{\alpha_i F_i(t)}{K_i(t)}, \ w(t) = \frac{\beta_i F_i(t)}{N_i(t)}. \tag{6}$$

The consumer goods sector

The production function of the consumer goods sector is specified as follows

$$F_s(t) = A_s K_s^{\alpha_s}(t) N_s^{\beta_s}(t), \ \alpha_s + \beta_s = 1, \ \alpha_s, \beta_s > 0, \tag{7}$$

where A_s, α_s, and β_s are technological parameters. The marginal conditions are

$$r(t) + \delta_k = \frac{\alpha_s p(t) F_s(t)}{K_s(t)}, \ w(t) = \frac{\beta_s p(t) F_s(t)}{N_s(t)}. \tag{8}$$

Consumer behaviors and wealth dynamics

Consumers make decisions on choice of leisure time, consumption levels of services and commodities as well as on how much to save. We note that the wage rate of group j is

$$w_j(t) = w(t) H_j^{m_j}(t), \ \ j = 1, \cdots, J. \tag{9}$$

Per capita current income from the interest payment $r(t)\bar{k}_j(t)$ and the wage payment $T_j(t)w_j(t)$ is

$$y_j(t) = r(t)\bar{k}_j(t) + T_j(t)w_j(t).$$

We call $y_j(t)$ the current income in the sense that it comes from consumers' payment for human capital and efforts and consumers' current earnings from ownership of wealth. The total value of wealth that consumers can use is $\bar{k}_j(t)$. Here, we assume that selling and buying wealth can be conducted instantaneously without any transaction cost. The per capita disposable income is given by

$$\hat{y}_j(t) = y_j(t) + \bar{k}_j(t) = (1 + r(t))\bar{k}_j(t) + W_j(t). \tag{10}$$

where $W_j(t) \equiv T_j(t)w_j(t)$ is the wage income. The disposable income is used for saving, consumption, and education. It should be noted that the value, $\bar{k}_j(t)$, (i.e., $p(t)\bar{k}_j(t)$ with $p(t) = 1$), in (10) is a flow variable. Under the assumption that selling wealth can be conducted instantaneously without any transaction cost, we may consider $\bar{k}_j(t)$ as the amount of the income that the consumer obtains at time t by selling all of his wealth. Hence, at time t the consumer has the total amount of income equaling $\hat{y}_j(t)$ to distribute between saving and consumption. It should be noted that in the traditional neoclassical growth theory and most empirical studies disposable income is defined as the income that a household earns each period of time after taxes and transfers. It is supposed to be the money available to the household for spending on goods and services. Indeed, when wealth plays minor role in analyzing behavior of households the traditional concept is not misleading. Nevertheless, when wealth is large and plays an important role in affecting household behavior, the omission in the money available for spending may be misleading. Obviously, a rich man with the net value of wealth US$70 billions will save a lot even if he had no current income (no pension and wealth earning a net zero rate of return) as common sense tells us.

According to the neoclassical growth theory (such as the most well-known Solow model in growth theory), the rich man makes neither consumption nor saving as his disposable income is zero. In our model, the man's disposable income is 0 + 70 = 70. If his consumption annually is 0.1 billions, his saving is 70 – 0.1 = 69.9 billions US dollars. His actual saving rate is saving/(disposable income) = 69.9/70, rather than 0 as in a national statistical record. In our approach rich people have a high propensity to save than poor people partly as the extremely rich have too much to spend. As our approach accumulated wealth will play another important role in protecting the social status as wealth helps the rich to accumulate more physical capital (due to interest returns of wealth) as well as human capital (due to easy access to best education, for instance), to build more useful social networks, and maintain reputation of being rich.

The typical consumer distributes the total available budget between saving $s_j(t)$, consumption of consumer goods $c_j(t)$. The budget constraint is

$$p(t)c_j(t) + s_j(t) = \hat{y}_j(t) = (1 + r(t))\bar{k}_j(t) + w_j(t)T_j(t), \tag{11}$$

The time constraint for everyone

$$T_j(t) + \bar{T}_j(t) = T_0, \tag{12}$$

where $\bar{T}_j(t)$ is the leisure time of the representative household and T_0 is the total available time. Substituting (12) into (11) yields

$$w_j(t)\bar{T}_j(t) + p(t)c_j(t) + s_j(t) = \bar{y}_j(t) \equiv (1 + r(t))\bar{k}_j(t) + T_0\, w_j(t). \tag{13}$$

The variable $\bar{y}_j(t)$ is the disposable income when the household spends all the available time on work. We assume that the consumer's utility function is dependent on $\bar{T}_j(t)$, $c_j(t)$, and $s_j(t)$ as follows

$$U(t) = \overline{T}_j^{\sigma_{j0}}(t) c^{\xi_{j0}}(t) s^{\lambda_{j0}}(t), \quad \sigma_{j0}, \xi_{j0}, \lambda_{j0} > 0, \tag{14}$$

where σ_{j0} is the propensity to use leisure time, ξ_{j0} is the propensity to consume, and λ_{j0} the propensity to own wealth. This utility function proposed by Zhang (1993) is applied to different economic problems. Maximizing $U_j(t)$ subject to (13) yields

$$\overline{T}_j(t) = \frac{\sigma_j \overline{y}_j(t)}{w_j(t)}, \quad c_j(t) = \frac{\xi_j \overline{y}_j(t)}{p_s(t)}, \quad s_j(t) = \lambda_j \overline{y}_j(t), \tag{15}$$

where

$$\sigma_{j0} \equiv \rho_j \sigma_{j0}, \quad \xi_{j0} \equiv \rho_j \xi_{j0}, \quad \lambda_{j0} \equiv \rho_j \lambda_{j0}, \quad \rho_j \equiv \frac{1}{\sigma_{j0} + \xi_{j0} + \lambda_{j0}}.$$

Change in the household wealth

According to the definitions of $s_j(t)$, the wealth accumulation of the representative household in group j is given by

$$\dot{\bar{k}}_j(t) = s_j(t) - \bar{k}_j(t). \tag{16}$$

This equation simply states that the change in wealth is equal to saving minus dissaving.

Dynamics of human capital

In economic theory there are three sources of improving human capital, through education, "learning by producing", and "learning by leisure". Arrow (1962) first introduced learning by doing into growth theory. The basic idea is that people accumulate more skills and have more ideas when they are engaged in economic production. Uzawa (1965) took account of trade-offs between investment in education and capital accumulation in his well-known two-sector model. The basic idea is that education uses social resources but enable people to have more skills and knowledge. Zhang (2007) introduced impact of consumption on human capital accumulation (via the so-called creative leisure) into growth theory. Arrow's idea of learning by doing is that useful knowledge can be obtained mainly through working experiences. His idea has narrow implications as there are many other sources of accumulating skills and knowledge. Activities which are classified neither as formal education as in the Uzawa model nor as production as in the Arrow model, such as playing computer games, having social parties, being brought up by rich and educated parents, living in a decent society, touring different parts of the world, and being extremely rich, may have strong effects on human capital. Influencing by the three approaches just mentioned and being concerned with providing a case of richest 1% owing 50% wealth, we propose that the human capital accumulation is described as follows

$$\dot{H}_j(t) = \frac{\widetilde{\upsilon}_j c_j^{a_j}(t) \bar{k}_j^{\upsilon_j}(t) T_j^{\theta_j}(t)}{H_j^{\pi_j}(t)} - \delta_{hj} H_j(t), \tag{17}$$

where δ_{hj} is the depreciation rates of human capital, $0 < \delta_{hj} < 1$. In (17), $\tilde{\upsilon}_j$, a_j, υ_j, and θ_j are non-negative parameters, and π_j is a parameter. In our approach different groups may have different depreciation rates of human capital. The human capital accumulation in this study is influenced by different approaches to human capital accumulation in the literature of endogenous human capital. We now interpret the items in $\tilde{\upsilon}_j c_j^{a_j} \bar{k}_j^{\upsilon_j} T_j^{\theta_j} / H_j^{\pi_j}$. The item $c_j^{a_j}$ which implies a positive relation between human capital accumulation and consumption is influenced by Uzawa's learning through education and Zhang's learning through consumption. As education is classified as the consumption of services, a higher level of consumption may imply a higher investment in education. On the other hand, a higher consumption also implies that the household may accumulate more through other consumption activities. The item $\bar{k}_j^{\upsilon_j}$ which implies a positive relation between wealth and human capital accumulation can be interpreted that more wealth means, for instance, a higher social status. More wealth may also help one to maintain professional reputation. The specification of $T_j^{\theta_j}$ is influenced by Arrow's learning by doing. More work accumulates more human capital. The term $H_j^{\pi_j}$ implies that more human capital makes it easier (more difficult) to accumulate knowledge in the case of $\pi_j < 0$ ($\pi_j > 0$).

Demand of and supply for consumer goods

The output of the consumer goods sector is consumed only by the households. The demand for consumer goods from a group is $c_j(t)\bar{N}_j$. The condition that the total demand is equal to the total supply implies

$$\sum_{j=1}^{J} c_j(t)\bar{N}_j = F_s(t). \tag{18}$$

Demand of and supply for capital goods

As output of the capital goods sector is used only as capital goods, the output equals the depreciation of capital stock and the net savings. That is

$$\sum_{j=1}^{J} s_j(t)\bar{N}_j - K(t) + \delta_k K(t) = F_i(t). \tag{19}$$

We completed the model. The model is structurally general in the sense that some well-known models in theoretical economics can be considered as its special cases. For instance, if we fix wealth and human capital and allow the number of types of households equal the population, then the model is a Walrasian general equilibrium model. If the population is homogeneous, our model is structurally similar to the neoclassical growth model by Solow (1956) and Uzawa (1961). It is structurally similar to the multi-class models by Pasinetti and Samuelson (e.g., Samuelson, 1959; Pasinetti, 1960, 1974). We now examine dynamics of the model.

3. The Dynamics and Its Properties

As the system consists of any number of types of households, its dynamics is highly dimensional. The following lemma shows that the economic dynamics is represented by $2J$ dimensional differential equations. First we introduce a variable

$$z(t) \equiv \frac{r(t) + \delta_k}{w(t)}.$$

Lemma

The dynamics of the economy is governed by the following $2J$ dimensional differential equations system with $z(t)$, $\{\bar{k}_j(t)\}$, and $(H_j(t))$, where $\{\bar{k}_j(t)\} \equiv (\bar{k}_2(t), \cdots, \bar{k}_J(t))$ and $(H_j(t)) \equiv (H_1(t), \cdots, H_J(t))$, as the variables

$$\begin{aligned}
&\dot{z}(t) = \Lambda_1(z(t), (H_j(t)), \{\bar{k}_j(t)\}),\\
&\dot{\bar{k}}_j(t) = \Lambda_j(z(t), (H_j(t)), \{\bar{k}_j(t)\}), \quad j = 2, ..., J,\\
&\dot{H}_j(t) = \Omega_j(z(t), (H_j(t)), \{\bar{k}_j(t)\}), \quad j = 1, ..., J,
\end{aligned}$$

in which Λ_j and Ω_j are unique functions of $z(t)$, $\{\bar{k}_j(t)\}$, and $(H_j(t))$ at any point in time, defined in the appendix. For given $z(t)$, $\{\bar{k}_j(t)\}$, and $(H_j(t))$, the other variables are uniquely determined at any point in time by the following procedure: $r(t)$ and $w(t)$ by (A3) → $w_j(t)$ by (A4) → $p(t)$ by (A5) → $\bar{k}_1(t)$ by (A18) → $N_i(t)$ by (A12) → $N(t)$ by (A11) → $N_s(t)$ by (A8) → $\bar{y}_j(t)$ by (A6) → $K_i(t)$ and $K_s(t)$ by (A1) → $F_i(t)$ and $F_s(t)$ by the definitions → $\bar{T}_j(t)$, $c_j(t)$, and $s_j(t)$ by (15) → $K(t)$ by (4).

Following the lemma, we have a computational program to follow the motion of the dynamic economic system by simulating the dynamic equations with any number of types of households. As the system is nonlinear and is of high dimension, it is difficult to generally analyze behavior of the system. For illustration, we specify the parameters as follows:

$$\begin{aligned}
&\begin{pmatrix} N_1 \\ N_2 \\ N_3 \end{pmatrix} = \begin{pmatrix} 1 \\ 69 \\ 20 \end{pmatrix}, \begin{pmatrix} m_1 \\ m_2 \\ m_3 \end{pmatrix} = \begin{pmatrix} 0.7 \\ 0.15 \\ 0.1 \end{pmatrix}, \begin{pmatrix} \xi_{10} \\ \xi_{20} \\ \xi_{30} \end{pmatrix} = \begin{pmatrix} 0.1 \\ 0.18 \\ 0.2 \end{pmatrix}, \begin{pmatrix} \lambda_{10} \\ \lambda_{20} \\ \lambda_{30} \end{pmatrix} = \begin{pmatrix} 0.94 \\ 0.65 \\ 0.6 \end{pmatrix}, \begin{pmatrix} \sigma_{10} \\ \sigma_{20} \\ \sigma_{30} \end{pmatrix} = \begin{pmatrix} 0.25 \\ 0.2 \\ 0.2 \end{pmatrix},\\
&\begin{pmatrix} \bar{v}_1 \\ \bar{v}_2 \\ \bar{v}_3 \end{pmatrix} = \begin{pmatrix} 0.8 \\ 0.4 \\ 0.1 \end{pmatrix}, \begin{pmatrix} a_1 \\ a_2 \\ a_3 \end{pmatrix} = \begin{pmatrix} 0.3 \\ 0.2 \\ 0.1 \end{pmatrix}, \begin{pmatrix} v_1 \\ v_2 \\ v_3 \end{pmatrix} = \begin{pmatrix} 0.2 \\ 0.1 \\ 0.1 \end{pmatrix}, \begin{pmatrix} \theta_1 \\ \theta_2 \\ \theta_3 \end{pmatrix} = \begin{pmatrix} 0.3 \\ 0.35 \\ 0.4 \end{pmatrix}, \begin{pmatrix} \pi_1 \\ \pi_2 \\ \pi_3 \end{pmatrix} = \begin{pmatrix} 0.1 \\ 0.2 \\ 0.4 \end{pmatrix},\\
&A_i = 1, \ A_s = 0.9, \ \alpha_i = 0.32, \ \alpha_s = 0.34, \ T_0 = 24, \ \delta_{h1} = 0.04, \ \delta_{h2} = 0.06,\\
&\delta_{h3} = 0.08, \ \delta_k = 0.05.
\end{aligned} \tag{20}$$

Group 1, 2 and 3's populations are respectively 1, 69 and 20. Group 2 has the largest population. The capital goods sector and consumer goods sector's total productivities are respectively 1 and 0.9. Group 1, 2 and 3's utilization efficiency parameters, m_j, are

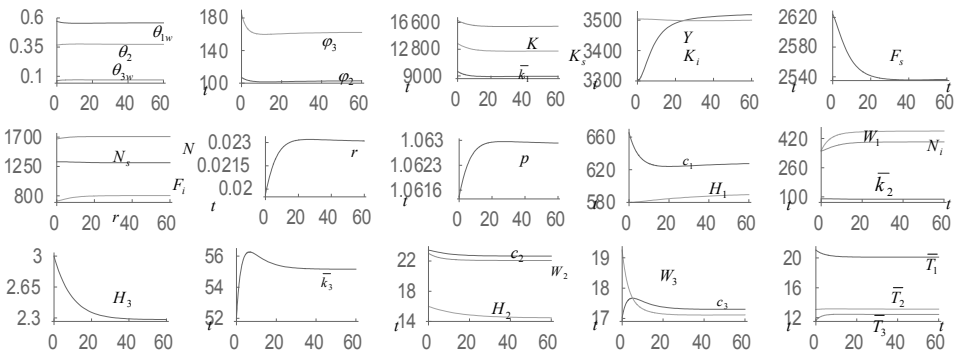
respectively 0.7, 0.15 and 0.1. Group 1 utilizes human capital mostly effectively; group 2 next and group 3 lest effectively. We call the three groups respectively as the rich, the middle, and the poor. We We specify the values of the parameters, α_j, in the Cobb-Douglas productions approximately equal to 0.3. The rich's learning by doing parameter, $\bar{v}_1$, is the highest. The returns to scale parameters, π_j, are all positive, which implies that human capital accumulation exhibits decreasing returns to scale in human capital. The depreciation rates of human capital are specified in such a way that the rich has lowest rate. The rich's propensity to save is 0.94 and the rich's propensity to save is 0.6. It is assumed that the rich is most effective in learning through consuming and working. The value of the middle's propensity is between the rich and the poor. In Figure 1, we plot the motion of the system with the following initial conditions

$$z(0)=0.135,\ \bar{k}_2(0)=73,\ \bar{k}_3(0)=45,\ H_1(0)=460,\ H_2(0)=17,\ H_3(0)=3. \tag{21}$$

In Figure 1, the national output Y, the share of each group's wealth in the national wealth θ_{jw}, and the ratio between group 1's and another group's wealth φ_j, are respectively defined as

$$Y(t)=F_i(t)+p(t)F_s(t),\ \theta_{jw}(t)\equiv\frac{\bar{K}_j(t)}{K(t)},\ \varphi_j(t)\equiv\frac{\bar{k}_1(t)}{\bar{k}_j(t)},\ j=1,2,3.$$

Figure 1 – The Motion of the Economic System.



With different initial conditions, the economy experiences different paths of development. Under (21), the national output and wealth experience negative growth over time. The rich's human capital is increased and the middle's and poor's human capital fall over time. A rich household works more hours and a household from the other two groups works less. The rich own more than half of the national wealth with 1 percent of the population and the poor own less 10 per cent of the national wealth with the 20 percent of the national population. The representative household from the rich owns more than 160 times wealth than the household from the poor.

We start with different initial states not far away from the equilibrium point and find that the system approaches to an equilibrium point. Under (21) we find that the system has a unique

equilibrium. The equilibrium values are listed in (22). The rich has highest human capital and highest wage income. The rich household spends lest hours on working and the poor household spends longest time on working. The rich household's consumption level and wealth are also much higher than the household from the two other groups.

$$\theta_{1w}=0.559,\ \theta_{2w}=0.373,\ \theta_{3w}=0.069,\ \varphi_2=103.4,\ \varphi_3=162.7,\ Y=3503.5,\ K=16092.3,$$
$$N=1708.4,\ F_i=804.6,\ F_s=2539.2,\ K_i=3526,\ K_s=12566.3,\ N_i=401.4,\ N_s=1306.9,$$
$$r=0.023,\ p=1.06,\ w_1=118.9,\ w_2=2.04,\ w_3=1.48,\ W_1=462.4,\ W_2=22.1,$$
$$W_3=17.13,\ H_1=591.9,\ H_2=14.47,\ H_3=2.28,\ \bar{k}_1=8988.23,\ \bar{k}_2=86.96,\ \bar{k}_3=55.19,$$
$$c_1=629.7,\ c_2=22.66,\ c_3=17.31,\ \bar{T}_1=20.11,\ \bar{T}_2=13.15,\ \bar{T}_3=12.43. \quad (22)$$

It is straightforward to calculate the six eigenvalues as follows

$$-0.38,\ -0.32,\ -0.18,\ -0.11,\ -0.07,\ -0.03.$$

As all the eigenvalues are negative, we see that the equilibrium point is locally stable.

4. Comparative Dynamic Analysis

We simulated the motion of the dynamic system. It is important to ask questions such as how a change in one group's propensity to save or to obtain education affects the economic growth, inequality and each class's wealth and consumption. Before carrying out comparative dynamic analysis, we introduce a variable $\bar{\Delta}x_j(t)$ to stand for the change rate of the variable, $x_j(t)$, in percentage due to changes in a parameter.

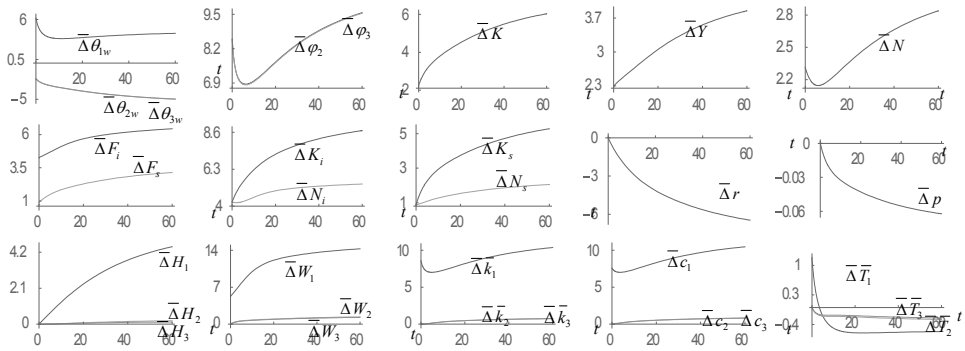
The rich applying human capital more effectively

Different people in society have different opportunities to apply their human capital. It is expected that the rich has more opportunities to utilize and tends to be more capable of applying human capital. There are many possible determinants of inequality of income and wealth in modern societies. It is expected that the rich get richer in the near future. For instance, if the society is developed toward such a direction that enables the rich (and successful ones) to apply their human capital more effectively, one may expect changes in inequality between the rich and the poor. We now increase the rich's human capital utilization efficiency as follows: $m_1: 0.7 \Rightarrow 0.71$. As the rich increases their efficiency in applying human capital, the inequality between the rich and the poor is greatly enlarged.

The rich get higher share of the national wealth and the ratios of per household wealth between the poor and rich and between the middle and rich are increased. The improved efficiency by the rich benefits the growth of the national wealth, GDP and total labor supply. The output levels and two input factors of the two sectors are augmented. The rate of interest falls in tandem with rising national wealth. The price of consumer goods falls. The rich's human capital as well as the poor and the middle are all enhanced, with the rich's human capital being increased much higher than the poor and middle's. It should be noted that an improvement in the rich's human capital utilization efficiency increases not only the rich's per household wealth, consumption level of services and wage income, but also the middle's and the poor's. In summary, an improvement in the rich's human capital utilization efficiency enlarges the gaps between the rich and the poor and the rich and middle, and benefits everyone in society (except everyone working longer hours). By the way it should be remarked that the impact of human capital is currently a main topic in economic theory and empirical research (e.g., Easterlin, 1981,

Hanushek and Kimko, 2000; Barro, 2001; Krueger and Lindahl, 2001; Bandyopadhyay and Tang, 2011; Castelló-Climent and Hidalgo-Cabrillana, 2012). There are different empirical conclusions about inequalities and human capital (e.g., Tilak, 1989; Could *et al*. 2001; Tselios, 2008; Fleisher *et al.* 2011). Our study addresses issues related to dynamic interactions among growth, inequality and distribution by assuming heterogeneity in preferences and human capital utilization efficiencies among different types of people. Our conclusion with regard to the rich's human capital change is that it benefits everyone and worsen equality.

Figure 2 – The Rich Applying Human Capital More Effectively

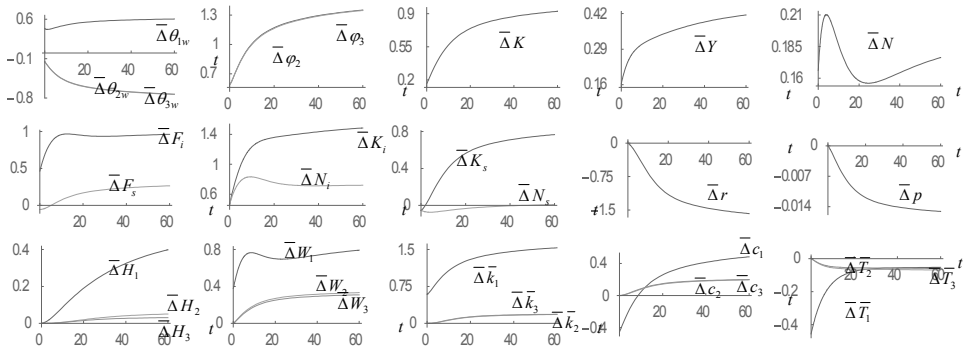


The rich's propensity to save being augmented

If the rich has become too rich to spend their wealth and become less interested in showing off with wealth, their propensity to save tends to be enhanced. We now increase the rich's propensity to save in the following way: $\lambda_{10} : 0.94 \Rightarrow 0.95$. The simulation results are plotted in Figure 3. The effects caused by the rise in the rich's propensity to save are quite similar to the effects of an improvement in the rich's human capital utilization efficient. As the rich increases their propensity to save, the inequality between the rich and the poor is enlarged. The rich get higher share of the national wealth and the ratios of per household wealth between the poor and rich and between the middle and rich are increased.

The national wealth, GDP and total labor supply are augmented. The output levels and two input factors of the two sectors are increased. The rate of interest and the price of consumer goods are lowered. The rich's human capital as well as the poor and the middle are all enhanced. It should be noted that although the rich's consumption of consumer goods is reduced in the short term, it is enhanced in the long term. This occurs as in the short term the increased propensity to save makes the rich consume less from the disposable income. But their consumption is increased in the long term as more wealth enables the rich to accumulate more human capital and the rich work long hours due to the change in the preference. We see that in the long term any household's per household wealth, consumption level of services and wage income are augmented. In summary, a rise in the rich's propensity to save benefits the national economic variables, enlarges the gaps between the rich and the poor and the rich and middle, and benefits everyone in society (except everyone working longer hours).

Figure 3 – The Rich's Propensity to Save Being Augmented

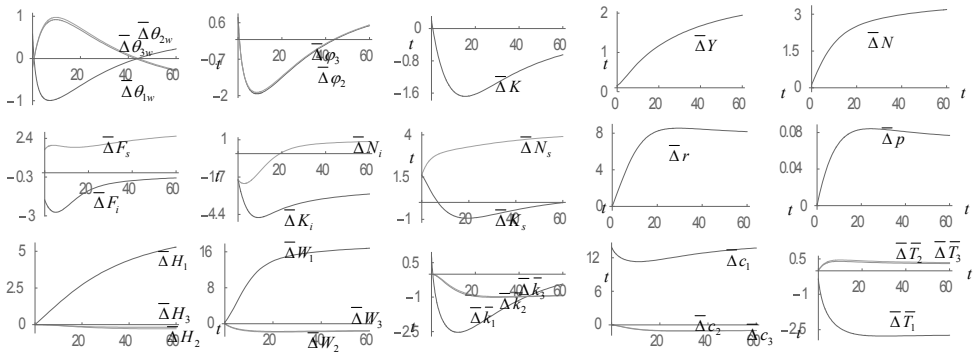


The rich's propensity to consume being increased

We now increase the rich's propensity to consume in the following way: $\xi_{10} : 0.07 \Rightarrow 0.08$. The simulation results are plotted in Figure 4. Per household of all the households is reduced by the rich's preference change. In the short term the inequalities are "improved" as the share of the rich in the national wealth falls and the ratios of the per household's wealth levels are shrunk. In the long term the inequalities are "deteriorated" as the share of the rich in the national wealth rises and the ratios of the per household's wealth levels are enhanced. This occurs partly because in our approach working experiences, owning wealth and consuming experiences all can affect human capital accumulation. As the rich consume more, they may grasp more business opportunities, learn more about business and build more productive/useful human relations.

The rich's human capital is thus enhanced. As they earn more income, their share of national wealth will be increased more rapidly than the other two groups. The rich work more hours and the middle and the poor work less hours. The rich get more wage income and the other two groups less. The national wealth is reduced and the national GDP and labor supply are augmented. The rate of interest and price of consumer goods rise. The output of the consumer goods sector is enhanced and the output of the capital goods sector is reduced.

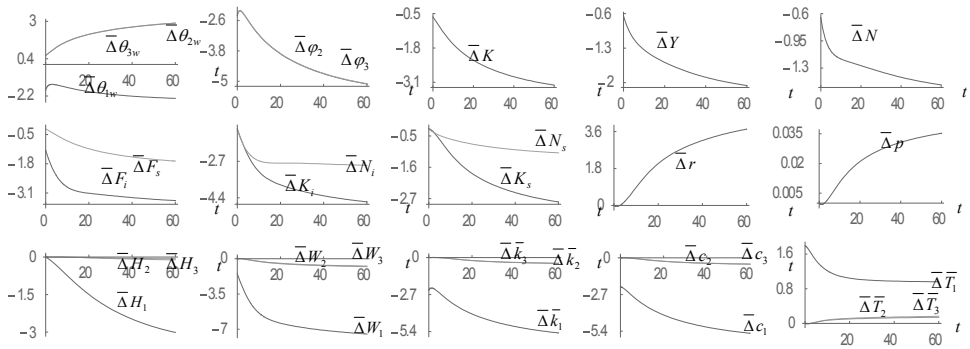
Figure 4 – The Rich's Propensity to Consume Being Increased



The rich's propensity to enjoy leisure being increased

Another change in the rich's preference is that they prefer more consuming leisure. To examine the impact of their preference change, we now increase the rich's propensity to enjoy leisure as follows: $\sigma_{10} : 0.25 \Rightarrow 0.26$. The simulation results are plotted in Figure 5. The inequalities are improved as the share of the rich in the national wealth falls and the ratios of the per household's wealth levels are shrunk. As the rich spend more time leisure, their human capital fall. The national wealth, GDP and labor supply all fall. The rate of interest and price of consumer goods rise. The output levels of the two sectors and each sector's two inputs are enhanced. The household from any group has lower human capital, works less hours, consumes less goods, and owns less wealth. In summary as the rich tend to enjoy more leisure, the inequalities are reduced but everyone worsens off (except having more leisure hours).

Figure 5 – The Rich's Propensity to Enjoy Leisure Being Increased



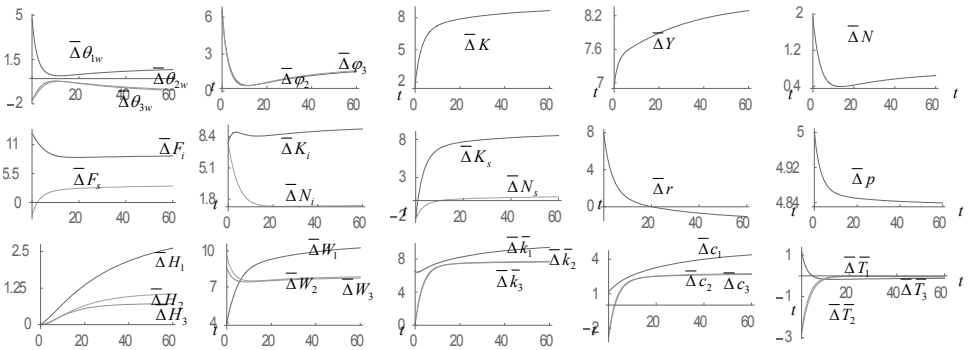
A rise in the total factor productivity of the capital goods sector

Another important question is what will happen to different people and the national economy if the total factor productivity of the capital goods sector is increased. We increase the total productivity in the following way: $A_i : 1 \Rightarrow 1.05$. The simulation results are plotted in Figure 6. The rise in the productivity increases human capital and wage incomes of all the groups. The rate of interest rises initially and falls in the long term. The price of consumer goods rises. The distribution of the total labor force is slightly affected. The two sectors increase the output levels in the long term. The wealth and consumption levels of all the groups are increased in the long term. The national wealth, GDP and total labor supply are all increased. The inequality between the rich and the poor is enlarged. The rich get higher share of the national wealth and the ratios of per household wealth between the poor and rich and between the middle and rich are increased. It should be further noted that economists have been concerned with relations between wealth and income distribution and growth have long time ago. Kaldor (1956) argues that as income inequality is enlarged, growth should be encouraged as savings are promoted. This positive relation between income inequality and growth is also observed in studies, for instance, by Bourguignon (1981), Forbes (2000), and Frank (2009).

There are other studies which find negative relations between income inequality and economic growth. Some mathematical models which predicate negative relations are referred to, for instance, Galor and Zeira (1993) and Galor and Moav (2004), and Benabou (2002). Some empirical studies by, for instance, Persson and Tabellini (1994), also confirm negative relations. From our simulation, we see that relations between inequality and economic growth are complicated in the sense that these relations are determined by many factors. The relation are

expectably ambiguous or development-dependent in the sense that one may observe positive or negative relations according the parameter values combinations and state of economic development. We already demonstrated that if the rich increase their human capital utilization efficiency or the total factor productivity of the capital goods sector is increased, the economy experiences positive growth and inequalities are enlarged. It is also straightforward to show that if either the poor or the middle increase their human capital utilization efficiency, the economy will experience positive growth and inequalities between are shrunk.

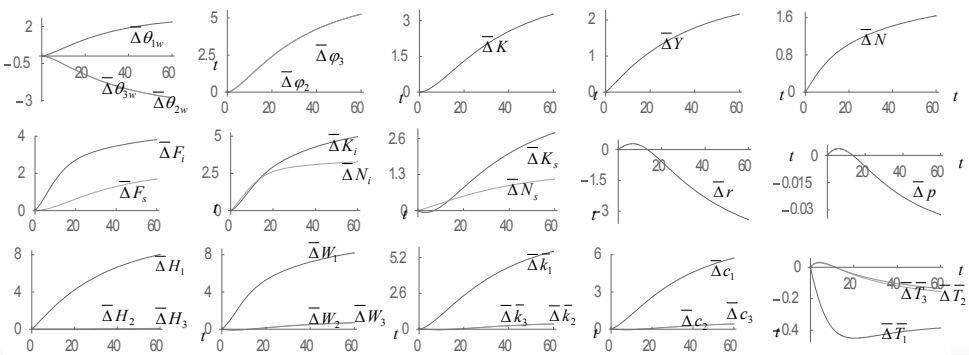
Figure 6 – A Rise in the Total Factor Productivity of the Capital Goods Sector



The rich's learning through consuming being strengthened

We now strengthen the impact of the rich's learning through consuming upon human capital accumulation as follows: $a_1 : 0.3 \Rightarrow 0.31$. As the rich's consumption affects human capital accumulation more strongly, the wealth gap between the rich and the poor is enlarged. The rich get higher share of the national wealth and the ratios of per household wealth between the poor and rich and between the middle and rich are enhanced. The rich's human capital is augmented, which also increases the growth of the national wealth, GDP and total labor supply. The output levels and two input factors of the two sectors are augmented. The rate of interest and the price of consumer goods fall. We see that the parameter change enlarges the gaps between the rich and the poor and the rich and middle, and benefits everyone in society (except everyone working longer hours).

Figure 7 – The Rich's Learning through Consuming Being Strengthened



5. Concluding Remarks

This paper built a dynamic economic model of heterogeneous households to explain some economic mechanisms of how the richest one per cent of the population own 50% of national wealth. The main determinants of growth and inequality are endogenous wealth and human capital accumulation under perfectly competitive conditions. The production technologies and economic structure follow the Uzawa two-sector model. In this study a household's disposable income is the traditional disposable income (which is the income that a household earns each period of time after taxes and transfers in the Solow model and many empirical studies) plus the value of the household's wealth.

By applying Zhang's concept of disposable income and utility approach, we describe consumers' wealth accumulation and consumption behavior. We showed how wealth accumulation, human capital accumulation, and division of labor, and time distribution interact with each other under perfect competition. We simulated the model with three groups of the population, the rich 1 %, the middle 69%, and the poor 20%. We demonstrated the existence of an equilibrium point at which the rich 1% do own more than half of the national wealth and the poor 20% less than 10% of the national wealth. We showed how the system moves to the equilibrium from an initial state and confirm that the equilibrium point is stable. We also demonstrated how changes in the total factor productivity of the capital goods sector, the rich's human capital utilization efficiency, the rich's efficiency of learning through consuming, and the rich's propensities to save, to consume, and to enjoy leisure, affect growth and inequality.

Although our comparative dynamic analysis does not find a situation of 'the rich get richer and the poor get poorer', we show that inequalities can be enlarged in tandem with economic growth, for instance, when the total factor productivity of the capital goods sector is increased.

The study has many obvious limitations when we look at real economic systems. For instance, we assume that there is no social mobility in the economic system. Although for a "mature" social and economic system, it is rate for the poor to become rich. In a case like China, about three decades ago there was almost no rich in the entire country. The educated and rich could rarely survive during the Mao period. Today there are so many really rich people who had never dreamt of becoming rich even two decades ago. Our model does not explain this kind of phenomena.

This study does not consider the role of the government in redistributing wealth and income. It is important to see how the government can affect distribution with various policies. We carried out comparative dynamic analysis only with respect change in a single parameter. It is more insightful to allow multiple parameters to be changed simultaneously. Another important issue is how to introduce endogenous change in preferences of different people. We may extend the model in some other directions. We may introduce education and allow some kind of government intervention in education. In this study, we don't consider public provision or subsidy of education.

Acknowledgements: The author thanks the anonymous referees and Editor Fabio Musso for the constructive comments. The author would also like to extend his appreciation to the financial support from the Grants-in-Aid for Scientific Research (C), Project No. 25380246, Japan Society for the Promotion of Science.

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Appendix: Identifying the Differential Equations in the Lemma

By (6) and (8) we obtain

$$z \equiv \frac{r+\delta_k}{w} = \frac{N_q}{\overline{\beta}_q K_q},\ q = i, s, \tag{A1}$$

where $\overline{\beta}_q \equiv \beta_q / \alpha_q$. From (A1) and (3), we obtain

$$\frac{N_i}{\overline{\beta}_i} + \frac{N_s}{\overline{\beta}_s} = z \sum_{j=1}^{J} \overline{k}_j \overline{N}_j, \tag{A2}$$

where we also use (4). Insert (A1) in (6)

$$r(z) = \alpha_r z^{\beta_i} - \delta_k,\ \ w(z) = \alpha z^{-\alpha_i}, \tag{A3}$$

where

$$\alpha_r = \alpha_i A_i \overline{\beta}_i^{\beta_i},\ \ \alpha = \beta_i A_i \overline{\beta}_i^{-\alpha_i}.$$

We have

$$w_j(z, H_j) = H_j^{m_j} w. \tag{A4}$$

Hence, we determine the rate of interest and the wage rates as functions of z and (H_j). From (7) and (8), we have

$$p(z) = \frac{\overline{\beta}_s^{\alpha_s} z^{\alpha_s} w}{\beta_s A_s}. \tag{A5}$$

From (A4) and the definitions of $\overline{y}_j$, we have

$$\overline{y}_j = (1+r)\overline{k}_j + T_0 w_j. \tag{A6}$$

Insert $p c_j = \xi_j \overline{y}_j$ in (18)

$$\sum_{j=1}^{J} \xi_j \overline{N}_j \overline{y}_j = p F_s. \tag{A7}$$

Substituting (A6) in (A7) yields

$$N_s = \sum_{j=1}^{J} \widetilde{g}_j \, \bar{k}_j + \widetilde{g}, \tag{A8}$$

where we use $p F_s = w N_s / \beta_s$ and

$$\widetilde{g}_j(z) \equiv \bar{r} \, \beta_s \, \xi_j \, \bar{N}_j, \;\; \bar{r}(z) \equiv \frac{1+r}{w}, \;\; \widetilde{g}\left(z, \left(H_j\right)\right) \equiv \beta_s \, T_0 \sum_{j=1}^{J} H_j^{m_j} \, \xi_j \, \bar{N}_j .$$

Inserting $w_j \bar{T}_j = \sigma_j \bar{y}_j$ in (12), we have

$$T_j = T_0 - \frac{\sigma_j \bar{y}_j}{w_j}. \tag{A9}$$

Insert (A6) in (A9)

$$T_j = \left(1 - \sigma_j\right) T_0 - \frac{(1+r)\sigma_j \bar{k}_j}{w_j}. \tag{A10}$$

Insert (A10) in (1)

$$N = n_0 - \sum_{j=1}^{J} n_j \, \bar{k}_j, \tag{A11}$$

where

$$n_0\left(z, \left(H_j\right)\right) \equiv T_0 \sum_{j=1}^{J} \left(1 - \sigma_j\right) \bar{N}_j H_j^{m_j}, \;\; n_j\left(z, \left(H_j\right)\right) \equiv \bar{r} \, \sigma_j \, \bar{N}_j .$$

Substituting (A8) and (A11) into yields

$$N_i\left(z, \left(H_j\right), \left(\bar{k}_j\right)\right) = n_0 - \widetilde{g} - \sum_{j=1}^{J} \left(n_j + \widetilde{g}_j\right) \bar{k}_j . \tag{A12}$$

Insert (A12) and (A8) in (A2)

$$\bar{k}_1 = \varphi\left(z, \left\{\bar{k}_j\right\}, \left(H_j\right)\right) \equiv \left(\frac{n_0 - \widetilde{g}}{\bar{\beta}_i} + \frac{\widetilde{g}}{\bar{\beta}_s} - \sum_{j=2}^{J} \phi_j \, \bar{k}_j \right) \frac{1}{\phi_1}, \tag{A13}$$

in which

$$\phi_j\left(z, \left(H_j\right)\right) \equiv z \, \bar{N}_j + \frac{n_j + \widetilde{g}_j}{\bar{\beta}_i} - \frac{\widetilde{g}_j}{\bar{\beta}_s}, \;\; \left\{\bar{k}_j\right\} \equiv \left(\bar{k}_2, ..., \bar{k}_J\right).$$

It is straightforward to confirm that all the variables can be expressed as functions of z, $\{\bar{k}_j\}$ and (H_j) by the following procedure: r and w by (A3) $\rightarrow$ w_j by (A4) $\rightarrow$ p by (A5) $\rightarrow$ $\bar{k}_1$ by (A18) $\rightarrow$ N_i by (A12) $\rightarrow$ N by (A11) $\rightarrow$ N_s by (A8) $\rightarrow$ $\bar{y}_j$ by (A6) $\rightarrow$ K_i and K_s by (A1) $\rightarrow$ F_i and F_s, by the definitions $\rightarrow$ $\bar{T}_j$, c_j, and s_j by (15) $\rightarrow K$ by (4). From this procedure, (A13), (16), and (17), we have

$$\dot{\bar{k}}_1 = \bar{\Omega}_1\left(z, \{\bar{k}_j\}, (H_j)\right) \equiv \lambda_1 \bar{y}_1 - \varphi, \tag{A14}$$

$$\dot{\bar{k}}_j = \Lambda_j\left(z, \{\bar{k}_j\}, (H_j)\right) \equiv \lambda_j \bar{y}_j - \bar{k}_j, \quad j = 2, ..., J,$$

$$\dot{H}_j = \Omega_j\left(z, \{\bar{k}_j\}, (H_j)\right), \quad j = 1, ..., J, \tag{A15}$$

Taking derivatives of equation (A13) with respect to t and combining with (A15), we get

$$\dot{\bar{k}}_1 = \frac{\partial \varphi}{\partial z}\dot{z} + \sum_{j=2}^{J} \Lambda_j \frac{\partial \varphi}{\partial \bar{k}_j} + \sum_{j=1}^{J} \Omega_j \frac{\partial \varphi}{\partial H_j}. \tag{A16}$$

Equaling the right-hand sizes of equations (A14) and (A16), we get

$$\dot{z} = \Lambda_1\left(z, \{\bar{k}_j\}, (H_j)\right) \equiv \left[\bar{\Omega}_1 - \sum_{j=2}^{J} \Lambda_j \frac{\partial \varphi}{\partial \bar{k}_j} - \sum_{j=1}^{J} \Omega_j \frac{\partial \varphi}{\partial H_j}\right]\left(\frac{\partial \varphi}{\partial z}\right)^{-1}. \tag{A17}$$

In summary, we proved the lemma.

DETERMINANTS OF CUSTOMERS` CHURN DECISION IN THE NIGERIA TELECOMMUNICATION INDUSTRY: AN ANALYTIC HIERARCHY PROCESS APPROACH

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Received: *May 31, 2015* Accepted: *August 24, 2015* Online Published: *October 7, 2015*

Abstract

This paper describes the application of Analytic Hierarchy Process (AHP) for unraveling customers' motivation for churn of telecommunication network in Nigeria. By identifying, modeling and measuring of customers` churn motivations across four mobile telecommunication service providers in Nigeria. AHP was used to design a hierarchical model of seven criteria for customers` churning of network and investigates the relative priorities of the criteria through a pairwise comparison. The questionnaire were administered through convenient sampling to 480 mobile telecommunication customers and was completed and returned by 438 mobile phone subscribers in Lagos state, Nigeria, but only 408 copies were useful for the analysis of this study. The result shows that six out of the seven criteria have weight above 10% in their individual contribution to motivating customer churn behavior in the Nigeria telecommunication industry. The inefficient data/ internet plan criterion has the highest weight of 18.81% relative to the churn decision. Thus, AHP effectively supported modeling and analyzing subscribers` motivation toward good marketing decision for both the individual and the organization. It helps in developing an analytic and intelligible framework of decision-making on complex problem of customer churn in an emerging market like Nigeria.

Keywords: Inequality and growth; learning by consuming; wealth and income distribution; heterogeneous households.

1. Introduction

Telecommunication is one of the prime support services needed for rapid growth of any developing economy (Arora, 2013). In Nigeria, the telecommunication industry received a boost in 2001 with the deregulation (removal of monopoly rights, especially enjoyed by state-owned telecommunication networks) of the sector. The deregulation allows for private Global System of Mobile communication (GSM) service providers to come into the country to support the state owned telecommunication company popularly known as Nigeria Telecommunication (NITEL). Consequently, two private companies ECONET of Zimbabwe and MTN of South Africa were licensed by the National Communications Commission (NCC) to operate GSM in Nigeria. These two companies alone increased the mobile telephone lines from 300,000 in 2001 to 1,660,000 in 2002. In 2003, another private-owned service provider, GLOBACOM, entered the market with its mobile service called the Glo-mobile (OECD report, 2003/2004). For this therefore, the number of mobile-phone subscriptions increased from less than one million in 2001 to over 133 million by November 2014 (NCC reports, 2014).

Thus, mobile telecommunication popularly called GSM was well received by most Nigerians who have been battling with inefficiency of the only one service provider (NITEL) prior to the year 2001. After thirteen years of deregulation and globalisation of Nigeria telecommunication industry, Nigeria currently has five major GSM service providers namely: Airtel, MTN, Globalcom, Etisalat and the less functioning M-tel. Therefore, there are currently options for customers to choose from among multiple service providers and actively exercise their rights of switching from one service provider to another. This right possessed by customer to switch from service provider to another is known as churn. As it applies to this study, churn is explicitly defined as the act of leaving or abandoning a service provider for another. As a result, it become a constant practice among customers/subscribers of mobile telecommunication service providers in Nigeria. Furthermore, Mobile Number Portability (MNP) implementation in April 2013 lends credence to subscribers' right to churn by switching their network providers at will on an average of every six months without losing their original number.

The advent of cheap "china phones" that combine two to three or even up to four subscribers` identity module or subscriber identification module (SIM) cards in a phone, made it possible for most Nigerians to keep an average of two to three SIM cards of different service providers for various reasons that can be best described by each subscriber. As mobile telecommunication service now becomes essential to our daily life, it is observed that subscribers have learnt to keep their mobile phone (s) at arm's length at all times, thus, predicting the reasons why mobile churn seems essential from the perspective of mobile service providers. Since, unguided movement of mobile phone subscribers from one service provider to another is one of the major phenomenon that can make or mar the survival and the profitability of any Mobile telecommunication firm. Thus, the need for research driven policy and strategies on customers` churn decision in the growing Nigeria mobile telecommunication industry cannot be over emphasised.

Although, previous studies appear to have focused on churn prediction itself, using different statistical tools like data mining (Kolajo and Adeyemo, 2012), survival analysis (Van den Poel and Larivie`re, 2004), logistic regression (Kim and Yoon, 2004; Burez and Van den Poel, 2007), most of these seem to have failed to capture churn motivations, which may serve as good indicator for real churn forecasting. This is a major gap that this study intends to fill with Analytic Hierarchy process method.

This study is important because, the annual churn rate of Nigeria mobile telecommunication according to NCC reports, have grown exponentially from 2 percent in

2001 to 48.4 percent in 2007 (Pyramid Research, 2010). This became worrisome, considering the consequences of customers` churn on mobile service providers` profit, cost of operations, loss of revenue, problem of referral, survival in the light fierce competition, and the MNP implementation in April 2013. These and other worrisome statistics trend to make a research on customer churn issues worthwhile.

Moreover, most prior studies used the data or information available in the internal database of the firms (service providers) which mask detailed information about customers switching behaviour and their causes. While data, through Analytical Hierarchy Process (AHP), based questionnaire could provide more information on the reasons for customers` termination of contract with service provider and help to make a better distinction between customers who churn for various reasons that will be supplied through primary source of data collection, it will help stakeholders to link service attributes to subscribers' decisions and make necessary inference. This in a considerable way, formed the basis for data used in AHP analysis. It should also be noted that customer churn is a notorious problem for most industries, since customers are the lifeblood of any organization.

2. Literature Review

AHP is a popular tool for decision-making developed by Saaty (1977, 1980). Since it was released, many individuals and groups in various fields have used the AHP because of its user-friendly interface for multi-criteria decision-making (Vargas, 1990). In the AHP, data from a decision-maker's judgments, known as pairwise comparisons, are aggregated, and the degree of importance of each alternative is quantified in the AHP. This procedure identifies not only the most important alternative, but also the preference for all alternatives for each decision-maker (Oyatoye, Adebiyi and Amole, 2015; Crawford and Williams, 1985). Using the AHP to analyse the decision-making process, therefore, results in a precise clarification of respondents' preferences/motivation for the alternatives (Sato, 2007). Thus, the decision to use it in this study.

The Analytic Hierarchy Process (AHP) is arguably the most well known and widely used multi-criteria method. It has firm theoretical underpinnings and has been used successfully to help people make better decisions in a wide variety of complex circumstances (Golden, Wasli and Harker, 1989; Vaidya and Kumar 2006). A main strength of the AHP is that it is both methodologically sound and user-friendly. Its ease of use is due to a unique combination of design characteristics.

The AHP frames a decision as a hierarchy, an organisational framework many people are already familiar with and easy to explain to those who are not. All inputs consist of comparisons between just two decision elements at a time; pairwise comparisons like these are generally considered to be one of the best ways to elicit judgments from people (Reynolds and Jolly, 1980). The output is easy to understand because it is based on simple scales derived from the pairwise comparisons. Besides, there is in-built measure of consistency in the judgments being made which both checks the reliability of the analysis and reduces the chance of making a procedural mistake. According to Saaty and Kearns (1991), the strength of this approach is that it organizes tangible and intangible factors in systematic way, and provides a structured relatively simple solution to the decision-making problems. In addition, by breaking a problem down into a logical fashion from the larger, descending in gradual steps, to the smaller and smaller, one is able to connect, through simple paired comparison judgments, the small to the large (Lu, Madu, Kuei and Winokur, 1994; Stephen, 1984).

In sum, there are three major concepts behind the AHP, namely: *The AHP is analytic:* Mathematical and logical reasoning for arriving at the decision is the strength of the AHP. It helps to analyse the decision problem on a logical footing and assists on converting decision-

makers' intuition and gut feelings into numbers which can be openly questioned and be explained by others.

The AHP structures the problem as a hierarchy: Hierarchic decomposition comes naturally to human beings. Reducing the complex problem into sub-problems to be tackled one at a time is the fundamental way that human decision-making have worked. Evidence from psychological studies suggests that human beings can compare 7 ± 2 things at a time. Hence, to deal with a large and complex decision making problem such as customer churn motivation, it is essential to break it down as a hierarchy. The AHP allows that.

The AHP defines a process for decision-making: Formal processes for decision-making are the need of the hour. Decisions, especially collective ones, need to evolve. A process is required that will incorporate the decision-maker's inputs, revisions and learning, and communicate them to others so as to reach a collective decision. The AHP has been created to formalize the process and place it on a scientific footing. It also helps in aiding the natural decision-making process. AHP approach is selected in this research to provide an effective tool to the stakeholders for unraveling the motivation for customer churn and measuring the churn drivers in service industry, which in turn, will make insightful contributions to the business world, marketing and operations research literature. Therefore, the AHP should be applied to churn decisions of subscribers.

3. Methodology

Churning network provider in order to choose the most proffered telecommunication network provider is a complex problem requiring a multi-criteria decision analysis technique, so as to consider the factors holistically (criteria and alternatives) that motive customer churning behaviour. The Analytical hierarchy process was employed in this study in order to structure and simplify the complex problem, bring it to a condition, which is more easily understood. More importantly, the criteria weights and scores are based on pairwise comparisons of criteria and alternatives, respectively, using a ratio scale of measurement. In order to achieve the objectives of this study, survey research designed was found most appropriate and suitable due to the fact that surveys inquiry is about people`s attitude, lifestyles, behaviour, perception and problems (Leary, 2001). The survey is in two stages, first is the observation experiment through focus group discussion (FGD), consisting of fifteen subscribers in four groups who discussed extensively on the drivers of customer` churn in the telecommunication industry. The result of the FGD was used in the second stage for building the hierarchical model and drawing an AHP based questionnaires. The questionnaires were designed to enable each subscribers` to compare the relative importance of each driver to subscribers` decision to churn a network provider for the criteria, while the alternatives at the third level were equally pairwise to determine the relative importance of sub-criteria to each driver (criteria) of churn in the Nigeria telecommunication market. Eighty (80) copies of the questionnaires were administered using convenient sample in each of the six locations within Lagos state, corresponding to the administrative division of Lagos. The area includes Yaba, Ikorodu, Epe Badagry and Ikeja. Out of the total of 480 questionnaire administered, four hundred and eight (408) were properly filled and found suitable for the AHP analysis.

The AHP analysis was done using Microsoft Excel software by calculating the weight of the criteria and alternatives. The process of analysis using AHP method involved two stages as follows (Taylor III, 2002):

i. First Stage: build hierarchical model for Motivation for customer churn decision in the Nigerian telecommunication industry: (a) Establishing the pair-wise comparison matrix for each decision alternative for each criterion; (b) Synthesization; (c)

Establishing the pair-wise comparison matrix for each criteria; (d) Establishing the normalized matrix; (e) Establishing the preference vector; (f) Calculating overall values for each decision alternative; and (g) Determining the rank of alternatives according to the values that have been acquired in the previous stage.

ii. Second Stage: Test of Consistency: After analyzing the data by using the AHP method, the result of the selection process must be tested for consistency. The test of consistency was carried out using the following formulas and the table 1.

$$CI = [\lambda_{max} - n]/(n - 1) \quad (3.1)$$

where $\lambda_{max}=\Sigma w_i c_i$

After acquiring Consistency Index (CI), the next step is calculating Consistency Ratio (CR) by using the formula

$$CR = CI/RI \quad (3.2)$$

where n is the number of items compared; W_i is the weight; C_i is the sum along the column; CR is the consistency ratio; CI is the consistency index; and RI is the random consistency index.

The Random Consistency Index (RI) can be observed in Table 1 as follows:

Table1 – Random Index

N	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
R.I.	0	0	0.58	0.90	1.12	1.25	1.32	1.41	1.45	1.49	1.54	1.48	1.56	1.57	1.59

Adapted from Saaty, (2000)

If CR ≥ 10%, the data acquired is inconsistent, otherwise (CR < 10%) the data acquired is consistent. The results obtained from the above procedure were reported under results and discussion section of this paper.

AHP Customer Churn model

Level 1 The Goal: Determinant of customer churn decision in Nigerian telecommunication industry.

Level 2 The Criteria: Unwanted calls/SMS; dispute in billing; mobile number portability (MNP); frequency of promotions/bonuses by competitors; poor inter/intra connectivity; inefficient data plan; and poor complaint management.

Level 3 The Alternatives: The components of each customer churn drivers formed the alternatives, the alternative of unwanted calls/SMS are frequently receiving irrelevant texts and irrelevant calls from the network operator. For dispute in tariff; short-change in service charge and charges for service(s) not rendered by network operator are the alternatives. Easiness of MNP and competition brought by MNP are the alternatives of MNP as a driver for customer churn while frequency of promotion has competitors' frequent promos, bonuses on calls/SMS/data plan by competitor and poor/dubious promos of present operator as its alternatives. Poor intra/inter connectivity has its alternatives as difficulties in making calls/sending SMS to same network and that of other network while inefficient data plan has sufficient with high cost and insufficient with low cost data plan as its alternatives. The last

driver (poor complaint management), has the following as its alternative; service agent non-willing to resolve customer challenges, non-response and service agent being elusive. Thus, the hierarchical model is presented in Figure 1.

4. Results and discussion

4.1 Respondents reduced matrices for customer churn decision

The values found in the last column of table 2 denoted by weight, also known as eigenvector, have a direct physical meaning in AHP. They determine the participation or weight of those criteria relative to the total results of the goal. Considering the criteria stated for the determinant of customer churn in the Nigeria telecommunication industry, inefficient data/ internet plan criterion has a weight of 18.81% relative to the total goal, which states the determinant of customer churn. A positive evaluation on this factor contributes approximately twice more than a positive evaluation on the mobile number portability implementation criterion (9.73%). Following the procedure of AHP, there is need to check for data inconsistencies. The main objective is to capture enough information that will help to determine whether the customers have been consistent in their choices. The inconsistency index is based on maximum lambda, which is calculated by summing the product of each element in the eigenvector (weight), by the respective column total of the original comparison matrix. Table 4.2 demonstrates the calculation of the maximum eigenvalue also called maximum lambda (λ_{Max}).

In order to verify that the consistency index (CI) is adequate, Saaty (2000) suggests what is called consistency ratio (CR) which is determined by the ratio between the consistency index and random consistency index (RI). The matrix will be considered consistent if the result of the ratio is less than 10%. The random index value is fixed and is based on the number of evaluated criteria as shown in table 1.

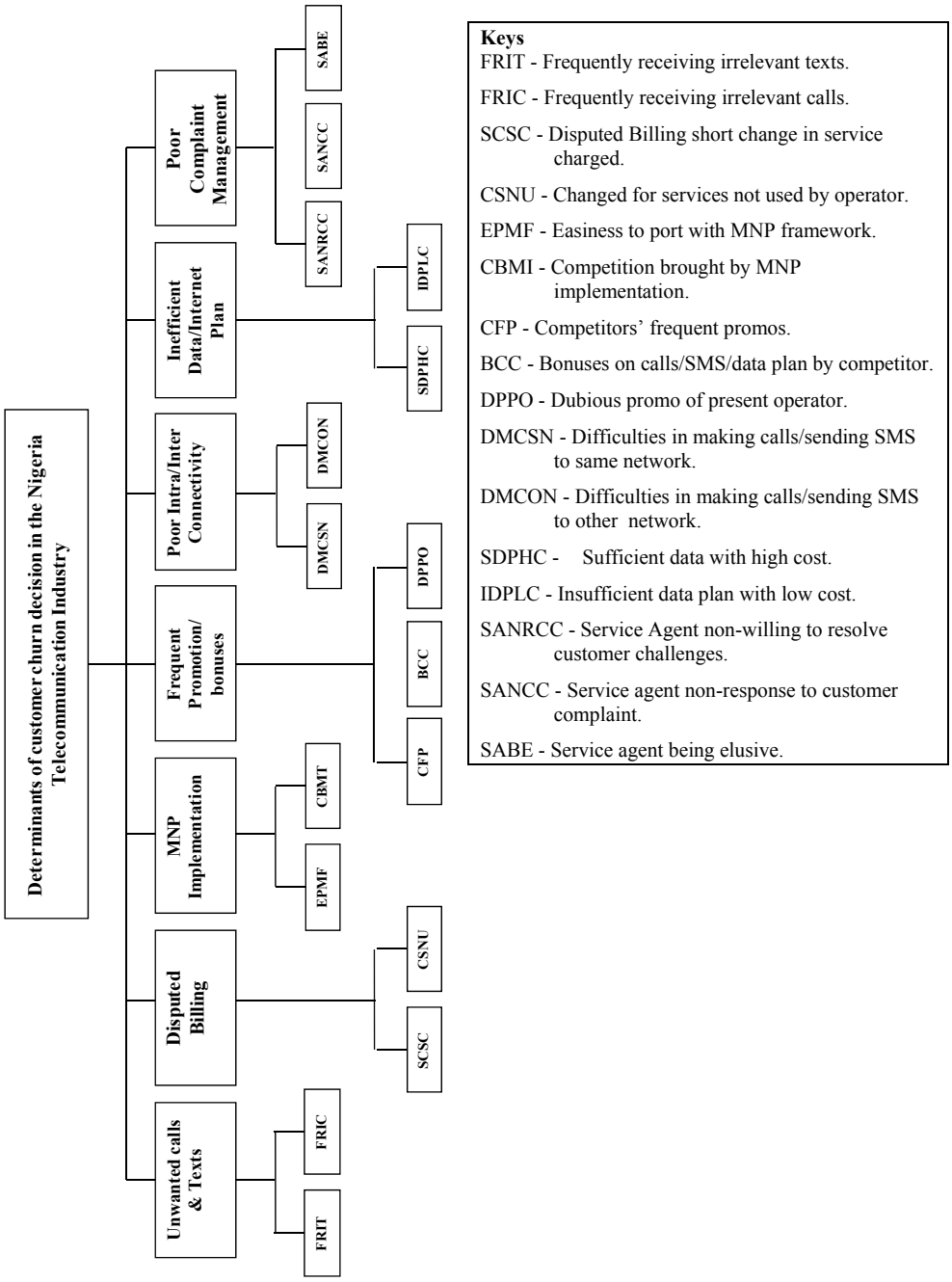
In the case of the determinant of customers` churn decision criteria, the consistency rate for the initial group criteria is:

$$CR = \frac{CI}{RI} = 0.0320/\ 1.32 = 0.0242 < 3\%$$

Since its value is less than 10%, the matrix is considered to be consistent.

Therefore, considering the eigen vector values / priority weight of determinant of customers churn decision criteria, it is evident that inefficient data/ internet plan criteria have contributed 18.81% to the goal, while mobile number portability implementation criterion contributes (9.73%) to the goal (determinant of customers` churn decision in the Nigeria telecommunication industry).

Figure 1 – Proposed hierarchical model for customers` churn decision in the Nigeria mobile telecommunication



Source: AHP model developed by Researchers (2014)

Table 2 – Reduced matrix for determinant of customers churn criteria in the Nigeria Telecommunication Industry

Decision Criteria	Unwanted calls & Texts	Disputed Billing	MNP Implementation	Frequent Promotion / bonuses	Poor Intra/Inter Connectivity	Inefficient Data/Internet Plan	Poor Complaint Management	Weight		
Unwanted calls & Texts	1.0000	1.1723	1.9663	1.0900	0.5000	0.5391	1.0217	0.1338	λ_{max}	**7.1919**
Disputed Billing	0.8530	1.0000	1.9593	1.3549	1.1181	0.7115	1.5191	0.1596	CI	0.0320
MNP Implementation	0.5086	0.5104	1.0000	0.9532	0.6151	0.7162	0.6938	0.0973	CR	0.0238
Frequency of Promotion/Bonuses	0.9174	0.7380	1.0491	1.0000	1.0766	0.8944	1.5675	0.1397		
Poor Intra/Inter Connectivity	2.0000	0.8944	1.6258	0.9288	1.0000	1.1277	2.0693	0.1799		
Inefficient Data/Internet Plan	1.8549	1.4055	1.3962	1.1181	0.8868	1.0000	2.4151	0.1881		
Poor Complaint Management	0.9788	0.6583	1.4414	0.6379	0.4833	0.4141	1.0000	0.1016		

Table 3 – Calculation of the maximum eigenvalue of the seven criteria about determinant of customer churn in Nigeria telecommunication industry

Criteria	Unwanted calls & Texts	Dispute billing	MNP Implementation	Frequency of promotion and bonuses	Poor Inter/Intra connectivity	Inefficient data/internet plan	Poor complaint Management
Eigen vector/priority weight	0.1338	0.1596	0.0973	0.1397	0.1799	0.1881	0.1016
Column sum	8.1127	6.3789	10.4381	7.0829	5.6799	5.403	10.2865

Maximum eigenvalue/(λ_{Max}): (0.1338*8.1127) + (0.1596*6.3789) + (0.0973*10.4381) + (0.1397*7.0829) + (0.1799*5.6799) + (0.1881*5.403) + (0.1016*10.2865) = 7.1919

The test for consistency of churn decision criteria is calculated using the formula below:

$CI = (\lambda_{Max}-n)/(n-1)$

$CI = (7.1919-7) / 7-1$

$= 0.1919/6 = 0.0320$

Table 4 – Reduced matrix for unwanted calls & texts alternatives

Unwanted calls and Texts	Frequently receiving irrelevant texts	Frequently receiving irrelevant calls	Weight	λ_{max} =	2.0000
Frequently receiving irrelevant texts	1.0000	4.3282	0.8123	CI =	0.0000
Frequently receiving irrelevant calls	0.2310	1.0000	0.1877	CR =	0.0000

Table 5 – The calculation of the maximum eigenvalue for unwanted calls and texts alternatives

Decision Alternative of Unwanted calls and Texts	Frequently receiving irrelevant texts	Frequently receiving irrelevant calls
Eigen vector/priority weight	0.8123	0.1877
Column sum	1.2310	5.3282
Maximum Eigen Value (λmax)	λ_{max} = { (0.8123*1.2310)+(0.1877*5.3282)}= = 1.0000 +1.0001 = 2.0000	

In considering the decision alternatives of unwanted calls/text criteria, the eigenvector priority weight was computed and shows the contribution of each decision alternatives in relation to unwanted calls/texts criteria. Based on the decision alternatives of unwanted calls/text, frequently receiving irrelevant text (FRIT) has a weight of 81.23% relative to unwanted calls/text criteria. A positive evaluation on this factor contributes approximately 4 (four) times more than a positive evaluation on frequently receiving irrelevant calls alternative (18.77%). Following the procedure of AHP, there is need to check for data inconsistencies. The main objective is to capture enough information to determine whether the customers have been consistent in their choices. The inconsistency index is based on maximum lambda, which is calculated by summing the product of each element in the eigenvector (weight), by the respective column total of the original comparison matrix. Table 5 demonstrates the calculation of the maximum eigenvalue also called maximum lambda (λ_{Max}).

The test of consistency is done using the formula below

$$CI = (\lambda_{Max}-n)/(n-1)$$
$$CI = (2.000-2)/2 -1$$
$$= 0/1 = 0.0000.$$

In verifying that the consistency index is adequate, Saaty (2000) suggests what is called consistency ratio (CR) which is determined by the ratio between the consistency index and random consistency index (RI). The matrix is considered consistent if the ratio is less than 10%. The random index value is fixed and is based on the number of evaluated criteria as shown in table 1 in chapter three. In the case of the decision alternative of unwanted calls and texts, the consistency rate for the initial group criteria is

$$CR = \frac{CI}{RI} = 0.00$$

Since its value is less than 10% the matrix is considered to be consistent.

Therefore, considering the eigen vector values / priority weight of decision alternatives of unwanted calls/text, it is evident that frequently receiving irrelevant texts alternative have contributed 81.23% to the unwanted calls/text criteria, while frequently receiving irrelevant calls alternative contributes 18.77% in customers decision to churn a network provider. Thus, frequently receiving unsolicited texts messages from network provider can influence customers' decision to churn more than irrelevant calls. Subscribers are more uncomfortable with frequent irrelevant text messages from services provider.

Table 6 – Reduced matrix of dispute billing alternatives

Dispute Billing	Short-change in service charged	Charged for services not used by operator	Weight	λ_{max} =	2.0000
Short-change in service charged	1.0000	1.1861	0.5426	CI =	0.0000
Charged for services not used by operator	0.8431	1.0000	0.4574	CR =	0.0000

Considering the decision alternatives of dispute billing criteria, the eigenvector / priority, weight was calculated, and shows the contribution of each decision alternatives in relation to dispute billing criteria. Based on the decision alternatives of dispute billing, short change in service charged (SCSC) has a weight of 54.26% on disputed billing criteria. A positive evaluation of this factor contributes approximately one (1) more than a positive evaluation on charge for services not used by operator alternative (45.74%). Following the procedure of AHP, there is need to check for data inconsistencies. Checking for data inconsistencies as before, Table 7 presents the computation of the maximum eigen value (λ_{Max}), after which the consistency ratio is calculated as usual.

Table 7 – The calculation of the maximum eigenvalue for disputed billing alternatives

Disputed Billing criteria	Short-change in service charged (SCSC)	Charged for services not used by operator
Eigen vector/ priority weight	0.5426	0.4574
Total sum	1.8431	2.1861
Maximum Eigenvalue/(λ_{Max})	(0.5426*1.8431) + (0.4574*2.1861) = 2.0000	

The test of consistency is calculated using the formula below:

$CI = (\lambda_{Max}-n)/(n-1)$
$CI = (2.000-2)/2 -1$
$= 0/1 = 0.0000$

As shown in earlier computations, the consistency ratio of disputed billing criteria, using the initial group criteria is:

$$CR = \frac{CI}{RI} = 0.00$$

Since the CR value is less than 10%, the matrix is considered to be consistent.

Therefore, in considering the eigen vector values / priority weight of decision alternatives of disputed billing, it is evident that short-change in service charged (SCSC) alternative have

contributed 54.26% to the disputed billing criteria, while charging customers for services not used by operator alternative, contributes 45.74% to disputed billing criterion.

Table 8 – Reduced matrix for mobile number portability alternatives

Mobile Number Portability (MNP)	Easiness to port with MNP framework	Competition brought by MNP implementation	Weight	λ_{max} = 2.0000
Easiness to port with MNP framework	1.0000	1.6542	0.6232	CI = 0.0000
Competition brought by MNP implementation	0.6045	1.0000	0.3768	CR = 0.0000

Considering the decision alternatives of MNP implementation criteria, the eigenvector / priority weight was calculated, and shows the contribution of each decision alternatives in relation to MNP implementation criteria. Based on the decision alternatives of mobile number portability implementation, easiness to port with MNP framework has a weight of 62.32% with regards to MNP implementation criteria. A positive evaluation of this factor contributes approximately twice more than a positive evaluation of competition brought by MNP implementation alternative, which has a weight of 37.68%. Following the procedure of AHP, there is need to check for data inconsistencies. As has been done in previous analyses, the inconsistency index is computed as shown in Table 9.

Table 9 – The calculation of the maximum eigenvalue for MNP alternatives

Mobile Number Portability Implementation criteria	Easiness to port with MNP framework	Competition brought by MNP implementation
Eigen vector/ priority weight	0.6232	0.3768
Total sum	1.6045	2.6542
Maximum Eigenvalue/(λ_{Max})	(0.6232*1.6045) + (0.3768*2.6542) = 2.0000	

The test of consistency is calculated by using the formula below:

$CI = (\lambda_{Max}-n)/(n-1)$
$CI = (2.000-2)/2 -1$
$= 0/1 = 0.0000$

Thus, in the case of the mobile number portability implementation criteria, the consistency rate for the initial group criteria is

$$CR = \frac{CI}{RI} = 0.00$$

CR which is less than 10%, indicates that the matrix is consistent.

Therefore, in considering eigen vector values / priority weight of decision alternatives of mobile number portability implementation, it is evident that easiness to port with MNP framework alternative have contributed 62.32% to the mobile number portability implementation criteria. However, competition brought by MNP implementation alternative contributes 37.68% to the mobile number portability implementation criterion.

Table 10 – Reduced matrix for frequent promotions/ bonuses alternatives

Frequent Promotion/ bonuses	Competitor' frequent promos	Bonuses on calls/SMS/data plan by competitor	Dubious promo of present operator	Weight			
Competitors' frequent promos	1.0000	1.1397	1.0582	0.3518	λ_{max}	=	3.0347
Bonuses on calls/SMS/data plan by competitor	0.8774	1.0000	1.6149	0.3710	CI	=	0.0174
Dubious promo of present operator	0.9450	0.6192	1.0000	0.2772	CR	=	0.0299

Considering the decision alternatives of frequent promotions/ bonuses criteria, the eigenvector priority weight was calculated and shows the contribution of each of the decision alternatives in relation to frequent promotions/ bonuses criteria. Based on the decision alternatives of frequent promotions/ bonuses, bonuses on calls/SMS/data plan by competitor has a weight of 37.10% of frequent promotions /bonuses criteria. A positive evaluation of these factors contributes approximately twice more than a positive evaluation of dubious promo of present operator alternative (27.72%).

Table 11 – The calculation of the maximum eigenvalue for frequent promotions/ bonuses by competitors' alternatives

Frequent promotion /bonuses	Competitors' frequent promos	Bonuses on calls/SMS/data plan by competitor	Dubious promo of present operator
Eigenvector/ priority weight	0.3518	0.3710	0.2772
Total sum	2.8224	2.7589	3.6731
Maximum Eigenvalue/(λ_{Max})	(0.3518*2.8224) + (0.3710*2.7589) + (0.2772*3.6731) = 3.0347		

The test of consistency was calculated as follows:

$CI = (\lambda_{Max}-n)/(n-1)$
$CI = (3.0347-3) / 3 - 1$
$= 0.0347 / 2 = 0.0174$

In the case of the frequent promotion/bonuses criteria, the consistency rate for the initial group criteria is

$$CR = \frac{CI}{RI} = 0.0174/ 0.58$$
$$= 0.0299 < 3\%$$

Since CR value is less than 10%, the matrix is consistent.

Therefore, in considering the eigen values / priority weight of decision alternatives of frequent promotion/bonuses, it is evident that bonuses on calls/SMS/data plan by competitor alternative have contributed 37.10% to the frequent promotion/bonuses criteria, while dubious promo of present operator alternative contributes 27.72% to frequent promotion/bonuses criterion.

Table 12 – Reduced matrix of poor inter/intra connectivity alternatives

Poor Intra/Inter Connectivity	Difficulties in making calls/sending SMS to same network	Difficulties in making calls/sending SMS to other network	Weight	λ_{max} = 2.0000
Difficulties in making calls/sending SMS to same network	1.0000	2.8338	0.7392	CI = 0.0000
Difficulties in making calls/sending SMS to other network	0.3529	1.0000	0.2608	CR = 0.0000

Considering the decision alternatives of poor inter/intra connectivity criteria, the eigenvector priority weight was computed and shows the contribution of each of the decision alternatives in relation to poor inter/intra connectivity criteria. Based on the decision alternatives of poor inter/intra connectivity, difficulties in making calls/sending SMS to same network have a weight of 73.92% on poor inter/intra connectivity criteria. A positive evaluation of this factor contributes approximately thrice more than a positive evaluation of difficulties in making calls/sending SMS to other network alternative (26.08%).

Table 13 – The calculation of the maximum eigenvalue for poor inter/intra connectivity alternatives

Poor inter/intra connectivity criteria	Difficulties in making calls/sending SMS to same network	Difficulties in making calls/sending SMS to other network
Eigenvector/ priority weight	0.7392	0.2608
Total sum	1.3529	3.8338
Maximum Eigenvalue/(λ_{Max})	(0.7392*1.3529)+(0.2608*3.8338) = 2.0000	

The test of consistency was calculated as follows:

$CI = (\lambda_{Max}-n)/(n-1)$

$CI = (2.000 - 2)/2 - 1$

$= 0/1 = 0.0000$

In the case of the poor inter/intra connectivity criteria, the consistency rate for the initial group criteria is:

$$CR = \frac{CI}{RI} = 0.00$$

Since CR value is less than 10%, the matrix is considered to be consistent. Thus, in considering the eigen values/priority weight of decision alternatives of poor inter/ intra connectivity, it is evident that difficulties in making calls/sending SMS to same network alternative have contributed 73.92% to the mobile number portability implementation criterion, while, difficulties in making calls/sending SMS to other network alternative contribute 26.08% to the poor inter/intra connectivity criterion.

Table 14 – Reduced matrix of inefficient data/ internet plan criteria

Inefficient Data/Internet Plan	Sufficient data with high cost	Insufficient data plan with low cost	Weight	λ_{max} = 2.0000
Sufficient data with high cost	1.0000	2.7231	0.7314	CI = 0.0000
Insufficient data plan with low cost	0.3672	1.0000	0.2686	CR = 0.0000

Considering the decision alternatives of inefficient data/ internet plan criteria, the eigenvector priority weight was calculated and shows the contribution of each decision alternative in relation to inefficient data/ internet plan criteria. Based on the decision alternatives of inefficient data/ internet plan, sufficient data with high cost have a weight of 73.14% of inefficient data/internet plan criteria. A positive evaluation of this factor contributes approximately thrice (3 times) more than a positive evaluation of insufficient data plan with low cost alternative (26.86%).

Table 15 – The calculation of the maximum eigenvalue for inefficient data/ internet plan alternatives

Inefficient data/internet plan	Sufficient data with high cost	Insufficient data plan with low cost
Eigen vector/ priority weight	0.7314	0.2686
Total sum	1.3672	3.7231
Maximum Eigenvalue/(λ_{Max})	(0.7314*1.3672) + (0.2686*3.7231) = 2.0000	

The test of consistency is done using the formula below:

$$CI = (\lambda_{Max}-n)/(n-1)$$
$$CI = (2.000-2)/2 - 1$$
$$= 0/1 = 0.0000$$

In the case of the inefficient data/internet plan criteria, the consistency rate for the initial group criteria is:

$$CR = \frac{CI}{RI} = 0.00$$

Since the value of the CR is less than 10%, the matrix is considered to be consistent. Therefore, in considering the eigen values / priority weight of decision alternatives of

inefficient data/internet plan, it is evident that sufficient data plan with high cost alternative have contributed 73.14% to the inefficient data/ internet plan criteria, while inefficient data plan with low cost alternative contributes 26.86% to the inefficient data/internet plan criteria.

Table 16 – Reduced matrix of Poor Complaint Management

Poor Complaint Management	Service Agent non-willing to resolve customer challenges	Service agent non-response to customer complaint	Service agent being elusive	Weight		
Service Agent non-willing to resolve customer challenges	1.0000	2.2423	2.0880	0.5146	λ_{max} =	3.0394
Service agent non-response to customer complaint	0.4460	1.0000	1.6229	0.2784	CI =	0.0197
Service agent being elusive	0.4789	0.6162	1.0000	0.2069	CR =	0.0339

Considering the decision alternatives of poor complaint management criteria, the eigenvector priority weight was calculated and shows the contribution of each decision alternative in relation to poor complaint management criteria. Based on this decision alternatives of poor complaint management, service agent non-willingness to resolve customer challenges have a weight of 51.46% with regards to poor complaint management criteria. A positive evaluation on this factor contributes approximately thrice more than a positive evaluation of service agent being elusive alternative (20.69%).

Table 17 – The calculation of the maximum eigenvalue for poor complaint management alternatives

Poor complaint management	Service Agent non-willing to resolve customer challenges	Service agent non-response to customer complaint	Service agent being elusive
Eigen vector/ priority weight	0.5146	0.2784	0.2069
Total sum	1.9249	3.8585	4.7109
Maximum Eigenvalue/(λ_{Max})	(0.5146*1.9249) + (0.2784*3.8585) + (0.2069*4.7109) = 3.0394		

The test of consistency is calculated below:

$CI = (\lambda_{Max}-n)/(n-1)$
$CI = (3.0394-3)/3 -1$
$= 0.0394/2 = 0.0197$

In the case of the poor complaint management criteria, the consistency rate for the initial group criteria is

$CR = \frac{CI}{RI} = 0.0197/ 0.58$
$= 0.0339 < 4\%$

Again since the CR value is less than 10%, the matrix is considered to be consistent. Therefore, in considering eigen vector values / priority weight of decision alternatives of poor complaint management, it is evident that service agent non-willingness to resolve customer challenges alternative contributed 51.46% to the poor complaint management criteria, while service agent being elusive alternative contributes 20.69% to poor complaint management criteria.

Table 18 shows the priorities of the criteria with respect to the main goal which is to determine reasons for customers leaving a particular network provider to another network provider in the Nigeria telecommunication industry. Based on the views of the customers, the most critical determinant factor for leaving a network provider to another network provider is inefficient data/internet plan with priority 0.1881, followed by poor inter/intra connectivity with priority 0.1799, dispute in billing with priority 0.1569, frequent promotion/ bonuses with priority 0.1397, unwanted calls/ texts with priority 0.1338, and poor complaint management with priority 0.1016, while the least determinant factor is the MNP implementation with priority 0.0973.

Table 18 – Composite priorities of the criteria about Goal

Goal: determinants of customer churn in Nigeria Telecommunication industry	Unwanted calls/ texts	Dispute billing	MNP Implementation	Frequent promotion/ bonuses	Poor inter/intra connectivity	Inefficient data/ internet plan	Poor complaint management
Pooled Average Composite Priority	0.1338	0.1569	0.0973	0.1397	0.1799	0.1881	0.1016
Relative Preference Ranking	5th	3rd	7th	4th	2nd	1st	6th

The horizontal bar chart in figure 2 represents the pictorial diagram of decision criteria where the horizontal bar length is the priority of each criterion. From the chart, inefficient data plan/ internet plan has the longest bar with priority of 0.1881, followed by poor inter/ intra connectivity with priority of 0.1799, dispute billing with priority of 0.1596, frequent promotion and bonuses with priority of 0.1397, unwanted calls and texts with priority of 0.1338 and poor complaints management with priority of 0.1016 while the MNP implementation has the shortest bar with priority of 0.0973.

Figure 2 – Bar chart showing decision criteria with their corresponding priority.

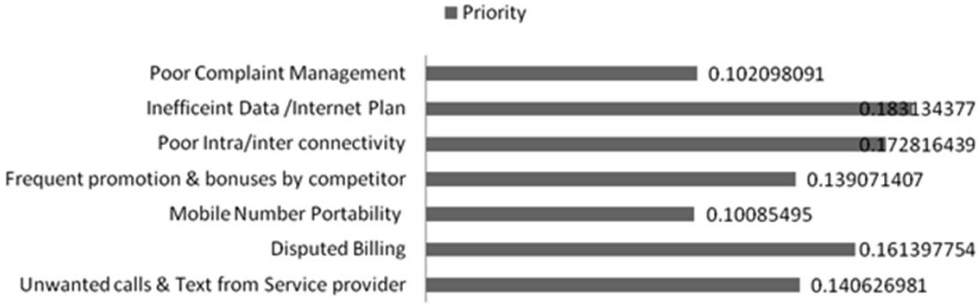


Table 19 reveals the customers perception with regards to the decision alternatives of unwanted calls/texts using the composite priorities. This criterion has only two alternatives in this study. Customers` mostly detest frequently receiving irrelevant texts (FRIT) with priority 0.8123 than frequently receiving irrelevant calls (FRIC) with priority of 0.1877.

Table 19 – Composite priorities of the decision alternative about unwanted calls/ texts

Decision alternative with regards to unwanted calls/ texts	Frequently receiving irrelevant text (FRIT)	Frequently receiving irrelevant calls (FRIC)
Pooled Average Composite priority	0.8123	0.1877
Relative preference ranking	1	2

The horizontal bar chart in figure 3 represents the pictorial diagram of decision alternatives of unwanted calls/text where the horizontal bar length is the priority of each criterion. From the chart, frequently receiving irrelevant texts has the longest bar with priority of 0.8123, compared to frequently receiving irrelevant calls with priority of 0.1877.

Figure 3 – Bar chart showing decision alternatives of unwanted calls/texts

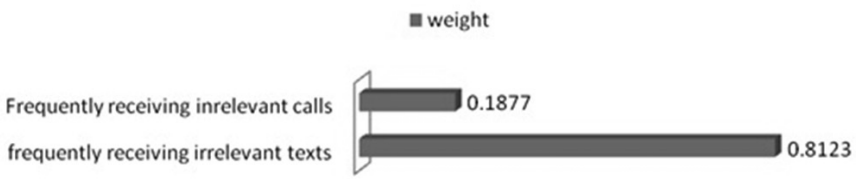


Table 20 reveals subscribers` perception about the decision alternatives of dispute billing using the composite priorities. Subscribers mostly preferred disputed billing short change in service charge with priority of 0.5426 compared to charged for services not used by the operators with priority of 0.4574.

Table 20 – Composite priorities of the decision alternative about dispute in billing

Decision alternative with regards to dispute billing	Disputed billing short change on service charge	Charged for services not used by operator
Pooled Average Composite priority	0.5426	0.4574
Relative preference ranking	1	2

The horizontal bar chart in figure 4 represent the pictorial diagram of decision alternatives of dispute billing where the horizontal bar length is the priority of each criterion. From the bar chart, one observes that disputed billing in short change of service charged has the longest bar with priority 0.5426 compared to charge for services not used by operator with priority 0.4574.

Figure 4 – Bar chart showing decision alternatives of disputed billing

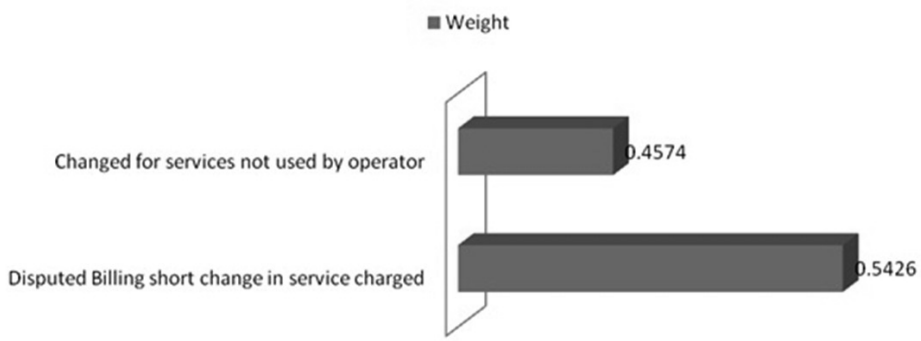


Table 21 reveals the customers perception about the decision alternatives of MNP implementation using the composite priorities. The customers mostly preferred easiness to port with MNP framework, with a priority of 0.6232, compared to competition brought by MNP framework with priority of 0.3768.

Table 21 – Composite priorities of the decision alternative about MNP Implementation

Decision alternative with regards to MNP implementation	Easiness to port with MNP framework	Competition brought by MNP implementation
Pooled Average Composite priority	0.6232	0.3768
Relative preference ranking	1	2

The horizontal bar chart in figure 5 represents the pictorial diagram of decision alternatives of MNP implementation where the horizontal bar length is the priority of each criterion. From the chart, easiness to port using MNP framework has the longest bar with priority of 0.6232, compared to competition brought by MNP implementation with priority of 0.3768.

Figure 5 – Bar chart showing decision alternatives of MNP implementation

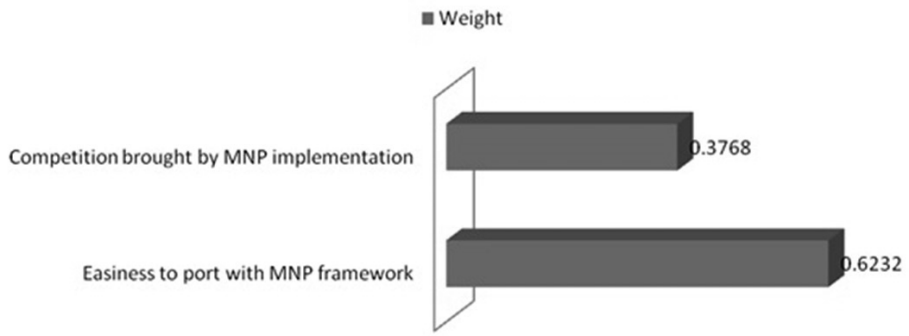


Table 22 reveals the customers perception about the decision alternatives of frequent promotions/ bonuses using the composite priorities. This criterion has three alternatives in this study. The customers mostly preferred bonuses on calls/SMS/data plan by competitors with priority of 0.3710, followed by competitor's frequent promos with priority of 0.3518 and the least preferred is dubious promo of present operator with priority of 0.2772.

Table 22 – Composite priorities of the decision alternative about frequent promotions/ bonuses

Decision alternative with regards to frequent promotions/ bonuses	Competitors' frequent promos	Bonuses on calls/SMS/ data plan by competitors	Dubious promo of present operator
Pooled Average Composite priority	0.3518	0.3710	0.2772
Relative preference ranking	2	1	3

The horizontal bar chart in figure 6 represents the pictorial diagram of decision alternatives of frequent promotions and bonuses where the horizontal bar length is the priority of each criterion. As the chart indicates, bonuses on calls/SMS/data plan by competitors has the longest bar with priority of 0.3710 followed by competitors` frequent promotion with priority of 0.3518, while dubious promotion by present operators has the shortest bar length with priority of 0.2772.

Table 23 reveals the customers perception about the decision alternatives of poor inter/ intra connectivity using the composite priorities. The customers are mostly disturbed by difficulty in making calls/sending SMS to same network with priority of 0.7392 compared to difficulties in making calls/SMS to other network with priority of 0.2608.

The horizontal bar chart in figure 7 stand for the pictorial diagram of decision alternatives of poor inter/intra connectivity where the horizontal bar length is the priority of each criterion. As the chart shows, one observes that difficulties in making calls/sending SMS to the same network has the longest bar with priority of 0.7392, compared to difficulties in making calls/sending SMS to other network with priority of 0.2608.

Figure 6 – Bar chart showing decision `alternative of frequent promotions and bonuses

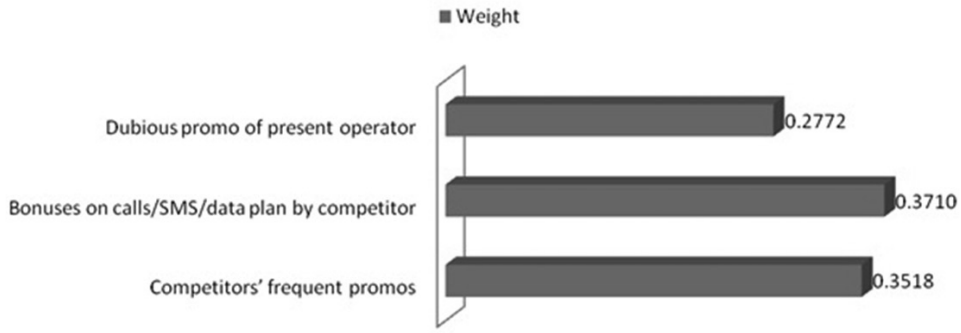


Table 23 – Composite priorities of the decision alternative about poor inter/intra connectivity

Decision alternative with regards to poor inter/ intra connectivity	Difficulties in making calls / sending SMS to same network	Difficulties in making calls/sending SMS to other network
Pooled Average Composite priority	0.7392	0.2608
Relative preference ranking	1	2

Figure 7 – Bar chart showing decision alternatives of poor inter/intra connectivity

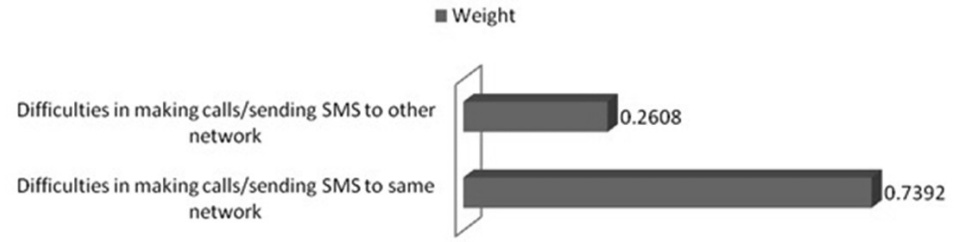


Table 24 reveals the customers` perception about the decision alternatives of inefficient data/ internet plan using the composite priorities. The customers mostly preferred sufficient data with high cost with priority of 0.7314, compared to insufficient data with low cost priority of 0.2686.

The horizontal bar chart in figure 8 represents the pictorial diagram of decision alternatives of inefficient data/ internet plan where the horizontal bar length is the priority of each criterion. From the chart, sufficient data plan with high cost has the longest bar with priority of 0.7314 compared to insufficient data plan with low cost priority of 0.2686.

Table 24 – Composite priorities of the decision alternative about inefficient data/internet plan

Decision alternative with regards to inefficient data /internet plan	Insufficient data with low cost	Sufficient data with high cost
Pooled Average Composite priority	0.2686	0.7314
Relative preference ranking	2	1

Figure 8 – Bar chart showing decision alternatives of inefficient data/ internet plan

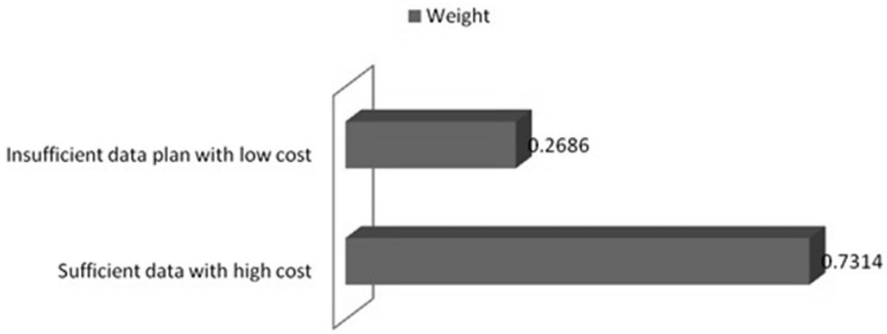


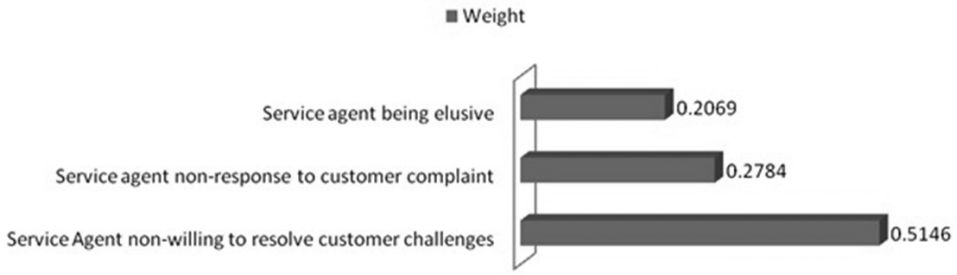
Table 25 shows the customers perception about the decision alternatives of poor complaint management using the composite priorities. In this study, this criterion has three alternatives. The customers most preferred service agent not willing to resolve customer challenges with priority of 0.5146, followed by service agent non-response to customer complaint with priority of 0.2784, while the least preferred is service agent being elusive with priority of 0.2069.

Table 25 – Composite priorities of the decision alternative about poor complaint management

Decision alternative with regards to poor complaint management	Service Agent non-willing to resolve customer challenges	Service agent non-response to customer complaint	Service agent being elusive
Pooled Average Composite priority	0.5146	0.2784	0.2069
Relative preference ranking	1	2	3

The horizontal bar chart in figure 9 represents the pictorial diagram of decision alternatives of poor complaint management where the horizontal bar length is the priority of each criterion. From the chart, one observes that service agent non-willingness to resolve customer challenges has the longest bar with a priority of 0.5146, followed by service agent non- response to customers` complaint with a priority of 0.2784 and service agent being elusive has the shortest bar length with a priority of 0.2069.

Figure 9 – Bar chart showing decision alternatives of poor complaint management



5. Conclusion

The study concluded that AHP is appropriate at modeling complex problem such as customer churn motivations in the service industry (such as telecommunication) by assigning priority to churn drivers in the business environment. The criteria and the alternatives in the AHP model are drivers of customers` churn decision in the Nigeria telecommunication industry. It also provided weight to each criteria as well as the alternatives as they motivates or influences an average subscriber in the study area to leave/abandon a network provider for competitor. The study also shows that MNP was not on the top priority list of factors that make customers to churn network in Nigeria, thereby suggesting that the factor (MNP) is less than effective regulatory policy for stimulating appropriate competition that can yield improved customer service delivery in the Nigeria telecommunication industry.

The study also concluded that certain promotional activities by telecommunication services providers are dubious and not complementary to attracting customers to their network but further enhances churning decision of subscriber, which may not be in the best interest of private firms whose primary motives to make profit.

6. Recommendations and Suggestions for future research

The following recommendations were drawn from the findings of this study:

(i) That GSM operator should improve the quality of their services through appropriate mix of churn drivers in order to increase their market share significantly.
(ii) Network operators should engage in the use Analytic hierarchy process model that can better unravel the motivations for customers churn through pairwise comparison of churn drivers by subscribers who have experienced the service for better decision rather than predicting churn from database.
(iii) Mobile telecommunication services provider should reverse the churn alternatives with high priority in order to sustain improved market share.
(iv) Service delivery of network operators in Nigeria should be geared towards reversing and correcting the criteria and alternatives that motivates customer(s) to churn network provider.
(v) Marketing effort should focus more on effective service recovery on criteria and the alternatives motivating subscribers churn in the Nigeria telecommunication industry.
(vi) Mobile network telecommunication service providers in Nigeria should avoid dubious promotional means as it trigger subscribers` churn decision, damage organisational reputation and long-term survival.

This study highlighted a number issues on which further research can be carried out in order to extend the frontiers of knowledge. For future studies:

(i) It will be necessary to collect data in all the geo-political zones and states of the federation to ascertain whether the preferences (weight) for the drivers of customers` churn decision will change significantly in order to overhaul the corporate strategies of the telecommunication firms.

(ii) The present research study was limited to GSM sub-sector of the Nigerian Telecommunication industry, further research may include Code-Division Multiple Access (CDMA) sub-sector, which has also been severely neglected by most subscribers.

(iii) The present study has discussed three levels AHP model, which aid evaluation of the determinant of customers` churn decision in the telecom industry. Future research may do well if it provides elaborate analysis of the forth level of the hierarchy, to allow for comparative analysis of the performance of the GSM operators to drivers of churn, if funded by GSM service providers in Nigeria.

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TOWARDS CORPORATE SHARED VALUE IN RETAIL SECTOR: A COMPARATIVE STUDY OVER GROCERY AND BANKING BETWEEN ITALY AND THE UK

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Received: *May 21, 2015* Accepted: *Sept 10, 2015* Online Published: *October 26, 2015*

Abstract

The research investigates the extent to which Banking and Grocery retailers use Corporate Social Responsibility (CSR) in accordance to evolving consumers' expectations and build a strategic model of Corporate Shared Value (CSV) to strive for economic and social returns simultaneously. The paper adopts a qualitative approach, based on the comparative case study methodology by investigating a sample of twelve Banking and Grocery retailers in Italy and the UK. Differences and similarities in CSR as new strategic model among countries and retail sectors emerge, with UK companies from both the sectors showing the most formalized integration of CSR within their business strategy. The chance for both Italian and UK retail companies is to adopt the best practices emerging from the case studies to turn their CSR programs into a strategic business model of CSV that will allow a stronger retailer-consumer relationship based on social improvements and a reinforcement of their brand image.

Keywords: Corporate Social Responsibility, Corporate Shared Value, Banking retailers, Grocery retailers, Branding, consumers' perception.

1. Introduction

Considering that attitudes are generally accepted as something people acquire, marketing academics have stressed on the importance of understanding how such attitudes develop and

* Despite the paper is the result of the cooperation among the three authors, Elena Candelo wrote sections 2 and 6, Chiara Civera wrote sections 4 and 5 and Cecilia Casalegno wrote sections 3 and 1

how they are affected. Regarding the business world, and in particular the retail sector, where customers interact with their chosen company, this tends to bring in a mixture of disciplines including psychology, sociology and economics (Hoyer and McInnis, 2012). The knowledge explicit in modern marketing and business techniques has meant that it is possible to influence and in some cases create consumer attitudes and influence them positively for reaching the business purpose. The social responsibility that this brings with it has been recognised in the development of codes of practices and ethical-driven processes for enhancing brand value and communicating it effectively.

Consumers, who, for the past decades, have been mostly influenced by business communications, are, nowadays alike affected by business activities beyond the communication itself and the coherence between brand image and companies' actual practices and processes.

According to consumers' evolving expectations (De Pelsmacker Janssens and Mielants 2005; Barksdale and Darden, 1972), it is commonly accepted that Corporate Social Responsibility (CSR) on behalf of business organisations represents to overcome the merely profit-oriented mentality and play a role as good citizen in the society (Carrol, 1991; Ahmed and Machold, 2004).

According to the 2013 Consumer Trend Report, nowadays products are asked to give back a specific set of expected and shared values. They need to be more than transparent to their audience, to become "naked" in communicating concrete and tangible benefits that go beyond the merely purpose a product or a service is supposed to serve. "Brands' wishes will be consumers' command" (Consumer Trend Report, 2013) and, in this sense, consumers keep driving companies' choices in the establishment of a new vision, new business models, products and services and coherent ways of advertising and creating marketing campaigns.

Therefore, as a set of non-business oriented actions addressed to temporarily improve corporates' behaviour and give them a voice within the social debate, CSR is not a new concept for them. The difference nowadays consists in the fact that it is largely being strengthened to include a concrete set of tools and planned communication activities addressed to solve social and environmental issues with positive repercussions on the reference community and ultimately on the existent and potential consumers' perceptions and satisfaction. It is, in other words, a new way of positioning business and relations with community by using the traditional CSR drivers and shaping them in a different way (Macleod, 2001; Mohr et al., 2001; Kuepfer and Papula, 2010).

Actions within Corporate Social Responsibility are becoming part of companies' core concerns. Can we consider this a new business model, even if less business-oriented? Or marketing and branding are just playing with words?

Before analysing the link between CSR and firms' strategies and highlighting the innovative implications of it for companies, a quick overview on CSR is required.

Generally considering that responsible, sustainable and philanthropic behaviours along with business ethics principles might represent a "good" way of reacting to the current societal and economic market scenario from the perception of consumers (Casalegno et al., 2012; Torres et al., 2012; De Pedro and Gilabert, 2012; Vallaster at al., 2012; Kuepfer and Papula, 2010; Neal and Cochran, 2008; Macleod, 2001; Mohr et al., 2001), the real impulse within companies towards CSR development raises issues of different kinds and the dilemma is not of an easy solution. What appears certain and clear, though, is that CSR needs to impose itself as a new corporate mindset with its own strategic implications (Kim et al., 2011).

Despite the multiple conceptualizations of CSR and the fact that a single definition has yet to be accepted (Vallaster et al., 2012), it is possible to group all its meanings under a CSR

mindset focusing on precise dimensions and activities that make CSR "a cross-functioning management tool which aims at achieving long term goals by fostering voluntary corporates' multi-stakeholders relationships" (Civera and Musso, 2012).

According to this definition, the authors has built and considered three main dimensions of CSR, in its traditional shape. They are: Accountability, referring to the way companies give evidence of their behaviour towards CSR through reports and codes of practices seen as differentiation elements; Corporate Philanthropy, identified as the sum of activities carried out in order to respond to various community needs by supporting projects of social interest and admired Third Sector Organizations; and, Sustainability, which is related to the inclusion and communication of environmental, societal and ethical concerns in process, goods/products and services.

2. Branding and Corporate Social Responsibility: a premises for a strategic understanding

Company differentiation is often realized by brand strategy to provide customers with quality, consistency and security. Definitely brand is a vehicle to influence stakeholders' quality perception and to add value to products and services. It is therefore necessary to understand the reasons why consumers give their preference to a brand among the many offers available and, consequently, it is important to analyse desires at the basis of their choice (Aaker, 1996). What are customers' needs, wishes and requirements according with current societal and environmental factors? Evidence shows that social concerns are getting increasingly important for stakeholders in general and for consumers in particular.

Thus corporate should build a true relationship with consumers and with their societies, primarily having consistency between the values associated with the brand and those transmitted by the behaviour of the company as a whole. Today corporate brands must be not only well known but also well regarded (Allen and Root, 2004): companies' behaviour and brand identity appear inextricably linked, with repercussions on the brand image and on the brand loyalty by customers.

The consequence of these arguments is that brand reputation is as important as brand awareness to create a coherent identity (Aaker, 2009): a kind of social legitimacy (Melo and Galan, 2011), which, in affluent societies, implies more than just profit maximization. CSR concerns emerge in this context as they affect both the social legitimacy and the stakeholders' perceptions, thus impact on the financial results of the company. Therefore companies have to move away from one-dimensional financial perspectives of business to a holistic view of societal relationships to incorporate sustainability into the whole culture of the organization (Gupta and Kumar, 2013).

Consequently, firms must implement the value of the relationship between brand and stakeholders through CSR strategies, especially in the medium-long term.

Therefore the brand acts as a tool that integrates the company with its stakeholders by creating valuable associations connected with sustainability, responsibility, philanthropy and ethics (Grace and O'Cass, 2002).

Considering brand strategy, activities carried out within CSR should be made visible inside and outside the company to create brand associations and communicated through the media. The positive word-of-mouth generated develops an integrated communication strategy.

Building a relationship between brand and CSR is important to strengthen customers' loyalty and, considering CSR complexity and evolution, a question arises: shall CSR become more than just a driver of branding and be translated in a formalized approach shared by the whole organization and outside it?

Sharing is the imperative. The question is, what and how to share? One of the most difficult intangible asset competitors cannot imitate is surely the way a certain organization behave and share its principles and social values with internal customers (employers) and external clients (consumers) ultimately.

What is called *organizational culture* (Schein, 2010) refers to the values and patterns of belief and behaviour that are commonly accepted and practiced by the members of a particular organization (Pringle *et al.,* 1988). In this scenario, the company is asked to put "everything together and make it work" (Schultz *et al.,* 1993) and, integrate communication with coherence and transparency. (Schultz *et al.,* 1993; Romano, 1988; Krugman *et al.,* 1994; Collesei, 2002; Duncan and Mulhern, 2004; Collesei and Ravà, 2008; Belch and Belch, 2009).

The necessity of integrating communication tools and lever on constant factors (Collesei, 2002) is perceived by companies as the most effective and strategic way to give their assets and business a reason to exist, and this is undisputed, especially in crisis periods (Casalegno *et al.,* 2012) and valid for all the stakeholders as extended audience (Kliatchko, 2008), considering that communication is not a *two-way* factor anymore.

Coherence is the driver of communication and helps creating the right reputation. According to this perspective, over the last years CSR has become one of the most powerful internal and external way of communicating homogenization and good behaviour in the way of conducting business activities.

Accordingly, if principles and shared values can represent powerful levers for competitive advantage, it is likewise true that nowadays the audience is not simply persuaded by paid activities – e.g. advertising - that aim to make them understand how ethic a certain company is. Customers are positively influenced by companies that do not need to prove their CSR through branding; instead by those who place it and communicate it on the market as a new business model addressed to social improvements. Here it is that CSR should turn into a strategic business model where actions undertaken in the field of ethics, sustainability, environment and philanthropy are coordinated and homogeneous within the core business of the company and therefore communicated transparently to achieve economic and social returns at the same time.

In accordance with an on-going research current put forth by Michael Porter in several of his works from 2002, the imperative for companies is to create and share values with the double purpose of reaching better performances in their competitiveness and improve their community well-being in a long-term perspective. Sharing values is reflected in communication as well as in the creation of concrete and valuable strategies.

In other words corporates need to strengthen CSR both as communication and strategy and bring it to a new level, the one of *Corporate Shared Value (CSV)* (Porter and Kramer, 2011).

Under the logic of CSV, any ethical, responsible and philanthropic action becomes profitable in an innovative way and places itself at the core of any companies' businesses: the design of new products and services that meet social and environmental needs while simultaneously delivering a financial return, for instance, goes beyond the merely communication of corporate values, citizenship and sustainability or the compliance to national and international standards (Moore, 2014); it confirms, instead, a strategic intention by the company to move beyond business and social concerns trade-off. With CSV companies coherently build a set of policies and practices that can buster their competitive power meanwhile improving environmental and social conditions within the community, which ultimately, like a virtuous circle, will positively impact on the company as well. Given that "the more a social improvement relates to a company's business, the more it leads to

economic benefits as well..” (Porter and Kramer, 2002), the breakthrough within the logic of CSV stays in the coherency through which companies place their responsible strategies within their core business and in the transparency when communicating them. For instance, the more Philanthropy is used to enhance competitive context, the more it could bring social and economic goals into alignment and improve a company’s long-term business prospects (Porter and Kramer, 2002)

In essence, CSV represents a change of mentality involving human resources, core processes/goods and services and communication. CSV starts from CSR but imposes its strategies in the form of a new business model. In particular, the CSR dimensions previously described evolve towards a more strategic framework, including: *Strategic Accountability* as compulsory activity to respond to the on-going challenges within society; *Strategic Philanthropy* as combined set of activities to support social and good causes in areas of competitive advantage for the company and coherent to its mission and core business; *Sustainable Deliverables* as concrete development of sustainable processes, goods/products and services that meet social needs while achieving economic return.

Communication plays a key role within the new strategic model of CSV, being considered the primary route through which corporates talk to and are able to reach their audience. Brands talk simultaneously for different purposes and to different targets. As a consequence, transparency and coherency become undisputable when communicating: some of the activities carried out within communities’ interest will be reasonably firstly addressed and communicated to empower corporates’ brand awareness and perception as forms of advertising in the interest of the company and, some others will merely serve social purposes in the stakeholders’ interest and communicated accordingly.

As far as Strategic Accountability and Strategic Philanthropy are concerned, for instance, in a CSV perspective, companies are asked to implement and increase the communication of certain activity almost compulsorily and give more and more evidence of their efforts towards the community through plans clearly and concretely reporting on investments and social returns.

Given the theoretical framework, the aim of the paper is to investigate whether CSR is just a driver of branding or the big move towards CSV implementation (as innovative and more structured way of thinking CSR) is being undertaken and, to which extent, by grocery and banking retailers comparing the situation in Italy and the United Kingdom.

3. Italy and United Kingdom: similarities and differences towards CSR

CSR strategies are built in different ways depending on the country (Brammer and Pavelin, 2006), so the choice of Italy and UK has been driven by considering their peculiarities and characterizations in the adoption of CSR as strategy to achieve economic and reputational benefits (Brammer and Millington, 2005). Italy and the United Kingdom present many similarities in their economical and geographical backgrounds and, at the same time, quite remarkable differences in their cultural environments, where beliefs, personal attitudes and preferences of individuals are formed. Therefore, this particularly affects corporates' attitudes towards ethics and the choice of their major CSR activities, from corporate giving to the implementation of some more marketing-oriented strategies like sponsorships.

On one hand, general settings and economic situation appear to be quite similar in the considered countries. Firstly, the population is estimated to be 60.8 million in Italy and 62.8 in the UK (United Nation Data, 2012) and secondly the Gross Domestic Product shows similar values in both countries: the UN Data estimates Italy GDP for the year 2012 to be equal to billion $2.013 and UK GDP for the same year to be billion $2.471 (United Nation Data, 2012).

On the other hand, factors like the social conditions, institutional and historical settings (CGAP, 2011) and the culture as mentioned above greatly differ between Italy and the UK, affecting CSR activities' typology and communication.

By examining closer these differences, at a first glance it is worthy to mention how history and tradition affect the context in which CSR is born.

On one hand, companies in United Kingdom, traditionally, have always played a central role in building and maintaining the so-called welfare state by emphasising on their business philanthropy for responding to "social, economic and political needs" (CGAP, 2011). In this sense, the environment for the proliferation of formalized policies within the area of CSR has always seemed to be more conducive.

In Italy, on the other hand, historically, the growth of cooperative organizations had been instrumental in creating a welfare state whilst corporate philanthropy has always been more connected to religion purposes and characterized by far less visibility and impact if compared to the UK (Assifero, 2010).

By analysing the results achieved by national and international researches and reports, a clearer understanding of the countries' differences in facing the challenge of CSR at a corporate level emerges: investments in CSR are generally increasing. Amount and reasons for investing still differ between the countries.

In particular, 73% of Italian companies with more than 80 employees adopt CSR programmes formally within the company and towards society (RGA, 2012) and communicate them with excellence (KPMG, 2013).

When taking into consideration the philanthropic effort among Italian and UK companies, what emerges is that the average estimated amount for cash and in-kind donations per company out of a broader range of CSR activities is much more higher in the UK ("UK Company Giving", 2011/2012; Osservatorio Socialis, 2014).

Moreover, the second "Report on Sustainability and Competitiveness" carried out by RGA in 2012 shows that in Italy corporates still find hard to integrate responsibility and sustainability into their business model and suffer of a lack of formalization in their CSR management (Istituto Italiano Donazione, 2012): they do not operate autonomously within their department and any choice regarding CSR projects, donations and sponsorships are taken along with the marketing, communication or human resources departments.

Even if Italian companies are paying more attention to innovate their business models, initiatives for CSR are still declared to be highly related to the idea of strengthening brand image and corporate reputation, to attract new customers and improve employees' satisfaction (Osservatorio Socialis, 2014).

Data available for the year 2009 (RGA, 2009) compare Italy to 31 countries (including UK) evaluated for their responsible competitiveness and it is unsurprising that Italy is placed 26th in the ranking, while UK at the 13th position, anticipating at a first glance what the findings from the empirical analysis will reveal.

The peculiar configuration of CSR leading to different level of implementation of CSV between Italy and the UK explains the choice of such geographical areas as objet of the study.

4. Research methodology and sample design

The present research has been carried out as part of an on-going international study that seeks to analyse the link between branding and CSR and the extent to which companies operating in various industrial sectors concretely achieve the implementation of Corporate Shared Value.

In particular, the aim of this paper is to focus on two Retail sectors (Banking and Grocery) and compare the level of formalization and methods of communication of companies' CSR strategies between Italy and the United Kingdom; and to investigate whether

companies included in the sample are developing a new business model, striving to turn from CSR to CSV, varying from retail sector and country.

Grocery and Banking sectors are the object of the study, for three main reasons.

First of all, more than other industrial sectors and especially nowadays, they have the duty toward their customers to respond responsibly to their increased expectations.

Secondly, on one hand, these retailers get in touch with their customers constantly, both at a corporate level through communication and at local level through their products, services and employers. On the other hand, customers have nowadays the power and the capacity to monitor companies' actions and judge the coherence between their communication and actual behaviour at the point of sale (grocery store or banks' branches) and influence it through a powerful mouth-to-mouth advertising. Transparency, in this sense, becomes the core and key word for grocery and banking retailers who want to establish long-term relationships.

Thirdly and eventually, these are the sectors most involved and top-spenders in CSR. Interestingly and not surprisingly they are also the ones most hit by a lack of customers' confidence resulting from the economic and financial meltdown.

Despite the sectors look different at a first glance, policies and programmes for CSR and its communication appear to move to the same direction, beyond the merely building of brand trust to ultimately achieve the highest level of customers' confidence in their products and services.

Grocer Retailers, for instance, address their offer and communication to a target market that is price-sensitive but it has become somehow accepting to pay higher prices for products associated with a good cause in the field of environment, sustainability and humanitarian aid Musso, Risso, 2006). The Banking sector has been forced to develop a one-to-one relationship with their investors and customers, by strengthening local presence on the territory, activities toward the community and the communication of them, in order to add value to their service proposition and face the challenge deriving from customers' mistrust.

To accomplish the purpose of the research, a sample of twelve (12) companies among Banking and Grocery Retailers, six (6) operating in Italy and six (6) in the UK, has been considered and investigated by adopting the *comparative case studies* method of research.

The sample has been investigated over the extent to which their CSR is becoming a new strategic business model, related but independent on branding and communication activities.

The use of a comparative study has allowed the authors to compare different strategic settings referred to two geographical contexts where the conditions leading to a specific company's attitude ("why") and the behaviour and strategies put in place by a certain company ("how") changes depending on the country (Feagin *et al.,* 1991).

It has been chosen to base the analysis on objective facts; concretely on the set of activities that companies within the sample currently implement and communicate to their audience. As a consequence, any information, documents and records over CSR implementation and communication accessible to the customers have been extracted from websites related to the company under investigation, companies' websites and annual reports (Sustainability Reports, Social Reports, Code of Ethics, International Norms and Standards, creation of ad-hoc ethical products and services, type and amount of cash and in-kind donations to Third Sector Organizations, description of initiatives of social relevance, partnership and sponsorship in the field of CSR). The information have been collected at a single point in time in 2015 and gathered around the three dimensions of the CSV framework and the relation between communication and CSR.

Specifically, information on each company addressed to investigate the extent of CSV implementation, have been gathered around:

Strategic Accountability:

- the spread of CSR communication messages and Reports (including adherence to International Standards) in accordance to the current issues (environmental, societal and economic mainly);
- the level of CSR strategy formalization concerning its governance and mechanisms of decision and control within the company;

Strategic Philanthropy:

- the level of formal implementation and accountability for philanthropy, with clear plans describing the nature of the donations or partnership with Third Sector Organization that match with the mission and core business of the company and the publishing of Reports to function both as financial evidence of the projects and communication of the achieved results;
- the typology of adopted techniques in the field of philanthropy (such as employees volunteering and Cause Related Marketing (CRM) as targeted strategic donations) and the intent they are communicated to serve (branding purposes for instance);

Sustainable Deliverables:

- creation and implementation of sustainable processes, products/goods and services that respond to social needs while delivering a financial return (e.g. development of ethical funds for banking retailers and eco and environmental friendly products for groceries' private labels);

Relation between communication and CSR:

- the extent to which certain CSR activities are pursued and communicated to meet and serve mainly commercial goals rather than the merely ethical intent.

In particular, six (6) companies have been picked up from the Banking sector (3 operating in the UK and 3 players from Italy); and the other six (6) companies competing in the Retail Grocery sector (3 in the UK market and 3 in Italy).

Some precise criteria have been used to choose the companies part of sample within the sector and have varied depending on the industrial sector and the geographical context the company belongs to.

UK Banking sector. Two criteria have been applied: the identification of the largest banks in the UK and – among the largest – the choice of the most involved in CSR. As a result, according to the ranking of the largest European banks for the year 2012 reported on the website relbanks.com and to the "Guide to UK Company Giving" (Lillya, 2011) which ranks the top 25 UK companies most spenders in corporate philanthropy[2], the sample is here composed by: Royal Bank of Scotland, Lloyds TSB Group and Barclays PLC.

Italian Banking sector. Due to the lack of data investigating the proportion of investments in Corporate Philanthropy, the criterion of the largest corporates in the country has been used. As a result, according to the website relbanks.com the top 3 banks in Italy part of the sample are: UniCredit SpA, Intesa SanPaolo, and Banca Monte dei Paschi di Siena.

UK Retail Grocery sector. Two criteria have been applied: the identification of the largest Retailers Grocery in the UK (among the categories Hypermarket and Supermarket) and – among the largest – the choice of the most involved in corporate philanthropy. As a result, according to the rankings reported on retailindustry.com, the "Guide to UK Company Giving"

[2] Cash investments: Royal Bank of Scotland Group UK (£ 34.7 million), Lloyds TSB Group UK (£ 33.5 million), and Barclays PLC UK (£ 19.3 million)

(Lillya, 2011) and "Top 3000 Charities 2012/2013" (Caritas Data, 2012)[3] that ranks the top 200 donors per community investments, the sample is composed by: Tesco PLC, Sainsbury's, and Co-operative Group (Food division).

Italian Retail Grocery sector. Because of the lack of data over the top corporate spenders in corporate philanthropy, the three largest Italian Grocery Retailers (in the category Hypermarket and Supermarket) according to the ranking reported by the website retailindustry.com have been analysed: Coop Italia (47th position), Conad Consorzio Nazionale Dettaglianti Soc. Coop. s.r.l. (67th position), and Esselunga SpA (115th position out of 250 Grocer Retailers).

Table 1 – The UK and Italian companies' sample

UK Banking Sector	UK Retail Grocery Sector
Royal Bank of Scotland Group	Tesco PLC
Lloyds TSB Group	J Sainsbury PLC
Barclays PLC	Co-operative Food Ltd

Italian Banking Sector	Italian Retail Grocery Sector
UniCredit Group SpA	Coop Italia
Intesa SanPaolo Group	Conad Consorzio Nazionale Dettaglianti
Banca Monte dei Paschi di Siena	Esselunga SpA

Source: Personal Processing

5. Empirical analysis and discussion of results

The qualitative methodology based on the case study development has helped the authors to collect the research findings around some relevant thematic areas within the topic of CSR towards CSV as new business model - including communication strategies - and report on some differences and relevant similarities emerging from the comparison between the Italian and UK retailer corporates.

Before deepening each of the analysed topics in relation to the countries and the retail sector, some general premises are needed.

First of all, the research findings will mostly confirm the general characteristics of the countries when it comes to their attitude towards CSR and the extent to which they are adopted as standardized strategies by corporates. Indeed, on one hand, Italian companies seem to be still in the process of formalizing their CSR strategy towards CSV as brand enhancement and community wellbeing at the same time, both at an internal level (towards their employees) and at the external one (so as to approach their existing and potential customers). On the other hand, retailer corporates in the UK appear overall more structured in their CSR strategy definition and in the communication of concrete results, whether the implemented CSR programme is directed to sustainable products development, to comply with certain International Standards or to report on the impact of a specific philanthropic activity benefiting the community.

Secondly, being the aim of the paper to highlight the differences and similarities in the evolution of CSR towards the strategic model of CSV between Italy and the UK, the findings will be drawn to accomplish this purpose of countries comparison rather than sectors'.

[3] 2011 Worldwide community investments: Tesco PLC (£ 64.3 million), Sainsbury's (£ 25 million), and Co-operative Group (£ 7 million cash donations)

Nevertheless, it is necessary to clarify that some intrinsic differences in the adoption of CSR as standardized and formalized strategy belong to the specific retail sector besides the country: in Italy, for instance, the Retail Groceries appear generally much less structured in the accountability of CSR programmes and the use of certain tools for achieving philanthropic goals than Banking Retailers.

Eventually, both the retailer sectors, no matter the country, seemed to have understood the practical relevance of adopting CSR policies and programmes and communicating them to their audience. Reasons justifying this choice can be found in the higher amount of scandals that, in the past few years, have severely hit both banking and grocery retailers: from the food safety scandals related to their origin and production to the banking managers misconduct leading to a constant decreasing of public confidence. CSR is a statement for companies and this is the starting point of the present paper; what varies between the countries is its level of formal implementation as innovative strategic business model towards CSV and its mechanism of communication for meeting new customers' expectations.

Each of the twelve (12) retailer corporates has been investigated over the extent to which their actions and behaviours around strategic accountability, strategic philanthropy, sustainable deliverables and relation between communication and CSR meet the criteria of CSV as new business model to accomplish. Results are summarized in the table below and then explained.

Table 2: Findings Summary

Investigated areas	Italy	United Kingdom
Strategic Accountability		
Spread of CSR policies and reports in accordance to the current issues	B1 B2 B3 G1 G2 G3	B1 B2 B3 G1 G2 G3
CSR Governance formalization	B1 B2 B3 G1 G2 G3	B1 B2 B3 G1 G2 G3
Strategic Philanthropy		
Philanthropy for competitiveness – Accountability and Financial Reports	B1 B2 B3 G1 G2 G3	B1 B2 B3 G1 G2 G3
Employees volunteering	B1 B2 B3 G1 G2 G3	B1 B2 B3 G1 G2 G3
Cause Related Marketing	B1 B2 B3 G1 G2 G3	B1 B2 B3 G1 G2 G3
Sustainable Deliverables		
Development of sustainable deliverables	B1 B2 B3 G1 G2 G3	B1 B2 B3 G1 G2 G3
Communication and CSR		
CSR – Commercial purposes	B1 B2 B3 G1 G2 G3	B1 B2 B3 G1 G2 G3

Source: Authors Processing

Strategic Accountability. The spread of CSR policies and programmes within the analysed players appears to be homogeneous in both countries and retailer sectors, confirming an increasing tendency and consciousness in utilizing ethics, sustainable, responsible and philanthropic activities as strategic responses to the current societal and economic challenges. Evidence shows that all the investigated retailer corporates are making extensive use of CSR as compulsory strategic tool by both publishing Reports, Code of Ethics or any other standardized programmes and communicating them within a set of values and certain responsible and ethic behaviours in response to challenging society's needs. Also, the content of the values within CSR is put forth in companies' mission statement, vision and on line and press PR messages, confirming its relevance within the business activity.

Worthy of mention is the fact that three (3) players in the Retail Grocery sector (one in the UK and two in Italy) operate in the market with the legal form of Cooperative, which implies a responsible attitude mandatory within their core business.

As far as the Governance of CSR is concerned – another key aspect to investigate CSR strategic implications - results show that both the retailer sectors in the UK and banking sector in Italy provide an high level of formalization. In these sectors CSR Units or Committee, becoming pure business departments/functions working closely with the Board of Directors and/or the Chairman directly and handling strategic and operational duties even concerning the Brand governance, which is supposed to reflect and balance the economic and social impact of a certain programme for CSR.

At the opposite, none of the Italian grocer retailers adopt a formal mechanism of control and governance for CSR, with activities spread within the Marketing, Communication and Board Departments indifferently.

To conclude, the biggest step forward in the field of strategic accountability to create CSV is being taken generally by banking retailers no matter the country. UK grocery retailers represent a benchmark for the Italian, in building an independent governance system for CSR in charge of activating and managing a new business model that is connected to the marketing and communication departments but goes beyond them, to embed the whole company.

Strategic Philanthropy. Generally speaking, the policy for implementation and accountability for Philanthropy appears to be more structured and standardized in the UK retailer corporates rather than the Italian ones.

In particular, the extent to which philanthropy is considered a proper strategic move with the development of clear plans showing the nature and the amount of investments in causes of social interest and measurement of their impact is higher within the UK retailers.

On one hand, banking sector – no matter the country – is more likely to give evidence of their Philanthropic activities by including such activity in their Social Reports as well as in Financial Plans.

On the other hand, Italian Grocer Retailers appear, once again, less structured and formalized: their support to Third Sector is mostly one-shot donations or random partnerships where the intent and the amount of philanthropic financial effort is communicated but the concrete impact and measurement of achievements is not. This has, as consequence, a perception of lower transparency and impact on corporates' business strategy, both at internal and external level.

The investigation over the typologies of adopted techniques in the field of Philanthropy (such as employees volunteering and CRM as strategic partnership) confirms what described above. All the UK players make a greater use of Employees' Volunteering than the Italian, confirming and showing a philanthropic attitude shared and spread inside the whole company, at all levels of responsibility, which is becoming as mandatory as any other core business

activity. Having realized the relevance of restoring a trustful and transparent relationship with their customers that happens at a local level (grocery stores and bank branches for instance), the UK retailers are taking, in this field, a huge step forward toward CSV creation. Accordingly, philanthropic projects involving employees to volunteer and/or fundraise for charities at the Point of Sale or Branch appear to be more structured with clear strategic plans.

As far as Cause Related Marketing (CRM) is concerned, findings report a high and homogeneous level of use of such technique in both countries and retailer sectors, with consistent differences between the countries in relation to the way these partnerships are built and their *reason why*. UK retailers, for instance, implement projects with longer gestation and life-cycle that are highly-connected to the company's core business and aim at enhancing business competitiveness and communities' well-being at the same time. At the opposite, Italian retailers still need to work on the strategic impact of their CRM programmes: they appear to be not strategically connected with their core business yet and more addressed to merely increase the perception of corporates' brands in a marketing-oriented process rather than having long-term strategic impact.

To sum up, confirming an intrinsic attitude typical of the Anglo-Saxon world, the tendency suggests that UK players have turned Philanthropy to a concrete strategy pursued with clear economic and social returns more than the Italian ones, that are still more focused on the commercial implication of Philanthropy.

Sustainable Deliverables. All the retailers have understood the strategic importance of concretely developing processes, goods/products and services that meet environmental, sustainable and responsible requirements. No differences emerge between the investigated countries and retailer sectors, confirming a general will to move from the merely communication of sustainability and responsibility as principles to follow when doing business to the fulfilment of a strategic concrete business model. Banking retailers in both countries, for instance, are highly involved in the development of social responsible funds and investments in green and renewable energy projects; grocer retailers are similarly putting in place and selling their private label Fair Trade products and activating training programmes for ethical trading.

Communication and CSR. As shown above, it is clear that consistent efforts in creating a new business model for CSR and strive towards the implementation of Corporate Shared Value are being made by the majority of the companies part of the sample, with less structured programmes and plans for CSR adopted by Italian grocer retailers. The strategy for communication reflects the extent to which the investigated retailers are setting up their CSV model.

One of the changing element in the argumentation of CSV is that the company becomes transparent and clear in its communication messages by admitting which kind of responsible, sustainable and philanthropic actions are undertaken with the aim of benefiting the society while impacting also on the brand perception enhancement. UK retailers seem to have taken a step forward in understanding this concept: the majority of the players clearly state and communicate to their stakeholders which CSR activity (especially in the philanthropic dimension) is carried out primarily with a commercial intent and the purpose to strengthen their brands competitiveness.

6. Conclusions and further implications

It is possible to conclude that, overall, despite the common propensity among both countries and retailer sectors to build a new business model of CSV as far as implementation of

sustainable deliverables and compulsory accountability is concerned, the main differences emerge between the countries when it comes to the achievement of strategic philanthropy and its relation to brand communication. UK players seem to be more effective than Italian corporates in formulating a strategy that reaches simultaneously brand enhancement and social purposes, with positive repercussions on their competitiveness.

All the analysed players appear to be to re-thinking their conduct in business, at the core level, in a stakeholders' perspective and have formally set up concrete responses to environmental and energy crises, financial crisis, pressure on innovation and fast development of information and communication technology, and eventually to the mounting pressure from stakeholders – which includes, of course, a change in their needs and expectations from business.

The research reveals its usefulness to function as collection of best practices that might serve as example for the Italian grocer retailers – which are still at an earlier stage of CSV implementation -and to further the debate around Shared Value and its impacts for retailers competitiveness, society well-being and ultimately on its effectiveness in increasing customers' perceptions and meeting their needs more appropriately. CSR does no longer represent a driver of the brand; results show that the imperative is to build a coherent strategy embedded by the whole corporate at a global and local level that considers brand competitiveness and society's improvement as linked parts of the same purpose: a sustainable and economic growth.

The on-going adjustments in developing a strategic business model for CSR towards the creation of Corporate Shared Value imposes continuous changes inside the company and the necessity to "share" those must be nowadays at the top of corporates' occupations; brands and CSR are strictly connected in the value creation process and its sharing. In this logic, consumers are not in touch with just brands; they constantly experience corporates' actions and behaviours and expect them to consistently and trustfully be coherent with the communication messages. Increasing their power in upholding corporates' good conduct, consumers' point of view around the connection between CSR and branding will be the forthcoming subject of investigation, to point out whether the creation of Shared Value is correctly reflected through communication in customers' perceptions and to which extent. New researches will keep focusing on the comparison between Italy and the UK.

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THE IMPACT OF BALANCED SCORECARD HALL OF FAME INDUCTION ANNOUNCEMENT ON FIRM VALUE

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Received: *July 3, 2016* Accepted: *October 7, 2015* Online Published: *Nov 28, 2015*

Abstract

In recent years, the Balanced Scorecard has emerged as a popular performance measurement and management system used by many organizations globally. This system helps link the strategy and vision of a company to its day-to-day operations. To recognize those companies that have successfully implemented the Balanced Scorecard, the Palladium Group, a leading organization of strategic management, established a widely-respected global program: Balanced Scorecard Hall of Fame for Executing Strategy. Since 2000, 152 companies have been inducted into the Hall of Fame. An event study was conducted to test the impact on firm value from the announcement of induction into the Balanced Scorecard Hall of Fame. If the balanced scorecard properly aligns the business strategy with the short-term operations, these benefits should impact positively on the firm's value. The results suggest some market price effect five- and ten-days prior to, but none following the announcement. The study's findings and opportunities for further research are discussed.

Keywords: Balanced scorecard, Firm value, Firm performance, Strategy execution, Event study.

1. Introduction

The Balanced Scorecard (hereafter BSC) is a strategic measurement and management system that was first formally introduced to the public by Drs. Robert S. Kaplan and David P. Norton (1992). They have produced several subsequent articles outlining in detail the BSC as a strategic performance system (1993, 1996a, 1996b, 2001a, 2001b, 2001c). In an ever-changing, competitive, and highly interconnected environment, they argued, a firm can no longer rely on the traditional approach of solely focusing on financial measures that mask the relationship of such measures to value-creating non-financial measures. Traditional models suffer from an explicit identification of the linkage between long-term strategies of a company, formulated

mostly by top management, and the short-term operational measures, which are often in the form of budgets created by the finance department. This deficiency limits the management's potential to drive performance and is often the reason for failure of many organizations in executing strategy effectively.

The BSC has the potential to improve firm performance for various reasons. It offers a holistic, disciplined approach to measuring and managing an entity's progress toward its mission, goals, and objectives. In addition to commitment of the firm's leadership, it requires involvement of the entire hierarchy. Because of the presence of the BSC, stakeholders are aware of the organization's vision and path to achieve it. The organization is fully and constantly involved in measuring and monitoring progress toward goals, identifying which parts the value chain need improvement, and allocating resources with a focus on improvement of processes and people to bridge such deficiencies.

While there is a degree of concern that expectations of impressive results from the BSC implementation are unrealistic, it appears that if the path to strategic goals is laid out and resources are allocated properly, the results would be better than when the BSC is not adopted and pursued with passion. When the value chain is managed through implementation of a clear vision, ultimately, financial performance – the lagging indicators in the BSC – will show better, more persistent, or more predictable outcomes. Under such conditions, an alignment of company performance with investor expectations is much more likely; when it is achieved, the financial markets can be expected to respond positively to the firm performance.

As more companies adopt the BSC system, the discussion of decision usefulness of the system and its impact on results has spread across the global corporate scene. The media coverage touting the achievements of adopters is not uncommon. Consequently, when the track record of successful BSC implementations is widely accepted by the investor community, it is likely that any news about a company's decision to adopt the BSC may be interpreted by investors as a positive sign of earnings stream expected from the company. The hope of company performance in line with expectations takes hold among present and future investors.

One widely publicized media event that resonates with the financial markets and its players is the induction of selected organizations in the BSC Hall of Fame, a resounding recognition that the inductee has successfully implemented the system. The investor confidence would likely get a boost from such news, resulting in a positive attitude toward firm practices to create value for its stakeholders. Thus, we present the following hypotheses for our study and discuss the findings in the following sections.

H0: Stock returns do not react to the announcement of induction into the Balanced Scorecard Hall of Fame as presented by the Palladium Group for Executing Strategy.

H1: Stock returns react positively to the announcement of induction into the Balanced Scorecard Hall of Fame as presented by the Palladium Group for Executing Strategy.

2. Literature review

As Kaplan and Norton state, the BSC is a comprehensive framework that translates a company's strategic objectives into a coherent set of performance measures. To enrich the dashboard of performance, the BSC typically adds three non-financial perspectives that complement the financial perspective: customer, internal business processes, and innovation and learning. The customer perspective focuses on the satisfaction of the firm's customer

base and how well their expectations are being met. Supplementing the customer perspective is the internal business perspective. This function takes into consideration the business processes that have a significant impact on the company's value chain and aims at bettering these processes. The innovation and learning perspective focuses on continual improvement to existing products and processes and the ability to introduce entirely new products with expanded capabilities (See Kaplan and Norton, 1992). As with the traditional method, the financial perspective examines bottom line numbers such as return on investment, return on equity, operating income, and cash flow. Importantly, the scorecard makes explicit the relationships between such financial measures (lagging indicators) with measures in the other three non-financial perspectives. This in turn provides insights on how to drive performance by leveraging these relationships.

A high degree of articulation of the BSC system makes it rather intuitive and on the surface, without any downside risks. However, the BSC has been constructively examined to suggest its limitations. A notable contribution in this regard comes from Norreklit (2000) who concludes that the BSC is a "hierarchical, top-down model that is not easily rooted in a dynamic environment or in the organization. If the balanced scorecard is to become more realistic, [its] control processes should be more interactive during strategy formulation, during the building of the scorecard and during the subsequent implementation (p. 81)." Wongrassamee, Gardiner, and Simmons (2003) compared two organizational improvement models, BSC and EFQM (European Foundation for Quality Management) model from five key perspectives: objectives, strategies and plans, target setting, reward structures and information feedback loops. They concluded that "a problem common to both is "being able to integrate them into a business unit or a whole company. . . Practically, it is difficult to find a perfect match between a company and a performance measurement framework (p. 28)."

In spite of the noted limitations, experimentation of the BSC in the corporate world and among the non-profits continues at a steady pace. In part, this may due to the fact that the BSC allows managers to view the organization through a comprehensive framework of both non-financial and financial measures, rather than focusing on one class of measures alone. It focuses managers on the most critical measures that will promote the most future success within the objectives of the corporate strategy. Measures of progress are determined for each of the four perspectives and then target goals are set. Next, managers take actions that will help the company progress towards their set goals which should stem directly from the strategic objectives of the company. Progress is continually assessed in order to determine the appropriateness of the measures and the targets set. The target measures are communicated throughout the organization to employees at all levels so as to connect the strategic vision to the daily operations performed by the employees. The BSC encourages continuous improvements as target goals are adjusted.

One organization that Kaplan and Norton co-founded is The Palladium Group (formerly the Balanced Scorecard Collaborative). The Palladium Group is recognized as a leader in helping organizations execute their strategies by focusing on strategic management, performance management, and business intelligence. A powerful initiative that the firm has instituted is the Balanced Scorecard Hall of Fame for Executing Strategy. Each year, organizations who have achieved extraordinary performance results following the implementation of Kaplan and Norton's BSC are inducted into the Hall of Fame. To be inducted, the organization (enterprise or leading business unit, public agency, or government entity) must have implemented the BSC by the standards of Kaplan and Norton, shown breakthrough performance results for at least 24 months, and provided a testimonial in which a senior executive credits the BSC in part to its success. The Hall of Fame is a highly regarded program that spans the globe.

The BSC, properly implemented, is effective and over time, has been embraced as an universal key for the performance improvement of almost any organization, for-profit or not-for-profit (Ashworth, 1999). Whereas other efforts to weave non-financial measures with financial measures into a holistic dashboard achieved very little attention in practice (See for example, Pyramid Model by McNair, et al., 1990, and EP2M Model by Adams and Roberts, 1993), the BSC – introduced by Maisel (1992) and in the same year, by Kaplan and Norton (1992) - has become a widely popular strategic measurement and management system. Its potential to add value has been established over the past 20 years.

Not unlike any system, the benefit of the BSC implementation lies in its successful implementation. Poorly implemented BSC is unlikely to produce impressive gains in the company performance. A high degree of support to the BSC adoption is required from the top management, adequate resources must be provided, stakeholder acceptance should be systematically sought, and persistent efforts should be made across the organization in order for the implementation to succeed. Given these prerequisites, it is likely that successful implementation of the BSC can be found only at a limited number of entities in the universe of all BSC adopters. Put differently, even the BSC could fail (Schneiderman, 1999). We believe an invitation to an organization for induction into the Balanced Scorecard Hall of Fame is a strong indicator the entity's successful implementation of the scorecard.

The link between financial performance and stock prices has been a subject of numerous studies. However, there is limited evidence of the impact of non-financial data on the stock prices. An early study conducted by Ittner and Larcker (1996) examined the information content of announcement of customer satisfaction rankings. Their findings suggest that non-financial information, such as the customer satisfaction rankings, is of value to the market and as well, is incremental information to the investors. The investor interest in studying qualitative, non-financial information such as in the BSC has been recognized (Light, 1998), for the value created by the combined use of both quantitative and qualitative information to drive strategy ultimately mirrors in the market cap of the company. Similarly, an Ernst & Young study (Mavrinac and Siesfeld, 1998) offered evidence that shareholders strongly rely on a broad range of non-financial factors which potentially provide the foundation for the future firm performance. Presumably, the BSC implementation leads to superior company performance and the analysts take this into consideration.

Whereas a series of dedicated events over a long period of time drive the implementation of the BSC, the trigger event that clearly establishes a milestone of successful implementation is the adopter's induction into the hall of fame. Numerous major and minute efforts prior to this announcement can only be considered steps toward the goal of successful BSC implementation. While the invitation for induction is a distinct and credible event arising from a third party outside of the company, its consideration as an event that impacts the company's market price has two limitations. First, the media announcements, company newsletters, or other interactions between the company and its stakeholders may already have resulted in the leakage of the news; this may have been absorbed into the market price of the company stock over time. Second, the market participants may not recognize long-term (positive) consequences of the event, may suspect that this was hype with no real significance to the company's performance, or may just downplay the future impact of the BSC in the life of the company. Nevertheless, we believe the announcement of induction is a high-profiled, credible, and impactful event in the life of a company, and should produce market price effects following the event.

3. Methodology

3.1 Hypothesis

In order to test the theory whether announcements of a firm's induction into the Balanced Scorecard Hall of Fame has an effect on firm value, a hypothesis is developed. The null hypothesis assumes that the announcement of a firm being inducted into the Balanced Scorecard Hall of Fame will have no impact on firm value. The alternative hypothesis is that the firm's value will be positively impacted by the Hall of Fame announcement. The hypothesis is formally stated as follows:

H0: Stock returns do not react to the announcement of induction into the Balanced Scorecard Hall of Fame as presented by the Palladium Group for Executing Strategy.

H1: Stock returns react positively to the announcement of induction into the Balanced Scorecard Hall of Fame as presented by the Palladium Group for Executing Strategy.

Kaplan and Norton (2001a, p. 102) state they have "observed several organizations achieving performance breakthroughs within two to three years of [BSC] implementation." The impact on firm value from successfully using the Balanced Scorecard should already be imputed into the stock price. As mentioned above, this feature is one of the criteria for a company to be inducted into the Balanced Scorecard Hall of Fame. Thus, gains from increasing the value of the firm from implementing this strategy should be already incorporated into the firm's stock price (H0). However, if the announcement of a firm's induction into the Balanced Scorecard hall of Fame conveys news to the market that this company has achieved economic rents from practicing this management strategy, then there should be a positive impact on the firm's value (H1).

Crabtree and DeBusk (2008) test for evidence of long-term impacts on firm value to firms that implement the Balance Scorecard. They used a long-horizon event study methodology to examine the relationship between BSC adoption and shareholder returns. Using a matched pair design, they showed that firms who adopt the BSC significantly outperform firms that do not adopt the BSC over a three year period beginning with the year of adoption. Their extensive analysis indicates that there is a statistically positive impact of its implementation on firm value. This study extends their research by using event study methodology to test for any market price impact from the induction of a company into the Balanced Scorecard Hall of Fame.

3.2 Methods

We use standard event study methodology to measure the magnitude of the effect of the announcement of a firm being inducted into the Balanced Scorecard Hall of Fame on firm value. Campbell et al (1997) discuss the historical development of event study research and summarize commonly used event study methodologies. Event studies measure the value effect of an event under the assumption of market rationality, allowing us to assume that investor assessment of firm value is accurate and reflected in the firm's stock prices. Consequently, any abnormal returns experienced in the event window can be interpreted as a measure of the impact of the event – the announcement of a firm being inducted into the Balanced Scorecard Hall of Fame – on the value of the firm.

To study whether an event has any impact on the market, we measure event-day cumulative abnormal returns (CARs) and test their statistical significance. We focus primarily

on whether or not there was a market price effect of the announcement of a firm being inducted into the Balanced Scorecard Hall of Fame for Executing Strategy within a reasonable time period, called the event window, following the announcement of such news. The event window is the amount of time, usually measured in number of trading days, taken by investors to absorb the impact of a new event. According to the efficient market hypothesis, new information is immediately incorporated into the stock price. Consequently, a short event window is likely to more reliably test the market effect of an event.

An event study methodology is used to determine the price effect of the disclosure of an event (Conrad, 1989; Holland and Wingender, 1997; Groff and Wingender, 2010). Single factor market model parameters are calculated using the estimation period of trading days before the event date to approximate one year of stock returns. The estimation period begins 321 trading days before the event and ends 70 days before it. Across the companies in our sample, these dates cover several market cycles. For this study, we use market model event study method and test the results for significance with the standard residual method. The market model event study method uses a linear regression to predict stock returns; then it compares the predicted value to its actual return. To test whether the cumulative abnormal return is significantly different from zero, we use the standardized cross-sectional method. We use the equally-weighted CRSP (Center for Research in Security Prices) index for the model's market returns. We also employ a generalized sign test, which differs from the simple sign test in that the fractions of positive and negative returns under the null hypothesis are determined by the fractions observed in the estimation period, rather than fixed at 0.5. *Beta*s in the market model are estimated using the method of Scholes and Williams (1977). To statistically test the data, the null hypothesis that the introduction of the event has no effect on the returns of the underlying security will be rejected if the Z-statistic is significant at the 0.10 level or lower in a one-sided test.

The abnormal return (ABR_{jt}) is the difference between the actual return (R_{jt}) on a specific date and the expected return ($E(R_{jt})$) calculated for the firm on that specific date. The expected return is calculated using the parameters of a single index regression model during the pre-event estimation period. The regression model parameters are determined by the following equation:

$$R_{jt} = a_j + b_j R_{mt} + e_{jt}$$

where

R_{jt} = the return on security j for period t,
a_j = the intercept term,
b_j = the covariance of the returns on the jth security with those of the market portfolio's returns,
R_{mt} = the return on the CRSP equally-weighted market portfolio for period t, and
e_{jt} = the residual error term on security j for period t.

Betas (β_j) in the market model are estimated using the method of Scholes and Williams (1977). Ordinary Least Squares (OLS) was used to estimate the slope and intercept parameters for each security in the data set. The market model estimation is adjusted for possible first order autocorrelation with a GARCH(1,1) approach. These estimates were then used to calculate the expected return for the event window, from which the abnormal returns (AR_{jt}) can be calculated as follows:

$$AR_{jt} = R_{jt} - (\alpha_j + \beta_j R_{mt})$$

where R_{jt} is the observed return of security j on Day t and R_{mt} is the return of the CRSP equally-weighted market index on Day t. The estimates of alpha and beta are those calculated above from the estimation period. The average abnormal return (AAR_t) is calculated as the mean AR_{jt} for all N securities:

$$AAR_t = \frac{\Sigma_{j=1}^{N} AR_{jt}}{N}$$

where t is the trading day relative to the event. The cumulative average abnormal return from Day T_1 to Day T_2 ($CAAR_{T_1,T_2}$) is calculated as follows:

$$CAAR_{T_1,T_2} = \sum_{t=T_1}^{T_2} AAR_t$$

Test statistics are calculated as in Patell (1976). Standardized abnormal returns (SAR_{jt}) are defined as follows:

$$SAR_{jt} = \frac{AR_{jt}}{S_{jt}}$$

S_{jt} is further defined as the square root of the security j estimated forecasted variance:

$$S_{jt}^2 = S_j^2(1 + \frac{1}{D_j} + \frac{(R_{mt} - R_m)^2}{\Sigma_{k=1}^{D_j}(R_{mk} - R_m)^2}$$

where R_{mt} is the observed return on the market index on day t, R_m is the mean market return over the estimation period, and D_j is the number of trading day returns (251) used to estimate the parameters for firm j, and S_j^2 is calculated as follows:

$$S_j^2 = \frac{\Sigma_{k=1}^{D_j} AR_{jk}^2}{D_j - 2}$$

Finally, the test statistic Z_{T_1,T_2} for the null hypothesis that the $CAAR_{T_1,T_2}$ equals zero is defined as:

$$Z_{T_1,T_2} = \frac{1}{\sqrt{N}} \sum_{j=1}^{N} Z_{T_1,T_2}^j$$

where

$$Z_{T_1,T_2}^j = \frac{1}{\sqrt{Q_{T_1,T_2}^j}} \sum_{t=T_1}^{T_2} SAR_{jt}$$

and

$$Q^{j}_{T_1,T_2} = (T_2 - T_1 + 1)\frac{D_j - 2}{D_j - 4}$$

To test the data, the null hypothesis that the announcement of a firm being inducted into the Balanced Scorecard Hall of Fame for Executing Strategy event has no effect on the returns of the underlying security will be rejected if the Z-statistic is significant at the 0.10 level or better.

The generalized sign test is used as a nonparametric test of the impact of the announcements. For each trading day or month in the event periods the number of securities with positive and negative average abnormal returns (cumulative or compounded abnormal returns for windows) is calculated. The generalized sign test statistic controls for the normal asymmetry of positive and negative abnormal returns in the estimation period. The significance levels for the generalized sign test are calculated. The null hypothesis for the generalized sign test is that the fraction of positive returns is the same as in the estimation period. For example, if 46% of market adjusted returns are positive in the estimation period, while 60% of firms have positive market adjusted returns on event day −1, then the test, based on the normal approximation to the binomial distribution, reports whether the difference between 60% and 46% is significant at various levels.

3.3 Data collection/organization

In order to collect the necessary data, the list of current Hall of Fame members was retrieved from the Palladium Group's website (2011). Research was then conducted through an electronic search of news media containing the press release with the date of induction announcement. The time period explored spanned from January 1, 2000 to December 31, 2010. Of the 152 companies currently in the Hall of Fame, the dates of announcement for 142 of them were retrieved from press releases. Eight more dates were retrieved via electronic communication with Robert Howie, the Chief Marketing Officer of the Palladium Group and director of the Balanced Scorecard Hall of Fame. According to Mr. Howie, there was no press release announcement for the first group of initiates. He supplied the date of June 1, 2000 for these initial eight companies.

The sample was sorted by date of announcement, industry, and region. The inductees to the hall fame comprised of U.S. Corporations (20%), Non-U.S. Corporations (42%), and non-profit/governmental organizations (38%). The latter category of inductees does not have equity investors and thus could not be included in the analysis. The event study used the daily return data available on the files of the Center for Research in Security Prices (CRSP). Since CRSP data do not include non-U.S. corporations, we had to also exclude this category from the final sample. Consequently, the sample consisted of only 28 U.S. Corporations listed on the New York Stock Exchange or NASDAQ. Of these, eight companies did not have data during the model's required estimation and event periods. Consequently, the final sample comprised of only 20 firms.

4. Hypotheses testing and discussion of results

4.1 Hypotheses testing

The results for the event study are reported in Table 1. The one-day average abnormal return on Day 0 is 0.43% with a Generalized Sign Z statistic of 2.005 that is statistically significant ($p < .05$). There are 14 firms with positive abnormal returns on the event date of the

announcement that the firm has been selected for the Balanced Scorecard Hall of Fame. There are 6 firms with negative abnormal returns on the event date. The event window of the day of the announcement and the subsequent trading day is calculated to see if there is any spill-over news. The event window $[T_0,T_1]$ has a positive cumulative average abnormal return of 0.83% that is statistically significant ($p < .05$). However, after this event period, the windows for one week of trading days after the announcement date of $[T_1,T_5]$ and for two weeks of trading days after the announcement date of $[T_1,T_{10}]$ have negative cumulative abnormal returns (-0.40% and -1.28%, respectively) and they are not significantly different than zero.

Table 1 – The Market Price Effects of the Announcement of Becoming a Member of the Balanced Scorecard Hall of Fame

Event Day	N	Mean CAR (%)	Positive:Negative	Portfolio Time-series (CDA) t	Generalized Sign Z
Hall of Fame Announcement	20				
(-10,-1)	20	2.31	14:6*	1.417$	2.005*
(-5,-1)	20	1.76	16:4**	1.524$	2.901**
(-1,0)	20	0.16	11:9	0.215	0.662
(0,0)	20	0.43	14:6*	0.831	2.005*
(0,+1)	20	0.83	14:6*	0.626	2.005*
(+1,+5)	20	-0.40	12:8	-0.346	1.110
(+1,+10)	20	-1.28	11:9	-0.788	0.662

The symbols $, *, **, and *** denote statistical significance at the 0.10, 0.05, 0.01, and 0.001 levels, respectively, using a one-tail test.

An interesting observation from the results in Table 1 is that there is a statistically significant positive cumulative abnormal return in the 2 weeks leading up to the announcement that a firm is being recognized for its induction into the Balanced Scorecard Hall of Fame. For the one week before the announcement $[T_{-5}, T_{-1}]$ the cumulative average abnormal return is 1.76% ($p < .01$). For the two weeks before the announcement $[T_{-10}, T_{-1}]$ the cumulative average abnormal return is 2.31% ($p < .05$). This movement would suggest that the information of the firms to be inducted into the Balanced Scorecard Hall of Fame is leaking out before the actual announcement. It indicates that the market values this information as very positive and it has a significant impact on firm value. We find that membership in the Balanced Scorecard Hall of Fame is an economically positive event for the average firm.

4.2 Discussion of results

From the results of the event period, each expected result was compared to the actual results. It was then determined whether or not each result (variance) was abnormal. Additionally, it was determined if the variances were significant or not. Significance was determined for the following days: ten, five, and one day before and after announcement as well as the actual announcement day itself.

The results showed significance for only two of the days analyzed: ten days before announcement and five days before announcement. There was a 99% confidence level of the abnormal returns at the 10 day mark and a 95% confidence of the abnormal results five days before announcement. Of the other days analyzed, no significant results were returned.

These results were somewhat different than what was expected before testing. It was assumed that the significant abnormal returns would result after the announcement date but

this was not the case. We surmise that there may be a possible leak of information from the companies before induction. The Hall of Fame organizers, the Palladium Group, notify winners of their induction status about 30 days before the actual award, with a requirement that the recipients will make no pre-announcement prior to the actual award ceremony. The organizers believe there have been no inductees that have ever violated this policy.

The only other conceivable reason that was determined was that the small sample size skewed the results. Although there was significance, there were only 20 companies used in the study which makes the results less reliable. It could be the case where the firms used in the study had a correlation that was actually random and not a true correlation. As the years go on and more firms are inducted into the Hall of Fame, a larger pool sample will be available for further testing.

5. Conclusion

In the long-horizon study by Crabtree and DeBusk (2008), the definition of event was rather broad; their study covered the first three years of BSC implementation. In addition, the study used matched-pair sample, which provided relative and yet important contrast between the doers and non-doers of the BSC. Indeed, the contribution of a holistic strategic measurement and management system such as the BSC is practically undeniable. Whether this will surface as a one-time event effect in an event study is contingent on the definition of "event." In this study, the event – induction into the hall of fame – is a culmination of tireless efforts of a company over a period of time (24 months) preceding the event. Any hint of the company's efforts to implement the BSC could have generated earlier, and perhaps gradual, absorption of the news into the company's stock price.

A limitation of this study comes from the final sample size. We couldn't control the sample size; it was limited by the number of inductees into the hall of fame whose shares traded in the U.S. financial markets. Data similar to CRSP can be found for non-U.S. corporations, but may not be comparable to, and thus cannot be combined with, CRSP data. Additionally, since no public information was available regarding the candidates for the hall of fame that were rejected in the same industry as the inductees, we could not use a matched-pair sample.

In the years following the BSC implementation, other things remaining the same, the company is likely to remain financially healthy. However, an event study would not capture this due to the efficient market. Consequently, other ways to explore this question should be considered. One possibility is to create a hypothetical portfolio of all companies actively engaged in the BSC and track its financial performance, controlling other variables, and comparing the portfolio's return with non-BSC-users' matched portfolio with similar risk levels. On the flip side, it would be interesting to see if companies that exited active use of the BSC (due to leadership change, for example) had any material adverse effects on their stock prices. For an effective implementation of a comprehensive dashboard, a great deal of efforts and other resources need to be committed. Therefore, an overriding question for chief executives is whether the balanced scorecard is worth the cost (compared to its value). Future studies to develop insights in a cost-vs.-value comparison of a holistic dashboard would add to the current knowledge and enhance our understanding of the role and significance of comprehensive scorecards.

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IS EQUALITY FAIR?

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Received: *July 19, 2015* Accepted: *Nov 2, 2015* Online Published: *Nov 30, 2015*

Abstract

This paper attempts to answer the question whether people consider decisions that lead to equal outcomes fair. I find that this is not always the case. In an experiment where subjects are given equal opportunities to choose how to divide money between each other in a two-player game, any strategy is perceived to be fair more than half the time, including the profit-maximizing strategy. The equal divisions that lead to equal outcomes are sometimes considered unfair by both players. Moreover, players frequently punished the others, whose decisions led to equal outcomes. I hypothesize that such punishments occur because people have different conceptions of what a fair outcome and fair punishment are.

Keywords: Fairness, Equal outcomes, Reciprocal punishment, Fair division, Social values, Effort.

1. Introduction

This paper looks into people's conceptions of fairness with regard to economic decision making. Concern for fairness is important because it stimulates people to deviate from self-interest and profit maximization if it leads to unfairness and punish others at the cost to themselves (Rabin, 1993; Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000; Nowak et al, 2000; Falk and Fischbacher, 2006). Most theories, including the ones cited above rely on an assumption that equal outcomes are fair or, at least, the less is the difference between outcomes, the fairer they are. It is also assumed in many experiments that equal or the most equal outcome available is fair (Thaler, 1988; Güth et al, 2001; Henrich et al, 2010; LoBue et al, 2011; Sheskin et al, 2014).

The problems with equal outcomes not always being fair have been addressed as early as Nash (1950). People may value things that they are dividing differently, have different beliefs about preferences of other people (Yaari and Bar-Hillel, 1984), have different social values and ideas of fairness (Charness and Rabin, 2002), or perceive intentions of others differently (Falk et al, 2008). In their paper criticizing mainstream theories of fairness, Fudenberg and Levine (2012) argue that what is fair for one person may not be fair for the other person if the rewards are not certain.

There are some empirical studies where equality is not a direct measure of fairness. Baumard et al (2012) build an experiment with young children where participants have to

make an effort before distributing rewards. Dividing the rewards according to the participants' contribution is considered fair. In another experiment with young children, Castelli et al (2014) show that some participants consider advantageously inequitable offers fair.

In their experiment on fairness and cheating involving the dictator game, Houser et al (2012) measure fairness objectively and subjectively. The subjective measure of fairness is a survey where participants are asked how fair in their opinion the division of money was. The objective measure is based on empirical results of the ultimatum game previously played in other experiments (Camerer, 2003). Remarkably, many responders consider divisions below even split to be fair. I.e. some participants think it is fair for the other person to take most of the money.

Interesting debate about fairness takes place in the field of information technology where multiple resources can be allocated according to various criteria, many of which are fair from different perspectives (Ghodsi et al, 2011). Luckily, computer systems have no emotions (yet) and the fair outcome is simply the most efficient one.

In another experimental study Durante et al (2014) show that fair or preferred level of redistribution of wealth within a society depends on task performance. The authors find that inequality in income stemming from differences in knowledge or skill is often considered fair.

Roemer (1998) and Devooght (2008) argue that inequality originating from factors like education or effort is fair, while inequality that stems from circumstantial factors like race, gender, or chance is unfair. Yet, it is easy to imagine how in some social groups people would consider a certain race to be privileged and racial equality to be unfair and even unthinkable. Using Roemer's (1998) and Devooght's (2008) ideas, Figueiredo and Netto (2014) in their macroeconomic study find that increased equality in Brazilian society does not translate into increased fairness within the society.

I conduct an experiment to specifically test whether people may consider equal outcomes unfair and willing to punish the others for dividing money equally with them. I designed a game where two players get to divide one money pool each and then have a chance to punish the other player by reducing the other player's outcome at the cost of own outcome. The game contains loaded language and attempts to test how various settings affect fairness preferences of participants. Section 2 describes the design of the game. Formal models are moved to appendices at the end of the paper.

The results show that people's fairness conceptions vary considerably and decisions to divide money equally are considered fair about as often as decisions to maximize outcome. The results are discussed in detail in section 3.

2. Experimental design

Subjects play a two-player game where each player is given a pool of money and has to decide how to divide it between herself and the other player. The other player makes the same decision simultaneously. Both players observe each other's decisions after the money pools are divided. In the second stage of the game, each player has an opportunity to impose a costly punishment upon the other player by reducing both players' outcomes by the same percentage.

2.1. The Game of Division and Punishment: Stage 1

Player 1 and player 2 divide their respective equal pools of money proportionally to one of the criteria that are relevant to real life situations. Among these criteria can be any traits, merits, or efforts that people value. The criteria I chose are described in Table 1.

Table 1 – The criteria for division of money in the first stage of the game

Criterion (proxy variable)	Real life situation	Specific examples of real life situations
Height[1]	People divide rewards according to their physical traits and attributes.	Men have higher average salaries than women (Kopczuk et al, 2010); people of a certain skin color are treated better at work place or have a higher chance of being hired (Castilla, 2008); taller people are more likely to get a managerial position in some societies/industries (Lindqvist, 2012).
Place of birth[2]	People divide rewards according to their citizenship, nationality, place of origin or belonging to a certain society.	Immigrants get the same treatment as natives, or not. Immigrants may feel it is unfair if they are not treat like the rest of the population and may feel it is just for them to take or steal from more fortunate locals. Locals may feel it is unfair to treat immigrants equally and may feel an urge to punish them by discriminating and limiting immigrants' access to goods, services, and jobs whenever possible.
Average grade[3]	People divide rewards according to the effort they put in in the past.	Students who have better grades in school get accepted to better universities; students who graduate from better universities can get higher paying jobs; workers with more impressive resumes get better jobs.
Problem solving accuracy[4]	People divide rewards according to the effort they put in immediately or within the current shift, day, month, etc.	Wage or salary can be tied to performance or productivity of a worker. A worker can receive bonuses for performing better than other workers. That may not be considered fair by everyone. For example, a banker receiving a multi-million bonus may feel like it is fair, but others may feel like the banker's performance does not merit such a high bonus.
Equal division[5]	People divide rewards evenly.	Equal access to primary education for everyone, equal wages or salaries for workers within a team are examples of evenly distributed rewards that are generally considered fair. Every reward that can be divided according to any other criterion can also be divided evenly. Although equal divisions are assumed to be fair in many theories discussed in the introduction of this paper, it is easy to see how equality can be perceived unfair in real life. For instance, equal rights and access to the country's infrastructure for immigrants as well as for locals will seem unfair to many. Equal job prospects for high school drop-outs and university graduates can easily seem unfair. On the other hand, if poorly educated workers or disadvantaged immigrants are not treated equally (or even favorably), their sense of unfairness can justify punishments like theft, fraud, and other crimes.

Each criterion corresponds to its respective variable (strategy) in equations in Appendix A: [1]H; [2]C; [3]G; [4]K; [5]E.

If player 1, for example, chooses to divide her money pool proportionally to the players' height, then the taller player will get more money and the shorter player will get less money. If both players are of the same height, the money pool is divided equally. Player 2 has the same decision to make and divides his money pool according to one of the criteria from the same set. After both players made their decisions, each will end up with a share of her money pool and a share of the other player's money pool. The outcome for each player in this stage of the game will be a sum of these two shares. The game is formally presented in Appendix A. The outcomes become a common knowledge after both players made their decisions.

2.2. The Game of Division and Punishment: Stage 2

Players may end up with unequal outcomes after the first stage. In this case, they may feel that the outcomes are unfair, according to the theories of fairness (Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000; Falk and Fischbacher, 2006). If one player believes her outcome is unfair, she is more likely to punish the other player. However, it is possible that a player may consider an unequal outcome to be fair. A common assumption is that all equal outcomes are fair, like in the ultimatum game or dictator game experiments (Thaler, 1988; Güth et al, 2001; Henrich et al, 2010). My experiment challenges this assumption.

In the second stage of the game, both players have an opportunity to punish each other by reducing the outcomes. Each player can reduce both players' outcomes by the same percentage. Therefore, the punishment is costly to the punishing player unless the punishing player has the outcome of 0. Neither player's outcome can be reduced below 0. The players make their punishing decisions simultaneously. The game ends after both players made their punishing decisions. Formal definitions of payoffs and strategies in the second stage of the game are in Appendix B.

2.3. The Experimental Procedure

Twenty four subjects participated in the experiment. The subjects played the game described above three times. Subjects were divided into two sections and randomly paired up in each of the three treatments. Everyone was informed that they are very unlikely to face the same player in the next treatment. The experiment took place in a computer lab of Maria Curie-Sklodowska University in Lublin and was programmed using z-Tree software (Fischbacher, 2007). The subjects were mostly second year students majoring in economic disciplines. The language of the experiment was English, the second language for all of the subjects. The subjects were not allowed to communicate, but they could call out a phrase if they did not understand it and someone would translate it into their native language.

In the beginning of the experiment, participants entered their height, average grade, and answered whether they were born locally. Then they received instructions about the rules of the first stage of the game:

> "*Now you will be grouped up with a random anonymous player. You will not know the identity of the other player and the other player will not know your identity neither during the experiment nor afterwards. You are given a money pool of 2 zloty. You have to divide this money pool between yourself and the other player proportionally to one of the criteria. You have to make a decision which criterion to use for the division of this money pool. The other player is also given a money pool of her own that also amounts to 2 zloty and will have to make the same decisions as you.*"

Then the subjects were asked to solve a mathematical problem: to approximate a square root of a randomly generated fraction in decimal form in 60 seconds. The calculators and mobile phones were not allowed. The accuracy of the solution from 0% to 100% appeared on the screen after the players entered their answers.

The next screen contained the list of criteria shown in Table 1 where the participants had to make the decision. There was information below the list on the same screen about what outcome each decision would lead to, so the subjects did not have to do any calculations to figure out what decision would lead to what outcome.

Between the first and the second stages of the game, the subjects in each group were informed about what decision the other player made and the outcomes of both players. On the same screen they were explicitly asked to state whether they consider their own division of money and the division of money by the other player fair.

The next screen offered the players an opportunity to reduce the outcome of the other player and own outcome by the same percentage. I avoided the word "punishment" or any other loaded term in the instructions to the punishment stage. At the end of the treatment the players could see how much they earned and how much their winnings and the winnings of the other player were reduced. This treatment was repeated three times generating 72 observations in total. The subjects received the show up fee of 2 zloty in addition to money pools of 2 zloty per player per stage.

The program code used in the experiment is available from author upon request.

3. Results

Below, I show what players considered fair and unfair and what decisions the players tended to punish more. I provide my interpretation of the results and discuss possible implications of the results for theories of fairness and real life situations.

3.1. What is Fair?

"The just cause… is: we did it, therefore it's a just cause." – Noam Chomsky

I start this section with a caveat that the participants in this experiment are not native English speakers and may understand the word "fair" differently. This study is not about linguistics of the word fairness, but about its economic content and consequences.

Out of 72 observations, each strategy, except for 'division according to the place of birth', was played at least 15 times. The players who made the divisions considered each one of those divisions fair at least 72% of the time (Table 2). Interestingly, not all equal divisions were considered fair by either player. A little over 62% of the strategies played were dominant strategies, where the players maximized their outcome. Players considered these dominant strategies fair just as frequently as equal divisions: 73% of the time.

Each strategy was considered fair by the other player about three quarters of the time, even the dominant strategies. The only exception was 'division according to height', which was considered unfair by the other player more often.

There are several ways of looking at the results. On one hand, divisions of money proportionally to effort either put in in the past or immediately are slightly less likely to be considered unfair by either player. However, divisions according to physical and social traits were still considered fair more than half of the time. These results should be taken cautiously because the subjects in this experiment were economics students, who tend to be more comfortable with decisions that maximize profits in experiments (Rubinstein, 2006).

Table 2 – The number and percentage of divisions considered fair (unfair) and punished by each player

	Criterion for division							
	Height (physical trait)	Average grade (past effort)	Equal division	Place of birth (social trait)	Problem solving accuracy (immediate effort)	Total	Dominant strategy*
Number of times played	18	17	15	4	18	72	45
Number of times played, %	25.0	23.6	20.8	5.6	25.0	100.0	62.5
Times considered fair	13	14	11	4	14	56	33
Times considered fair, %	72.2	82.4	73.3	100.0	77.8	77.8	73.3
Times considered **un**fair by the other player	8	4	4	1	4	21	14
Times considered **un**fair by the other player, %	44.4	23.5	26.7	25.0	22.2	29.2	31.1
Times punished by the other player	6	11	12	3	11	43	27
Times punished by the other player, %	33.3	64.7	80.0	75.0	61.1	59.7	60.0
Average punishment by the other player, excluding 0% punishments, % (σ)	56.2 (25.1)	49.5 (31.3)	44.0 (27.9)	30.7 (34.1)	41.3 (27.5)	45.5 (26.7)	42.4 (28.6)

*the strategy leading to the highest outcome regardless of what the other player chooses.

We can conclude with a high degree of certainty that equal outcomes are not always considered fair. Yet, we cannot tell exactly what people mean by the word "fair", as the meaning of the word itself is subjective. In the second stage of the experiment, I measure arguably the most important consequence of unfairness: punishment. Humans are shown to punish unfairness in multiple experiments. Mainstream theories of fairness (Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000) and reciprocity (Falk and Fischbacher, 2006) show that punishment can be a direct consequence of the sense of unfairness. Although, punishment may also be a way to reduce the advantage of the opponent or be purely motivated by spite and anger induced by other factors (Falk et al, 2005). In the design of the experiment, I make an assumption that the decision to punish must be positively correlated with the sense of unfairness. The interpretation of the results are based on this assumption.

Punishments were on average twice as frequent as divisions that subjects considered unfair. Some punishments were as small as 2% and could have been out of curiosity or a mistake (Appendix D). Therefore, I also measured the average size of punishments (Table 2). The frequency and size of punishments of equal divisions support the hypothesis that equal outcomes are not necessarily perceived as fair. This raises a question, however, of whether so many equal outcomes were punished due to concerns for fairness alone.

It could have been that subjects did not understand the instructions correctly or wanted to test what happens if they punish. By looking at the results across each treatment in Table 3, we can see that it is not the case. The frequency of punishments as well as the size of punishments only increases with each treatment.

Table 3 – Divisions considered fair (unfair) and punished across treatments

	I treatment	II treatment	III treatment
Number of observations	24	24	24
Times the strategy played considered fair	18	21	16
Times the strategy played considered fair, %	75.0	87.5	66.7
Times the strategy played considered unfair by the other player	6	6	9
Times the strategy played considered unfair by the other player, %	25.0	25.0	37.5
Times the strategy played punished by the other player	12	15	16
Times the strategy played punished by the other player, %	50.0	62.5	66.7
Average punishment by the other player, excluding 0% punishments, % (σ)	37.5 (18.4)	41.9 (28.9)	54.8 (29.2)

A possible explanation is that the players who got a smaller outcome tried to reduce their disadvantage by reducing both players' outcomes. Falk et al (2005) observed such behavior in their experiment where participants eagerly punished if punishments were more costly to the other player. I measured how many punishments decreased disadvantage for the punishing player and it was around half of all punishments (Table 4). The other half of the punishments either decreased advantage or did not change the difference between outcomes.

Table 4 – Relative frequency and size of punishments that decreased disadvantage between players' outcomes

	I treatment	II treatment	III treatment	Total
Number of punishments by the other player	12	15	16	43
Average punishment by the other player (excluding 0% punishments), %	37.5	41.9	54.8	45.5
Number of punishments that decreased disadvantage	7	10	10	27
% of punishments that decreased disadvantage	58.3	66.7	62.5	62.8
Average punishment that decreased disadvantage, % (σ)	36.4 (18.9)	47.2 (29.4)	55.7 (33.2)	47.6 (28.7)
Total number of situations where one player had a disadvantage	10	12	12	34*

*34 players had advantage, while 4 players had equal outcomes.

3.2. Why Punish Equal Outcomes?

One possible explanation why 80% of equal divisions were punished lies in the design of the game. In ultimatum game experiments the punisher goes last in the sequence and the player who proposes the division cannot punish the punisher. Here, if we assume that each player has her own idea of what is a fair outcome, we must consider that each player also has her own idea of what punishment is fair and what punishment is unjust. If a player perceives the punishment as unfair, logically, she would enjoy punishing the punisher to restore fairness as she sees it. Of course, this would be unfair from the perspective of the other player (initial punisher), who would want to punish again. This string of reciprocal punishments could go on forever unless both players eventually converged on what to consider a fair outcome.

Consider a situation where Player *E* chooses equal outcome and Player *M* chooses to maximize her outcome, yet each player believes that her decision is fair. Both players need to decide simultaneously whether to punish or not. Since each player thinks that her decision is fair, they both will perceive any punishment by the other player as unfair and unjust. If Player *M* believes that Player *E*'s punishment is likely, then Player *M* can punish in advance to mitigate the feeling of being unjustly punished. I describe this idea mathematically in Appendix C.

In a famous quote often ascribed to Oscar Wilde: "*No good deed goes unpunished*", a good deed can be perceived as not a good deed by the punisher, while the punisher may think that she is not a punisher at all, but doing a good (or at least a fair) deed instead.

3.3. Implications for Economic Experiments and Real Life Situations

Many experiments rely on the assumption that equal outcomes are considered fair by all players. The results obtained in our experiment do not necessarily make the experiments that rely on such assumption inaccurate, but provide a warning that different conceptions of fairness may influence the decisions of subjects. Consider a classic ultimatum game, where player 1 has to divide a sum of money between herself and player 2 and player 2 can either accept or reject the division. Rejection results in both players getting nothing. A vast body of empirical research shows that offers below 40% are often rejected (Fehr and Schmidt, 1999; Nowak et al, 2000; Henrich et al, 2001; Sanfey et al, 2003). The decisions to reject are commonly attributed to the player's desire to punish the unfairness of inequitable outcomes. By the same reasoning, the players who accept inequitable outcomes are assumed to have

lower preference for fairness. Our experiment shows that some of the players who accept (do not punish) unequal outcomes may in fact consider the unequal outcomes perfectly fair. If a player is able to put herself in the proposer's shoes and realize that she would divide the money in her favor AND consider this division fair, then it is possible that she views the proposer's unequal division as fair as well.

Situations where concerns for fairness and equality play a role in decision making are ubiquitous in human society. Below I discuss several cliché situations where fairness and equality may come in conflict.

3.3.1. Immigrant Employee versus Local Employee

In an increasingly globalized and unequal world, the issues of migration and employment remain acute. Is it fair for the immigrant employees to have equal rights and benefits as the local employees? One of the criteria for dividing money in our experiment is being born locally (Table 2). Despite having very low number of observations, it is clear that those who chose this criterion consider it fair, while some non-locals consider it unfair and punish locals given the opportunity. It is also interesting that it was a very infrequent decision. The four players who chose being local as a criterion for money division did not have a better strategy to play. Any other division (according to height, average grade, or problem solving accuracy) led to a worse outcome for these players.

3.3.2. Capitalism versus Socialism (or Communism)

Arguably, the most hotly debated issue in politics is what is fairer: capitalism or socialism. Logically, this debate exists because populations are divided on the issue. Socialists advocate more equal division of outcomes and opportunities, while capitalists argue that equality of at least outcomes is not fair at all. Our experiment shows that fairness is hardly an argument in debates for equality. Equal outcome was chosen only in 15 out of 72 observations, was considered unfair approximately by a quarter of subjects on either side of the division, and was punished 80% of the time (Table 2). Perhaps, if this experiment were conducted in one of the communist states, the results would differ dramatically.

3.3.3. Large Territory versus Large GDP

In geopolitics, countries divide various resources, spheres of influence, and many other benefits. These benefits can be divided equally, like voting rights in the United Nations General Assembly, or proportionally to one of the criteria, like spheres of political influence between superpowers. Consider two hypothetical superpowers, one geographically larger but poorer state, and the other is a smaller state with much higher GDP. Both states are looking to divide spheres of political influence and have three choices: to divide equally, proportionally to the geographical size of the countries, or proportionally to their GDPs.

One should be cautious extrapolating results of a small experiment with individual subjects onto large states, but there are plenty of countries in the world where one autocratic leader is in a position to individually make geopolitical decisions. The results of our experiment suggest that dividing the powers equally would be the worst possible decision. Such decision will not lead to the highest outcome, about as likely to be perceived unfair as the other decisions, and may still be followed by a punishment. It is also naïve to assume that the other side will perceive any one state's decision as fair. For example, dividing the power according to GDP may seem like a fair choice to one state, but the other state's leadership should not be expected to share the same fairness conceptions.

3.3.4. Thief versus Rich Person

There is a very common situation where equal outcomes are often punished. Consider a decision by a poor person to steal from a rich person. The motivation of a poor person is to take enough from a rich person to enjoy equal lifestyle with the rich person. Assuming both players had equal chance of being born rich or poor and put the same amount of effort throughout their lives, the resulting outcomes of such theft can be perceived as equal. Most societies throughout human history considered such "equal outcome" to be unfair and punished a person, a thief, whose decision led to this equal outcome. Yet some thieves and even social groups consider the inequality-reducing outcome resulting from theft to be fair and deserving of praise rather than punishment. A testament to this paradox is the popularity of the tale of Robin Hood, who notoriously steals from the rich and gives to the poor.

4. Conclusions

The concept of fairness revolves around the notion of equality. The difference between outcomes is easy to measure mathematically and it is often used as a measure of fairness in different theories and experiments. However, not everyone may consider equal outcomes fair. I conduct an experiment using a two-player game where players have to divide two equal pools of money. Then players are given an opportunity to impose a costly punishment upon each other. In the experiment the subjects are also asked whether they consider own decision and the decision of the other player fair.

The results show that subjects do not always consider equal outcomes fair. In addition, equal divisions of money in the experiment are followed by punishment 80% of the time. Due to a low sample size, we cannot definitively conclude that equal outcomes are punished with a specific frequency, but we certainly observe that such punishments occur.

Given a symmetric game structure where players have equal opportunities, the maximization of profit appears to be just as fair of a strategy as splitting money equally. The players who played the dominant (profit maximizing) strategy did not face the punishment more often than those who decided to divide the money equally. Such punishment pattern may influence the decisions of players in the simpler ultimatum and dictator games, although it cannot be directly observed in these games.

Results of my research are generally consistent with empirical observations (Baumard et al (2012); Houser et al (2012); Castelli et al (2014); Durante et al (2014); Figueiredo and Netto (2014)) and theories (Roemer (1998); Devooght (2008); Fudenberg and Levine (2012)) that take into account multiple factors and circumstances when defining fairness. Studies that assume fair outcomes to be equal or the most equal of all available options are shown to have a drawback. A participant in such study may actually have strong aversion to unfairness, but still choose an inequitable outcome because she perceives it to be perfectly fair.

Conducting a similar experiment with a larger sample using other criteria for division, such as race, gender, religion, and various performance and contribution measures, can be an interesting avenue for future research. Also, a more in-depth study of each trait and circumstance as a criterion for fair division of rewards between individuals, at a workplace, or within a society can provide useful insights into economic behavior.

Acknowledgements

I gratefully acknowledge support and funding of this research by the Faculty of Economics of Maria Curie-Sklodowska University. I would like to thank Anna Rakowska, Zbigniew Pastuszak, Taras Bondarenko, Pawel Pasierbiak, and Magdalena Kondas for their assistance in organizing the experiment.

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Appendix A

There are two players in the game, player 1 and player 2. Both players divide their respective money pools granted to them: player 1 divides Π_1 and player 2 divides Π_2. The pools of money are of equal size: $\Pi_1 = \Pi_2$.

The strategy set of player 1 is $S_1 = \{H_1, C_1, G_1, K_1, E_1\}$ and the strategy set of player 2 is $S_2 = \{H_2, C_2, G_2, K_2, E_2\}$. Descriptions of each strategy can be found in Table 1.

The outcome of each strategy for player 1 consists of two parts: money from player 1's division of her money pool and money from player 2's division of his money pool allocated to player 1. The set of outcomes for player 1 is $O(S_1, S_2)$ and it consists of subsets $o^1_{S_n}$ and $o^1_{S_n}$ that are added together:

$$O(S_1, S_2) = o^1_{S_n} + o^1_{S_n} \tag{A.1}$$

$o^1_{S_n}$ is a share of player 1's money pool Π_1 that she receives for choosing one of her strategies from her strategy set S_1:

$$o^1_{S_n} = \{o^1_{H_n}, o^1_{C_n}, o^1_{G_n}, o^1_{K_n}, o^1_{E_n}\} \tag{A.2}$$

$o^1_{S_n}$ is a share of player 2's money pool Π_2 that player 2 gives to player 1 by playing one of the strategies from his strategy set S_2:

$$o^1_{S_n} = \{o^1_{H_n}, o^1_{C_n}, o^1_{G_n}, o^1_{K_n}, o^1_{E_n}\} \tag{A.3}$$

Note that the superscript indicates the player who receives the share of the money pool, not the power. For example, if player 1 chooses the strategy *H*, her money pool will be divided proportionally to each players' height between player 1 and player 2 according to equation (A.4).

Each element of sets $o^1_{S_n}$ and $o^1_{S_n}$ are defined by equations below (A.4-A.13). Some equations are followed by comments for easier interpretation.

$$o^1_{H_n} = \begin{cases} 0 & if\ h_1 = h_{min}\ and\ h_2 > h_{min} \\ \Pi_1 & if\ h_2 = h_{min}\ and\ h_1 > h_{min} \\ \Pi_1/2 & if\ h_1 = h_2 \\ \left(\frac{h_1 - h_{min}}{h_1 + h_2 - 2h_{min}}\right)\Pi_1 & if\ h_1 \neq h_2, h_1 \neq h_{min}, h_2 \neq h_{min} \end{cases} \tag{A.4}$$

h_1 is player 1's height, h_2 is player 2's height, and h_{min} the lowest possible height of any player who may take part in the experiment. I set h_{min} arbitrarily at $h_{min} = 100$ centimeters. The purpose of the minimum parameters is to increase the dispersion of outcomes when the players have similar height or another trait. Special cases for $h_1 = h_{min}$, $h_2 = h_{min}$, and $h_1 = h_2$ are to avoid division by zero.

$$o^1_{H_2} = \begin{cases} 0 & if\ h_1 = h_{min}\ and\ h_2 > h_{min} \\ \Pi_2 & if\ h_2 = h_{min}\ and\ h_1 > h_{min} \\ \Pi_2/2 & if\ h_1 = h_2 \\ \left(\frac{h_2 - h_{min}}{h_1 + h_2 - 2h_{min}}\right)\Pi_2 & if\ h_1 \neq h_2, h_1 \neq h_{min}, h_2 \neq h_{min} \end{cases} \tag{A.5}$$

$$o_{C_2}^1 = \begin{cases} 0.25\Pi_1 & if\ c_1 = 0\ and\ c_2 = 1 \\ 0.75\Pi_1 & if\ c_1 = 1\ and\ c_2 = 0 \\ \frac{\Pi_1}{2} & if\ c_1 = c_2 \end{cases} \quad (A.6)$$

c_1 and c_2 are discrete variables. $c_1, c_2 \in \{0,1\}$. If player 1 possesses a certain social trait (born local in this case), then $c_1 = 1$, if not then $c_1 = 0$. The same pattern applies to c_2 for player 2.

$$o_{C_2}^1 = \begin{cases} 0.25\Pi_2 & if\ c_1 = 0\ and\ c_2 = 1 \\ 0.75\Pi_2 & if\ c_1 = 1\ and\ c_2 = 0 \\ \Pi_2/2 & if\ c_1 = c_2 \end{cases} \quad (A.7)$$

$$o_{G_2}^1 = \begin{cases} 0 & if\ g_1 = g_{min}\ and\ g_2 > g_{min} \\ \Pi_1 & if\ g_2 = g_{min}\ and\ g_1 > g_{min} \\ \Pi_1/2 & if\ g_1 - g_2 \\ \left(\frac{g_2 - g_{min}}{g_1 + g_2 - 2g_{min}}\right)\Pi_1 & if\ g_1 \neq g_2, g_1 \neq g_{min}, g_2 \neq g_{min} \end{cases} \quad (A.8)$$

g_1 and g_2 are average grades of player 1 and player 2 respectively on the scale from 60 to 100. They represent efforts put in by the players in the past. The minimum average grade is $g_{min} = 60$. It is the minimum passing grade for the subjects.

$$o_{G_2}^1 = \begin{cases} 0 & if\ g_1 = g_{min}\ and\ g_2 > g_{min} \\ \Pi_2 & if\ g_2 = g_{min}\ and\ g_1 > g_{min} \\ \Pi_2/2 & if\ g_1 = g_2 \\ \left(\frac{g_2 - g_{min}}{g_1 + g_2 - 2g_{min}}\right)\Pi_2 & if\ g_1 \neq g_2, g_1 \neq g_{min}, g_2 \neq g_{min} \end{cases} \quad (A.9)$$

$$o_{K_2}^1 = \begin{cases} 0 & if\ k_1 = k_{min}\ and\ k_2 > k_{min} \\ \Pi_1 & if\ k_2 = k_{min}\ and\ k_1 > k_{min} \\ \Pi_1/2 & if\ k_1 = k_2 \\ \left(\frac{k_1 - k_{min}}{k_1 + k_2 - 2k_{min}}\right)\Pi_1 & if\ k_1 \neq k_2, k_1 \neq k_{min}, k_2 \neq k_{min} \end{cases} \quad (A.10)$$

k_1 and k_2 show the accuracy of solutions to the mathematical problem presented to the students during the experiment. It represents the immediate effort put in by the students. k_{min} is the minimum possible accuracy and it equals to zero. $k_1, k_2 \in [0,1]$.

$$o_{K_2}^1 = \begin{cases} 0 & if\ k_1 = k_{min}\ and\ k_2 > k_{min} \\ \Pi_2 & if\ k_2 = k_{min}\ and\ k_1 > k_{min} \\ \Pi_2/2 & if\ k_1 - k_2 \\ \left(\frac{k_2 - k_{min}}{k_1 + k_2 - 2k_{min}}\right)\Pi_2 & if\ k_1 \neq k_2, k_1 \neq k_{min}, k_2 \neq k_{min} \end{cases} \quad (A.11)$$

$$o_{E_2}^1 = \Pi_1/2 \quad (A.12)$$

$$o_{E_2}^1 = \Pi_1/2 \quad (A.13)$$

$o^1_{E_1}$ and $o^1_{E_2}$ are parts of the player 1's outcome of the equal division of money pools by player 1 and player 2 respectively.

The game is symmetrical so the outcomes for player 2 are given by the same functions where players are reversed.

Appendix B

Stage 2 of the game is a subgame that takes place right after stage one. There are the same two players in the game: player 1 and player 2. Player 1 chooses to reduce both players' outcomes by any amount from 0 to 100%. Player 2 makes the same decision simultaneously. Payoffs in the entire game for player 1 and player 2 are $u_1(S_1P_1, S_2P_2)$ and $u_2(S_2P_2, S_1P_1)$ respectively:

$$u_1(S_1P_1, S_2P_2) = O(S_1, S_2)(1 - P_1)(1 - P_2) + u_{g_1} + u_{p_1}$$

$$u_2(S_2P_2, S_1P_1) = O(S_2, S_1)(1 - P_1)(1 - P_2) + u_{g_2} + u_{p_2}$$

where:

$O(S_1, S_2)$ is the outcome of the first stage of the game for player 1, who plays a strategy from strategy set S_1 against player 2's strategy from her strategy set S_2;

P_1 and P_2 are punishments of player 1 and player 2 respectively and P_1, $P_2 \in [1,0]$;

u_{g_1} is utility of fairness of player 1, u_{p_1} is utility of punishment of player 1.

u_{g_1} and u_{p_1} are non-monetary terms, which we cannot directly observe but I assume they exist. Players are also assumed to be rational and maximizing their payoffs.

Appendix C

Appendix C logically stems out of Appendix A and Appendix B and shares the same variables.

Utility of fairness (u_{g_1}) is a function of outcomes of both players (O_1 and O_2) and the average of their outcomes ($\bar{O}$) in line with theories of fairness and reciprocity by Fehr and Schmidt (1999), Bolton and Ockenfels (2000), and Falk and Fischbacher (2006): $u_{g_1}(O_1, O_2, \bar{O})$, where $O_1 = O(S_1, S_2)$ and $O_2 = O(S_2, S_1)$ as defined in (A.1).

The utility of punishment (u_{p_1}) is positively influenced by unfairness (negative u_{g_1}) and preference for spiteful punishment (Falk et al, 2005) when it reduces the difference between the smaller outcome of player 1 and bigger outcome of player 2: $\delta_1 = O_1 - O_2$, where δ_1 is the preference for spiteful punishment of player 1.

I also include preference for *reciprocal punishment* (ϑ_1) in u_{p_1}:

$$u_{p_1}(u_{g_1}, \delta_1, \vartheta_1)$$

In our experiment, both players have an opportunity to punish, but they have to do it simultaneously. In case when players' conceptions of fairness differ and player 1 perceives the punishment by the player 2 as unfair, while the player 2 perceives this punishment as perfectly fair, player 1 may enjoy reciprocating with the punishment of her own. The preference for reciprocal punishment is:

$$\theta \begin{cases} = 0 & if\ f_1 + f_2 = 0 \\ > 0 & if\ f_1 + f_2 \neq 0 \end{cases}$$

where $f_1, f_2 \in [-1,1]$ are fairness terms for player 1 and player 2 respectively.

If $f_1 < 0$, then the outcome of player 1 is perceived as unfairly small by player 1; if $f_1 = 0$, then the outcomes of both players are perceived as fair by player 1; if $f_1 > 0$, then the outcome of player 2 is perceived as unfairly small by player 1.

Although the punishments are simultaneous, it is enough for player 1 to believe that player 2 will consider player 1's "fair" strategy as unfair to have a positive preference for reciprocal punishment, assuming player 1 does not like being unfairly punished.

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